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THE *SUMMA PERFECTIONIS*  
OF PSEUDO-GEBER

A CRITICAL EDITION,  
TRANSLATION AND STUDY

BY

WILLIAM R. NEWMAN



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This book is dedicated to my wife,  
Marleen Rae Lipsick,  
without whose aid it could not have been completed.

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## *Foreword*

Despite the pioneering efforts of recent scholarship, the historiography of medieval alchemy remains a veritable *terra incognita*. Any gap in our historical knowledge is of course a loss, but the discipline of alchemy and its position in the world of medieval culture are of particular interest, since the questions surrounding alchemy allow us an unusual insight into the learned mentality of the Middle Ages.

The subject of alchemy provided medieval thinkers with a focus uniquely suited to the issue of human creation. To the conservative, alchemy seemed to arrogate the power of divinity itself in its claim that man could replicate the products of nature by means of art. At the same time, the craft orientation of alchemical practice was ill suited to the abstract character of the medieval university curriculum. Some scholastics took the view that alchemy was a pure technology, an *ars mechanica*, and hence unworthy of inclusion in a curriculum devoted to the study of *scientiae*.

Neither of these problems was resolved in the Middle Ages, but it can be said with certainty that their consideration reached a sort of crisis at the end of the thirteenth century and the beginning of the fourteenth. Alchemy fell under increasing censure during this period, and alchemical writers felt themselves compelled to include ever more space to the defense of their art. Around the end of the thirteenth century, at the height of this debate, a text appeared that would soon be acknowledged as a classic. I refer to the *Summa perfectionis* of "Geber," to which the present study is dedicated.



The appearance of the *Summa perfectionis* was pivotal in several respects. As a *summa*, a systematic compendium, the work provided a comprehensive overview of alchemical practices and theories current in the late Middle Ages. At the same time, it related a long series of arguments defending alchemy against its detractors. More than that, however, the *Summa* attempted to rationalize the practice of alchemy, by making its procedures conform to the processes of nature herself. According to the *Summa*, the alchemist should copy the generative methods of the natural world whenever it is possible to do so. By this means he will reproduce a genuine natural product rather than a mere superficial imitation.

This doctrine led the *Summa* ineluctably to the conclusion that the alchemist - in *transmuting* metals - must use the very materials that nature does in *forming* those metals - namely mercury and sulfur. As we shall see, this in turn was an epoch-making conclusion, for the so-called "mercury alone" theory, the dominant alchemical doctrine of the fourteenth century, found its basis in the *Summa's* theory of transmutation. For these reasons and others, a combined edition, translation, and study of the *Summa perfectionis* is a desideratum. The present work will approach the *Summa perfectionis* in a series of analytical chapters, each dealing with a specific topic. The general reader will no doubt find much that is tedious in chapters two, five, six, and seven, where the bulk of the textual criticism is contained. Unfortunately, the scholarly study of alchemy is still in such a state that even the most innocuous conclusions must be checked and double-checked against various manuscripts in order to assure their correctness. The printed editions of alchemical texts stem primarily from the sixteenth and seventeenth centuries, when editorial techniques were still in their infancy and even then unevenly applied. To the general reader I apologize for this painstaking method, but in a word, there is no other way to arrive at even relative certitude. If

these arguments prove too tedious, I suggest that the reader merely skim their conclusions and pass to the more theoretical material contained in chapters one, three, and four.

Let us here briefly outline the structure of the book. Chapter one contains a description of the alchemical debate from its inception in the medieval West until the beginning of the fourteenth century. Chapter two describes and attempts to resolve the so-called "Geber-problem," the complex of difficulties surrounding the identity of the *Summa's* author. Having shown in that chapter that the author was in all probability one "Paul of Taranto," we then describe the bases of his mineral science in chapter three. Chapter four, on the other hand, focuses on the matter theory of the *Summa*. As we shall see, the *Summa* embodies a consistently corpuscular view of the micro-structure of metals and of minerals in general. Our chapter four attempts to explicate this theory and to place it within its medieval context. Chapter five, on the other hand, is a brief and sketchy overview of the immense influence exercised by the *Summa* in the late Middle Ages.

With chapter six we enter directly into the textual problems presented by the *Summa* itself. This chapter presents an analysis of the sources used in the *Summa*, a task rendered quite difficult by the fact that these sources remain unnamed in the text itself, nor are they precisely quoted. Following this analysis, the reader will find a discussion of the manuscripts used in our critical edition of the *Summa*, in chapter seven. Here we provide a list of known *Summa* manuscripts, an analysis of the families of the manuscripts used in the present edition, and a brief codicological analysis of those manuscripts.

After the edition itself comes an English translation, accompanied by critical notes. The reader may find my translation of the *Summa* to be somewhat inelegant in style. I have chosen to translate as literally as possible in order to retain the exact meaning

of the numerous technical terms and arguments found in the text. It is to be hoped that whatever the translation may have lost in verbal polish it will regain in concision of meaning.

#### *Acknowledgements*

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## CHAPTER ONE

### *I. Introduction. Alchemical Debate in the Thirteenth Century: The Defense of Art*

The discipline called alchemy first made its appearance in the Latin West around the mid-twelfth century, when Robert of Ketton translated the *De Compositione alchemiae* of Morienus from Arabic into Latin.<sup>1</sup> Between the time of Robert's translation and the end of the fourteenth century, a massive quantity of alchemical literature had appeared in Latin, much of it original in character.<sup>2</sup> Yet the university curricula of the Middle Ages did not choose to incorporate alchemy, nor did any institutes of higher learning teach it until the scientific revolution. Furthermore, by the end of the thirteenth century a general backlash had been generated against this discipline, with mainstream scientific and religious authorities agreeing as to its perniciousness.<sup>3</sup> Who then were the practitioners of alchemy and what were they trying to accomplish?

In this introduction we shall show that alchemists and their supporters, while justifying this discipline before its opponents, gave a conscious and articulate defense of technology, indeed, one of the earliest and most thorough to be found in Latin Christendom. In addition to introducing a great deal of mineralogical and experimental material to the Occident - themes which we shall concern ourselves with later - the alchemists were truly among the first technological apologists in the Western world. We shall focus on a body of literature largely ignored by previous historians: our analysis must therefore be viewed as a voyage of discovery rather than one of siege and conquest. The texts to be discussed make up a disputation literature that may justly be called the "alchemical debate" of the late Middle Ages, although this

debate was not really resolved until the university of the scientific revolution incorporated chemistry as a part of its curriculum.

## II. The Early Thirteenth Century

Our story begins with the English translator Alfred of Sarsel, who around 1200 translated a meteorological section of Avicenna's (980-1037) *Kitāb ash-Shifā'*, and inserted it into the fourth book of Aristotle's *Meteors*, already translated by Henricus Aristippus.<sup>4</sup> This short text, which came to be known in Latin as *De congelatione et conglutinatione lapidum*, immediately acquired the authority of a genuine Aristotelian production, since it appeared to be the conclusion of the *Meteors'* fourth book.<sup>5</sup> The *De congelatione* contains a description of geological processes that include the formation of the known metals - gold, silver, copper, tin, lead, and iron. Following the doctrines of Arabic alchemy, Avicenna asserts that these six are composed of mercury (mercury is not considered a metal, but rather a metallic component) and sulfur in varying quantities and degrees of purity. It therefore comes as something of a shock when Avicenna proceeds to denounce the doctrine of metallic transmutation, upon which alchemical practice is based. The immense influence of the *De congelatione* upon the history of chemistry will make it necessary for us to quote Avicenna's attack below, as translated from the Latin of Alfred:

Artificers produce a solidification quite similar <to that of the metals> artificially, although artificial things are not like natural ones, nor so certain, even though they may be likenesses. Hence it is believed that natural composition comes about in this way or in a way similar to this. But art is weaker than nature and does not equal it, however much it labor. Whence the artificers of alchemy should know that the species of the metals cannot be transmuted. They can however make likenesses and tint red with yellow, so that it seem gold, and tint white with whatever color they want, until it be very similar to gold or copper. They can also remove the dirtiness of lead, but it will always be lead.

Although it may seem silver, yet other qualities will obtain in it, so that men err in this, such as those who take salt and sal ammoniac. In addition, I do not believe that the specific <i.e. species - determining> difference may be removed by any ingenious technique, because it is not due to such that one complexion is changed to another, since these sensible things are not <those> by which species are mutated, but are accidents and properties. For the <specific> differences of the metals are not known, and since the difference is not known, how will it be possible to know whether it is taken away or not, or how it could be taken away? But the stripping off of accidents within, such as taste, color, weight, or at least their diminution, is not impossible, for there is no argument against this. In addition, the proportion of composition of these substances will not be the same in all. Therefore one composite will not be able to be transmuted into the other unless perhaps it be reduced into the prime matter and thus be permuted into something other than what it was before. But this does not occur by means of liquefaction alone; rather, certain extraneous things befall it as a result of this.<sup>6</sup>

Avicenna's arguments remain perspicacious despite the vagaries of translation and an uncritical text. His main points may be summarized as follows:

- 1.) Artificial and natural products are intrinsically different. Art is inherently inferior to nature, and cannot hope to equal it. Therefore artificers cannot change an inferior metal to a better one, although they can produce passable imitations of the precious metals by inducing superficial characteristics.
- 2.) The true species determining characteristics of metals cannot be known, since these subsist beneath the level of sense. Since these specific differences are unknown it will be impossible to bring about the transmutation of one metal into another, for the alchemist cannot manipulate what he does not know.
- 3.) Accidental properties, nonetheless, such as taste, weight, and color, may be removed and replaced at will.
- 4.) The relative proportion of components in a given metal will be different from that in another metal. Therefore it will only be possible to transmute one metal into another by transmuting the components themselves of the metals, and this can only be

achieved if the metals can be reduced to the prime matter. Simple fusion, however, does not bring about such a reduction; it simply imposes another set of accidental properties.

It may be tempting for the modern reader to view Avicenna's rejection of alchemy as a forward-looking event which foreshadowed the weaning of chemistry from the "irrational" doctrines of alchemy. A closer look will reveal, however, that it was Avicenna, and not the alchemists, who held reactionary views. Avicenna begins his attack with the "self-evident" assertion that natural products are intrinsically superior to their artificial counterparts, and that the latter cannot possibly match up to the naturally-occurring exemplars of which they are copies. As a modern commentator of the *De congelatione* has remarked, Avicenna would have been on the side of "the general public <today>, who usually imagine that synthetic indigo, for example, is not veritable indigo, but only a very good imitation."<sup>7</sup>

It is important to note that Avicenna takes a considerably stronger position on the schism between artificial and natural products than did Aristotle. In the *Physics* (ii. 8, 199a), Aristotle allows art either to mimic nature or to progress beyond her, though he does not assert that all natural products can be replicated by man. As he says in the Venice edition of 1562 -

One sort of art perfects that which nature cannot complete, while another sort imitates nature.<sup>8</sup>

One almost gets the impression that a personal experience with alchemical counterfeiters led Avicenna to his disdain for human art, as expressed in the *De congelatione*. Whatever the sources for his view, it constituted an attack not on alchemy alone, but on the totality of technology and applied science, since any art, according to the *De congelatione*, is inferior to nature.

Avicenna's denial that man can change species-determining characteristics, which we shall henceforth refer to as the medieval

did, by its introductory phrase "Sciunt artifices," was, like his belief that natural products are better than artificial ones, an affront to technology in general, since it limited all artificial change to the manipulation of superficial accidents. It is difficult to ascertain the degree to which Avicenna intended his doctrine of intransmutability of species to be transferred to other realms of technology beyond chemistry. Whatever his ultimate intentions may have been, the alchemists' counter-arguments against the *De congelatione* forced them to adopt a radical view of technology, in which man assumed extraordinary power over nature. Centuries before the Baconian philosophy of nature with its Draconian decree to "put nature to the rack," we find protagonists of alchemy asserting that man's ability to transform the natural world is virtually unbounded.<sup>9</sup> Their justification of human art was not based on vague optimism, however; it was supported by practical observation, analogical reasoning, and a Neoplatonizing Aristotelianism.

Let us therefore glance at the alchemists' rebuttal to the *De congelatione*. Perhaps the most sustained defense of alchemy that the Late Middle Ages produced was the *Margarita pretiosa* written by Petrus Bonus of Ferrara.<sup>10</sup> This weighty tome, occupying eighty double columns in J.J. Manget's *Bibliotheca chemica curiosa*, was composed between 1330 and 1339; thus it is too late to shed much light on the alchemical debate of the thirteenth century.<sup>11</sup> Nonetheless, Bonus is quite faithful in citing his sources; hence we may be able to learn something of previous alchemical disputation by examining the sources of the *Margarita*. In the second chapter, Bonus complains that he has never encountered a defense of alchemy, because -

...it has always been the custom to make arguments for the purpose of destroying this art, but no one has attempted to support it, due to the difficulty <thereof>....<sup>12</sup>

Thus we might expect Petrus to have drawn solely on negative arguments, and to have constructed his own affirmative ones, which is undoubtedly what he would have liked us to believe. Another passage from the *Margarita* belies this expectation, however, for here Petrus admits that -

Certain alchemists, such as Geber and Morienus, have disputed <the question of alchemy> in their alchemical <texts>, as it were supporting this, but briefly and obscurely arguing partly against it and solving these arguments, while only adducing certain examples in favor of the affirmative, and supporting it by means of analogical speeches and metaphors, <thus> teaching it to be wholly true.<sup>13</sup>

If we now turn to Bonus's arguments against alchemy, it becomes at once apparent that many of them derive from the *Summa perfectionis* of pseudo-Geber, which will be the main focus of this book.<sup>14</sup> The same may be said for Petrus's affirmative responses, though here he has perhaps used more of his own material.<sup>15</sup> It is certain then that Bonus's citation of Geber as a defender of alchemy refers to the *Summa perfectionis*. But what of his claim that Morienus wrote an alchemical disputation?

At first one might think that Bonus here refers to the *De compositione alchemiae*, the oldest dated text of alchemy in Latin, to which we alluded at the beginning of this chapter. The *De compositione* after all contains a long section of *Interrogations and Responses* between Calid, king of the Egyptians, and the hermit Morienus.<sup>16</sup> This, however, is no debate on the issues raised by Avicenna, but a pious recitation of truths enunciated by the master to his willing novitiate. Furthermore, a number of Bonus's arguments are not to be found in the *De compositione* at all, but belong to a different source. Since some of these bear on the meaning of the term "alchemy," it will be appropriate if we transmit the first of them here. In chapter three, for example, Petrus says -

<according to> Morienus and the *Lilium*, alchemy is an attendant art, pertaining to the essence of the seven metals and teaching how their forms may be led from incompleteness to their natural goal.<sup>17</sup>

By good fortune, Petrus has given us not only a succinct definition of alchemy, but the very *incipit* of the text from whence he extracted it. "Alchimia est ars ministralis" (TK 76) forms the opening verse of a short *Liber Hermetis* found in a number of early manuscripts, and previously unnoticed by historians. "Hermes" was of course a popular pseudonym among medieval alchemists. This particular *Book of Hermes* is quite different from others, however, in its rigorously disputational style, as we shall see.

But if the text belonged to Hermes, why has Petrus ascribed it to Morienus? The answer is readily extracted from the manuscripts. The Hermes text, as it appears in Trinity College Cambridge 1400 (ff. 131r-132v) directly precedes the *Interrogations and Responses* of Morienus (133r-140v). Although the title of the Morienus work is clearly marked, the Hermes text is here anonymous.<sup>18</sup> If we now turn to another manuscript of about the same age as Trinity 1400, *Bibliothèque nationale latin* 6514, we again find the Hermes text (ff. 135r-135v) directly before that of Morienus (ff. 135v-137v). Here, however, a new title has been added before the Hermes text - "Incipit liber Morieni philosophi ad regem Khalid." Hence an unknown scribe has subsumed the sometimes anonymous *Liber Hermetis* into the *Interrogations and Responses*. As the following parallel citations will show, there can be no doubt that Petrus has used a version of the *Interrogations and Responses* containing the *Liber Hermetis*, like that of BN 6514:

*Margarita*, 25A

Et Morienus: Quicumque  
igitur hanc artem  
sectatur, caeteras et  
praecipue dialecticam

<*Liber Hermetis*>

BN 6514, 135v

Quicumque  
hanc artem  
sectatur ceteras et  
praecipue dyalecticam

scire  
convenit, quoniam  
philosophi huius artis  
non nisi sub involucro  
et figura locuti sunt.

scire  
convenit.  
Auctores enim huius  
per involucrum  
locuti sunt.

Fourteen pages later, we encounter another extract -

*Margarita*, 39A

Unde Morienus laudans  
finem eius dicit:  
Utilitas huius artis  
duplex est: Nam et  
animam, dum recte fit,  
felici iucunditate  
decorat,  
et corpus a paupertate  
liberat.

<*Liber Hermetis*>  
BN 6514, 135v

Utilitas huius artis  
duplex est, nam et  
animam dum ista sit  
multimoda iucunditate  
donat  
et corpus servitute  
liberat.

The small differences between Petrus's quotations and the *Liber Hermetis* are nothing more than textual variants, as the otherwise striking agreement will testify.

The reader may justly ask why we have occupied this space proving that Petrus used the *Liber Hermetis*, thinking it to be a part of the *Interrogations and Responses* of Morienus. Our excuse is that Petrus, as we already mentioned, claims that he found arguments for alchemy in only two sources, one of which we identified as the late thirteenth century *Summa perfectionis* of pseudo-Geber. The other source, as the reader will see, was the *Interrogations and Responses* of Morienus, or rather the *Liber Hermetis* incorporated within it. Before proceeding to the disputation proffered by the *Liber Hermetis*, however, it will be useful to show that the *Liber Hermetis* predates the *Summa*, and in fact contains one of the earliest alchemical disputations in Latin.

A quick glance at the known manuscripts of the *Liber Hermetis* reveals at least four from the late thirteenth or early fourteenth century, and two more that are definitely fourteenth

century products.<sup>19</sup> Thus the Hermes text was probably circulating during the thirteenth century. This, however, does not allow us to assert that it predates the *Summa*, for that text too was very possibly in use before the end of the thirteenth century, as we shall show in a later chapter.

In order to determine the approximate date of the *Liber Hermetis*, we must therefore examine its sources. The text mentions three works from which its author has drawn - a *Liber minerarum* (in BN 6514, f. 135r), a *Liber Ycir* <i.e. "Elixir"> (135r), and a *Liber testimonii* (135v). Unfortunately, "Hermes" mentions no authors for these texts, and gives no quotations therefrom. Lacking any further knowledge of these sources, we must therefore give an argument from silence. Since the *Liber Hermetis* makes no use - stated or implicit - of the sources that Albertus Magnus employed in his *De mineralibus*,<sup>20</sup> Vincent of Beauvais in his *Speculum naturale* and *Speculum doctrinale*,<sup>21</sup> or Roger Bacon in his *Opus minus* and *Opus tertium*,<sup>22</sup> we may conservatively argue that the *Liber Hermetis* was in existence before the middle of the thirteenth century.

Furthermore, the *Liber Hermetis* makes no direct quotation of the Latin *De congelatione*: it gives the arguments of Avicenna in quite different language than that of Alfred of Sareshel, even neglecting to quote the famous broadside "Sciart artifices alkimie species metallorum transmutari non posse." The absence of recognizable Latin sources and the palpably early date of the *Liber Hermetis* make it impossible, in fact, to rule out the possibility that the work is a translation from Arabic, though no clear evidence forces us to that conclusion. At any rate, its rebuttal of Avicenna is among the earliest to have entered the world of Latin Christendom, and therefore merits our present consideration.

Indeed, this *Liber Hermetis* may perhaps have formed one of the sources of the *Summa*, although the argument cannot be made

with certainty. What is clear, nonetheless, is that the *Liber Hermetis* is a work whose interest should exceed that of the narrow specialist, as it contains a series of arguments radically defending the role of human technology in a wide range of fields. If it is indeed one of the *Summa's* sources, then it may be said that the *Liber Hermetis* was the opening salvo in the fusillade of pro-alchemical rebuttals to Avicenna that populate the thirteenth and fourteenth centuries.

We shall here give our translation of Hermes's arguments, based on a transcription of BN lat. 6514, 135r-135v, and corrected with the aid of Trinity College 1400, 131r-133r, and B.M. Add. 41486, 218r-222r. The Latin may be found in Appendix II of this chapter.

*Extracts from the "Book of Hermes"*

[BN lat. 6514, 135 v]

1. Metallic bodies, inasmuch as they are works of nature, are natural, but human works are artificial and not natural.
2. Likewise the components of the respective metals are determinate according to their quantity, which quantity is unknown to mortals. Hence the latter cannot fabricate the former.
3. Likewise the place of their generation is the center of the earth, just as the place of an animal's fetus is the womb. Hence, just as the fetus is not generated except in an animal's womb, so metals are not <generated> except in the center of the earth.
4. Likewise metals have a determinate time in which they must be generated, but that <time> is unknown to men. Therefore men do not know how to make them.
5. Likewise metals differ in species. Hence in the same way that an ass is not generated from a man, metals are not generated from different metals.
6. Likewise it happens that <alchemists> transmute their colors, but fire dissolves these transmutations. Therefore they are transmuted in vain.
7. Likewise philosophers, if they knew this art to be true as other arts are, would have taught it as other arts.
8. Likewise, the followers of <this art> have no certain authority, but only old papers and glib fables, for example, "a certain man related to me, 'take such and such, add such to such, and such will be produced from such.'"
9. Likewise, if this art were true, it would not have been hidden to such a degree, especially having been sought for so long with so great intent.

<Responses>

1. But human works are variously the same as natural ones, as we will show in fire, air, water, earth, minerals, trees, and animals. For the fire of natural lightning and the fire thrown forth by a stone is the same fire. The natural ambient air and the artificial air produced by boiling are both air. The natural earth beneath our feet and the artificial earth produced by letting water sit are both earth. Green salt, vitriol, tutia, and sal ammoniac are both artificial and natural. But the



artificial are even better than the natural, which <anyone> who knows about minerals does not contradict. The natural wild tree and the artificial <ly> grafted one are both trees. Natural bees and artificial bees generated from a <decomposing> bull are both bees. Nor does art do all these things; rather it helps nature to do them. Therefore the assistance of this art does not alter the nature of things. Hence the works of man can be both natural with regard to essence and artificial with regard to mode of production.

2. The argument concerning the quantity of components is refuted by the green salt and other products mentioned above, which we make unremittingly without determination of the quantity of components.
3. The argument concerning place <of generation> is annulled because just as an animal is born from an egg in the womb <of its mother>, so <if the egg> is put under a breast or in a ripening chamber, the animal will be born.
4. The foresaid objection based on time <of generation> is easily crippled in the same way as that concerning the quantity of components.
5. Concerning difference of species, there is the objection that metals do not differ in species and <to the contrary> agree in one definition, for example, "composite body fusible in fire, not combustible, <and> extensible under the hammer." But let me acknowledge that practically no <others> are similar to these, <which are> similar <to each other>, because one <metal> receives the other, and they suffer <themselves> to be intermixed, and in the fire they are mutually absorbed, according as <there is> only a difference of accidental quality <between them>.
6. But what they assert reasoning from dissolution by fire needs no contradiction, since copper whitened by tutia is very little discolored by fire.  
[The final three responses are too corrupt to translate at present.]

These elliptical attacks on alchemy, each with its matching rebuttal, clearly reflect the influence of the *De congelatione*, though whether in its Latin translation or Arabic original, we cannot yet say. The first argument, that metals are natural products and hence may not be replicated by artificial means, implicitly contains the axiom of Avicenna that natural products are always better than artificial ones. Significantly, it is this proposition that "Hermes" begins with, and this with which he occupies the most time. His rebuttal of Avicenna comprises in effect a justification of all human arts, explicitly mentioning agriculture (grafting) in addition to alchemy. By showing that human efforts in general produce results not unlike those of nature, the author vitiates Avicenna's universal proposition that "art is weaker than nature and does not equal it, however much it labor." Having disproved this axiom, Hermes can proceed to say that alchemy succeeds in replicating such mineral products as "green salt" (this could refer to any number of artificial copper compounds), vitriol (probably copper or iron sulfate), tutia (zinc oxide or carbonate, the latter of which was mined, the former produced artificially as a deposit forming on the walls of refineries), and sal ammoniac (ammonium chloride, found naturally and produced artificially as a decomposition product of hair). It is interesting that Hermes is so confident of his chemistry that he asserts the artificial versions of these reagents to be even better than their natural counterparts. We have here a veritable manifesto proclaiming the power of technology in general and chemical technology in particular.

The second and fourth rebuttals appeal directly to sense. Of these, only the one concerning quantity of components can be found in the *De congelatione*, where it is subordinated to the argument that species cannot be transmuted (cf. the second argument in our summary of Avicenna's position). Hermes responds that alchemists unfailingly produce such reagents as "green salt," vitriol, tutia, and sal ammoniac without a knowledge of

their fundamental components; hence such knowledge is unnecessary. Similarly, they do this without reference to special times, i.e. the "judgements" of the astrologers; these too must therefore be superfluous.

Hermes's third rebuttal is a simple argument from analogy, though expressed in somewhat cryptic language. He seems to say that place of generation, like time, is an unnecessary consideration, because an egg can be taken from its mother and incubated artificially without ill results.

Finally, with his fifth counter-argument, Hermes comes to the Avicennian denial of species-transmutation. He adopts the approach of logic, saying that the metals belong to a single definition, any metal being "a composite, fusible, incombustible, malleable body." Logically, there is no reason why this should be called a genus rather than a species, since such differentiation is merely a matter of degree (a genus is merely comprehended by a more general definition than a species). By providing a single definition for all the metals, he can therefore argue that they all belong to a single "species," and that the "species" of which Avicenna speaks are only "species specialiores." Thus the *Liber Hermetis* does not need the transmutation of species. This purely logical approach to undermining the *Sciant artifices* was soon to give way in the West to a more hylomorphic tendency. As we shall see, Albertus Magnus - among others - took Avicenna's *species* to mean a form that "inheres" physically in the substance of a metal in order to determine its particular set of characteristics. Although permissible within the framework of Aristotelian philosophy (where *eidos* means either "species" or "form"), Albert's interpretation would have the effect of turning Avicenna's discussion of *genera* and *species* into an argument about matter and form.

Hermes then backs up this proof with the physical observation that fused metals can be intermixed and alloyed, thus

indicating that their differences are only accidental. Interestingly, this observational evidence takes little account of iron, which medieval artisans could not attain high enough temperatures to fuse.<sup>24</sup>

The sixth rebuttal, and the final one with which we shall concern ourselves, again appeals to sense. Hermes responds to the allegation that alchemically transmuted metals return to their original components upon application of heat by referring to brass, which he incorrectly maintains to be stable in the refiner's fire.

### III. The Mid-Thirteenth Century: Vincent, Albert, and Roger

The *Liber Hermetis*, although it offered a succinct and early defense of alchemy, does not seem to have been known to the three scholastic authors mentioned above, Vincent of Beauvais, Albertus Magnus, and Roger Bacon. It will be useful now to examine the works of these three authorities, in order to determine the degree of controversy surrounding alchemy in the mid-thirteenth century. Let us begin with Vincent, who completed his *Speculum doctrinale* and *Speculum naturale* between 1256 and 1259.<sup>25</sup> Since these two works contain much the same material on alchemy and mineralogy in general, we shall focus on the somewhat more orderly *Speculum doctrinale*.

Vincent devotes book eleven of the *Speculum doctrinale* to the mechanical arts. The last of these is alchemy, which Vincent says he has inserted here in the place of medicine, since the latter, as it concerns the causes of things, is both a science and an art, and so deserves a separate book.<sup>26</sup> Alchemy, to the contrary, is merely useful from a practical point of view - to the metal-worker, since it teaches "the examination intermixture, separation, and transmutation" of the metals, and to the physician, because it aids in the isolation of harmful components which "are often found mixed together in simple medicines."<sup>27</sup>

Vincent continues to say that alchemy is descended from the "science of minerals" (*ab illa parte naturalis philosophie que est de mineris*) in the same way that agriculture is derived from the "science of plants." To Vincent, therefore, alchemy "is properly the art of transmuting mineral bodies, such as metals and the like, from their own species to others."<sup>28</sup>

It would appear, then, that Vincent considers alchemy to be a simple practical art, entirely devoid of theoretical content. But the *Speculum doctrinale* begins at once to contradict itself, for the introductory passage is directly followed by extracts from the *De aluminibus et salibus* of pseudo-Rāzī that give extensive descriptions of mineral causation. Similarly, Vincent borrows long speculative passages from the *Questiones Nicolai Peripatetici*, which he calls *Liber de vaporibus*.<sup>29</sup>

A parallel confusion reigns in Vincent's description of the *De congelatione*'s attack on alchemy. He quotes Avicenna's broadside against the transmutation of species twice, without giving his own point of view.<sup>30</sup> Instead, he replies with an extract from the spurious *De anima in arte alkimia* also attributed to Avicenna, which contains a number of garbled arguments in favor of alchemy. We shall not concern ourselves here with the *De anima*, an Andalusian product of the eleventh or twelfth century,<sup>31</sup> because its disputation is too poorly translated to be of much interest in our present capacity. At any rate, Vincent's treatment of alchemy does not get much more positive than the following statement:

Some say that that final chapter of the *Meteors* where the transmutation of metals is treated is not by Aristotle, but an addition from the words of another author.<sup>32</sup>

To judge from Vincent's rather complacent account, the propositions of the *De congelatione* were not yet subjects of intense debate in the Latin world. In order to see if this was the general

case, let us examine the *De mineralibus* of Albertus Magnus, compiled around the time that Vincent's two *Specula* were being written.

Here we find a considerably more coherent assessment of alchemy than that of the *Specula*. Between 1250-1254, Albert took on the task of writing a comprehensive study of mineralogy, as part of his endeavor to explain the totality of natural science.<sup>33</sup> As a modern translator of the *De mineralibus* has pointed out, "The <genuine> Aristotelian *corpus* contains almost nothing on mineralogy."<sup>34</sup> Consequently, when Albert decided to investigate this subject, he found no Aristotelian text to serve as a model. As he himself says (in the translation of Dorothy Wyckoff) -

We have not seen Aristotle's books about these <minerals>, but only some excerpts from them; and what Avicenna says about <minerals> in the third chapter of the first book which he wrote about them is not sufficient.<sup>35</sup>

Since Albert found the fragmentary and spurious *De lapidibus* and the *De congelatione* to be insufficient, he turned to alchemical sources for a more precise knowledge of minerals.<sup>36</sup> In the course of his investigation, Albert therefore felt the need to respond to the arguments of the *De congelatione*, which he knew to be a work of Avicenna's.<sup>37</sup> Albert begins his analysis of transmutation with an attack on "Callisthenes," meaning pseudo-Khālid ibn Yazīd, to whom a *Liber trium verborum* and other texts are ascribed.<sup>38</sup> Albert cannot abide the theory of Callisthenes that all metals share one form, that of gold, in varying states of completion. Arguing from sense, he says that the metals appear to be "stable" (*permanens*); under normal circumstances they do not become other metals. Therefore they must each have their own substantial form by which they are "perfected." Similarly, each metal has its own peculiar set of properties, so their accidents are not common.

As a result, "the substances and <species of different metals> must be different."<sup>39</sup>

Given that Albert believes the metals to differ in their "species," we might expect him to uphold the viewpoint of the *De congelatione*. This, however, is not the case. In a special chapter devoted to the question "Whether one form of metal can be transmuted into another," Albert directly attacks the pronouncement "Sciant artifices."<sup>40</sup> Here it becomes clear that Albert has understood the Latin *species* to mean "specific form." Let us therefore supply our own translation of a critical passage -

Alchemy proceeds through this method, namely by corrupting one <metal> through a removal <of it> from its own species, and by inducing the species of another with the aid of those <natures> that are in matter...for in these <sulfur and mercury> the species of every metal is induced....<sup>41</sup>

Albert here says that the subject (a metal) must first be corrupted, after which a new species can be induced into that subject. His employment of the terms *corruptio* and *inductio*, makes it likely that he is envisioning this as a physical corruption of the first metal's specific form, to be followed by the generation of a new form. The use of "species" in this sense may be found at numerous other places of Albert's treatise.<sup>42</sup>

The substitution of "specific form" for "species" allows Albert to circumvent the *Sciant artifices*, since he can now draw on a well-defined Scholastic theory concerning the physical corruption of a preexistent form followed by the induction of a subsequent form. Thus Albert believes that *species* can indeed be transmuted, inasmuch as one specific form can be destroyed and replaced by another.

Albert's interpretation, however, slightly distorts Avicenna's use of the Arabic term *nau<sup>c</sup>*, or *species* in the *De congelatione*. By *species* Avicenna meant primarily a logical entity, in the same way that the term is contrasted to *genus* by logicians.<sup>43</sup> In the *De*

*congelatione* Avicenna does not speak of species as "inhering" in matter, or as being corrupted and induced. Instead, his species are above all abstract categories that existed in the Creator's mind when He fashioned the natural world. To say that such logical species are transmutable would be fatuous indeed, since they represent the distinct underlying concepts by which God created separate metals.<sup>44</sup>

At any rate, armed with his hylomorphic interpretation of "species," Albert says that honest alchemists act towards metals just as physicians do towards their patients. The alchemists first clean and purify the old metal, just as a doctor employs emetics and diaphoretics to purge his patient. Then they strengthen the "elemental and celestial powers" in the metal's substance, apparently by adding drug-like components and observing astrological "judgements." In this capacity, they are only preparing the metal for nature to act on it. As a result (in Wyckoff's translation)

...nature herself performs the work, and not art, except as the instrument, aiding and hastening the process, as we have said. And so they appear to produce and make real gold and silver. For whatever the elemental and celestial powers produce in natural vessels they also produce in artificial vessels, provided the artificial <vessels> are formed just as the natural <ones>. And whatever nature produces by the heat of the sun and stars, art also produces by the heat of fire, provided the fire is tempered so as not to be stronger than the self-moving formative power in the metals; for there is a celestial power mixed with it in the beginning, which may be deflected towards one result or another by the help of art.<sup>45</sup>

Albert's vision of art as an "instrument" or "aid" to nature hearkens back to the Aristotelian distinction which we cited earlier (*Physics*, ii. 8, 199a), where the Stagyrte mentions one sort of art which "perfects that which nature cannot do," and another that merely "imitates nature." According to Albert, the alchemist both imitates and perfects: he copies nature's *methods*, using fire to

achieve the effects of the stars, and even modeling his apparatus on the presumed shape of the subterranean caverns in which metals are generated. But, by employing the purgative tactics mentioned above, he also *perfects* where nature was unable to complete the job. This he does by corrupting the old specific form of the metal; the subsequent addition of drug-like ingredients, heat, and the directing of specific celestial virtues will combine to produce a new and better specific form. The alchemist has not therefore *transmuted* any species; he has only removed one specific form and prepared the way for another to be received.

Albert's benign view of alchemy does not provide witness to a heated debate on this subject. He is not responding to any *moderni*, but only to Avicenna, "Callisthenes," and other Arabic authors. The equanimity of his tone, furthermore, seems to reflect a period in which alchemical transmutation was not yet a general subject of irascible dispute. If we now turn to Roger Bacon, the atmosphere changes radically.

Roger wrote his *Opus tertium* around the year 1266, as a part of the trilogy also comprising his *Opus maius* and *Opus minus*. The three books were intended as an advertisement for reform, and as such they were sent by special courier to Roger's friend Clement IV, the erstwhile Guy de Foulques.<sup>46</sup> As a result of their partially rhetorical nature, we might expect Roger's three *Opera* to give way at times to enthusiasm. Indeed, the excitable friar here attains an almost apoplectic indignation in describing the shortcomings of his contemporaries. Yet, although the *Opera* sometimes degenerate into hyperbole, they are nonetheless revealing in their sectarian vision of the thirteenth century university's shortcomings. And it is precisely the discipline of alchemy that Roger wants to employ as one of the keystones of his reformed natural philosophy.

Let us therefore examine Roger's *Opus tertium*, in which, after extolling the virtues of mathematics, he passes to alchemy with the following words:

But there is another science which is about the generation of things from the elements, and about all inanimate things, for example the elements, simple and compounded humors, common stones, gems, and types of marble, gold and other metals, sulfurs, salts, and inks, azures, minium, and other colors, oils and burning pitches, and countless other things of which we have nothing in the books of Aristotle: nor do natural philosophers know of these things, nor the whole Latin crowd. And since this science is ignored by the mass of students, it is necessary that they be ignorant of all natural things that follow therefrom, for example the generation of animated things, such as vegetables, animals, and men, for prior things having been ignored, it is necessary that posterior things be ignored... Whence, due to ignorance of this science, common natural philosophy cannot be known, nor theoretical medicine, nor, consequently, practical medicine, not only because natural philosophy and theoretical medicine are necessary for its practice, but because all simple medicines from inanimate things are received from this science...Nor can the names of medicines or their significations be known without this science. And this science is called "theoretical alchemy," which theorizes about all inanimate things and about the generation of things from the elements. There is in addition an operative and practical alchemy, which teaches how to make noble metals, colors, and many other things - better and more plentifully by art than they are produced by nature. And a science of this sort is greater than all the preceding, because it produces greater utility. Not only can it provide the expenditures and countless other <needs> of the republic, but it teaches to discover such things as can greatly prolong human life, which cannot be arrived at by nature.<sup>47</sup>

Roger's approbation of alchemy far exceeds the modest esteem of Vincent or Albert. While the latter authors see alchemy primarily as a practical art whose masters have provided empirical examples for real philosophers to explain, Roger wants to make it the well-spring of all natural philosophy! He justifies his enthusiasm by splitting alchemy into two divisions, one theoretical (*alkimia speculativa*), the other practical (*alkimia operativa*). The former concerns itself with the causes not only of minerals, but "of all inanimate things," inasmuch as they are generated from the four elements. But because animate things come to be from the four humors, and the humors from the four elements, it follows that an

ignorance of the latter will result in an inadequate understanding of the former.<sup>48</sup> Consequently, theoretical alchemy, the science of "things generated from the elements" should provide the basis for natural philosophy and medicine.

Practical or operative alchemy, on the other hand, concerns itself not only with the transmutation of metals, but also with the production of dyes and medicines. As befits a message sent to the pope, the *Opus tertium* stresses that these virtues can be put to use for the fiscal support of the state. It would not be anachronistic, therefore, to say that Roger's practical alchemy is a sort of applied or industrial chemistry, with metallurgy and pharmacology thrown in as well. Indeed, we may follow Thorndike in referring to Roger in this context as an "applied scientist" (cf. n. 68 *infra*). His theoretical alchemy, on the other hand, comprises the speculative branch of this mega-discipline. Although modern historians have stressed Roger's mathematics (to the ultimate misfortune of the poor friar), we must note that in the passage above he explicitly lauds alchemy as "greater than all the foregoing <sciences>," of which the science of mathematics was one.

Despite the enthusiastic tone of Roger's comments, he was hardly unaware of the "Sciant artifices," as even his early Aristotelian commentaries show. Interestingly, his questions on *De plantis*, written between 1241 and 1246, uphold the viewpoint of the *De congelatione*, which Bacon here attributes to Aristotle, referring to it four times as part of "the fourth book of the *Meteors*."<sup>49</sup> Since Bacon's use of the *De congelationes*'s propositions in the sphere of vegetable science supports our view that these enunciations had considerable influence outside the realm of purely mineral affairs, it will be useful to look at his questions.

Bacon's first question is about grafting: he starts by asking whether the twig cut from a plant is still alive. Responding negatively, he answers that no living being can live without nutriment. Against this negation, however, he replies as follows -

Contra: a regression due to the privation of a continual state of being [habitus] does not occur without a resolution to the prime matter, as is said in the ninth book of the *Metaphysics* [perhaps actually a paraphrase of 1044b30-1045a6] and in the fourth of the *Meteors*.<sup>50</sup>

Bacon's response here does not seem entirely appropriate; for us, however, the important thing to note is his citation of Avicenna's principle that metals cannot be transmuted without their reduction to prime matter in the same breath as book nine of the *Metaphysics*. Roger has taken the Avicennian axiom as a general principle to be applied to the whole of nature. A similar use occurs when Roger asks whether "one species of plant can be transmuted into another." First he quotes an earlier passage of the *De congelatione*, where that text describes the fossilization of a plant. In Avicenna's terms, a plant has become a stone; thus it has been "transmuted into another."<sup>51</sup> In opposition to this, Roger then quotes the above paraphrase from the *Metaphysics*, followed by the "Sciant artifices" -

Likewise, in the fourth book of the *Meteors*, "The artificers of alchemy should know that the species of metals cannot be transmuted," therefore neither can the species of plants.<sup>52</sup>

But, as Roger knows, horticulturists do make successful graftings, hence changing the species of plants. He solves the ensuing conflict between philosophy and sense by saying that such transmutations do not involve specific change, but only a transmutation "according to being and accidental differences and properties," not according to "essence and specific difference." Several lines later, Roger offers an alternative conclusion, also based on the "Sciant artifices" -

Or it must be said that nature can transmute species, but not art, and Aristotle touches on this in the fourth book of the *Meteors*, "the artificers of alchemy should know, etc.," because he says "artificers," that is, a thing cannot be transmuted according to species *by art*, and he does not negate that it can be *by nature*.<sup>53</sup>

Here we have found the same man who in the *Opus minus* claimed artificial gold to be "better than the natural"<sup>54</sup> adopting two of the anti-alchemical positions of Avicenna, first that species cannot be transmuted, and second that nature can do what art cannot. Furthermore, he is so enamoured of these axioms that he has removed them from their metallurgical setting and inserted them into the science of plants, implicitly making of them general philosophical principles. Surely a radical change in Bacon's thought must have occurred between 1241-1246, when the *Questiones supra De plantis* was composed, and the late 1260's, when he wrote his three *Opera*.

If we turn, finally to the *Communium naturalium* of c. 1266, Bacon's mature position on the "Sciant artifices" will emerge. The inimitable words of our irascible friar deserve to be quoted -

Let the fools who misuse this authority <of Aristotle> at the end of the first translation of the *Meteors*, which they draw forth against the truth, saying it to be written <that> "the artificers of alchemy should know that the species of things cannot be transmuted" as if it were the word of Aristotle, be silent, since there is nothing of <Aristotle's> after the beginning of that chapter <starting> "Pure earth does not become stone etc.," but rather an addition by Alfred.<sup>55</sup>

Roger has replaced the authority of Aristotle with that of Alfred, making it an easy matter for him to dismiss the proposition that species may not be transmuted. Following this, he returns to the now familiar paraphrase from the *Metaphysics*, where Aristotle speaks of a privation of *habitus* via resolution to the prime matter, to show that the Stagyrite really did believe in such transmutation. To clinch his argument, Bacon then refers to the pseudo-

Aristotelian *Secret of Secrets*, which of course contains a short treatment of alchemy.<sup>56</sup>

The Bacon of 1241-6, who was lecturing on the natural philosophy of Aristotle at Paris - perhaps we should say the pre-Grosseteste Bacon<sup>57</sup> - was therefore a staunch supporter of the *De congelatione*, which our friar thought at that time to be a work by the genuine Aristotle. The Bacon of the 1260's, on the other hand, has demoted the document of "Alfred" to the domain of fools. Clearly a two-fold process has triggered Roger's change of attitude: first he has come to his mature position of high regard for experimental science and technology, and second, he has discovered the inauthenticity of the *De congelatione*.

Bacon's mature position, to summarize, is considerably stronger than that of Vincent and Albert. Unlike them, Roger actually rejects the theoretical validity of the "Sciant artifices" in his *Communium naturalium*. Vincent, on the other hand, chose to take no position, and Albert circumvented the issue by interpreting species to mean specific form. Roger, to the contrary, simply says that the proposition "species cannot be transmuted" is not true. Furthermore, he adds that "fools" abuse the authority of Aristotle by attributing this position to him, apparently in attacking alchemy. Since it was not the practice among Arabic authors to attribute the *De congelatione* to Aristotle, it follows that the "fools" to whom Bacon refers must have been Latins. Albert's dispute, on the other hand, was limited to Arabs, and Vincent found no need to take sides at all. It is therefore evident that the alchemical debate had grown in magnitude since the 1240's and 50's, when Vincent and Albert were concerned with mineralogy. To judge by the great space given to disputation in alchemical works written after 1250, this would certainly seem to be true. Let us therefore inspect the work of a practicing alchemist who probably wrote in the last third of the thirteenth century.

IV. Alchemical Debate in the Late Thirteenth Century:

Paulus de Tarento

We have shown in several previous publications that the alchemical writer Paulus de Tarento was also the probable author of the *Summa perfectionis* traditionally ascribed to the Arabic author Geber, and also that Paul probably wrote his *Theorica et practica* (which we shall abbreviate *TP*) in the last third of the thirteenth century.<sup>58</sup> Here, however, we shall concentrate on the defense of alchemy that Paul presents in the *TP*, putting it within the context of the foregoing debate.

According to its colophon, the *TP* was written while Paul was a lecturer at the Franciscan *studium* in Assisi. Although I have found no archival evidence to support this contention, it is manifest that the work was written for a scholastic audience, as a justification and exposé of alchemy. The *TP* begins with a proem that is heavily dependent on the pseudo-Aristotelian *Liber de causis*, in which Paul tries to justify the power of man over nature. He does this by identifying the Plotinian hypostasis "intellectus" with the human intellect, a not uncommon conflation among thirteenth century thinkers. Because nature is inferior and subject to intellect, man must therefore be in a position to manipulate and rule nature. As he himself says,

Whoever therefore knows...that nature is subjected in universal to the superior intellect, may easily observe that nature in particular is subjected to human intellect, [subjected] by effect to its virtue and by rule to its art.<sup>59</sup>

Because human intellect rules over nature, artisans, such as "sculptors, painters, farmers, and physicians," have nature subjected to themselves "as matter and instrument."<sup>60</sup> Drawing on the *Physics*, book II, Paul then says that human art is divided into two categories - that which results in the generation of an "extrinsic"

form, as in the case of painting and sculpting, and that which terminates in an "intrinsic form," such as medicine or agriculture. This bifurcation is due to the division of quality into two different genera.

The first genus is made up of the four elemental qualities, hot, cold, wet, and dry; these are primary qualities. The second genus is composed of qualities caused by the first, such as "white, black, sweet, bitter, hard, soft, sharp, dull," which are secondary qualities. When art takes a virtue of the secondary qualities as its instrument, as color is taken in painting or the hardness of a knife in sculpture, "then it is necessary that an accidental form be induced extrinsically" because "art and artificer act toward the passive nature from beyond."<sup>61</sup> Furthermore, secondary qualities are not *per se* active on nature except accidentally; they are properly active on sense alone.

Paul continues this line of reasoning at some length, concluding that arts which act by means of secondary qualities "are not transmutative of substance," and so can only induce an accidental form from beyond. But, when art "takes as instrument a virtue of nature which belongs to the first qualities," it is necessary that the work of the artisan pertain to real substance, and not just to accidents. The first qualities, Paul says, are "the hands of nature," by which she transmutes and makes all her products. In this case,

Art exists solely in the role of mover and director, of supporter and ruler, but not in the role of maker. Nature herself is then in the role of mover, maker, or causer....<sup>62</sup>

In other words, when the artisan employs first qualities, art moves and directs nature, but nature herself does the real making. This is the case with medicine and agriculture, for the physician operates on a natural form, "the disposition of the complexion within," and the horticulturist only cultivates or directs nature when



he makes graftings. Since the agricultor takes "natural agents" - "earth, water, air, heat, and seeds" - as his instruments, and the doctor "the virtues of drugs,"

...such men make essential things, not merely accidental ones. And since nature actually does the making in all things, while art only administers, joins together, and rules, the effect must be attributed rather to nature than to art, or to nature beneath <the rule of> art.<sup>63</sup>

The genuine physician, horticulturist, or alchemist, produces real changes in essence and substance, because he manipulates the first qualities of matter. False artisans, on the other hand, only produce the appearance of change; they attack the symptom rather than the cause. Interestingly, Paul is the only one from among the scientists examined by us who has no inkling that the *De congelatione* is not a work of Aristotle's. He uses the doctrine described above to rebut it several folios later -

We do not consider the opinion of Aristotle which he writes at the end of the *Meteors*, "The alchemists should know that species cannot be transmuted," to be true unless it be understood in the foresaid way, <so that transmutation occur> through purely artificial agents.<sup>64</sup>

In other words, the "Sciart artifices" holds only if the artisan employ secondary, "artificial" qualities, since these do not affect the substance of a given subject. Otherwise, if he uses primary qualities, it is indeed possible to induce substantial change and thus to alter species.

Paul of Taranto's argument, although it is primarily directed toward alchemy, is undeniably a justification of technology at large, or rather a defense of applied science. Although he does not use those terms, Paul's division between arts using first qualities and those relying on secondary ones is in effect a distinction between the applied scientist who understands and employs the true causes

of things, and the simple artisan who works to produce an effect without true knowledge of its causes.

As Avicenna said in the *De congelatione*, such an artisan cannot change species, for if the specific difference - the cause of the species - is not known, "how will it be possible to know whether it is taken away or not, or how it could be taken away?" The applied scientist, according to Paul, does understand the causes of species, and can therefore change them.

Among the figures examined by us, only Roger Bacon matches the premium put on technology, or rather applied science, by Paul of Taranto. It is possible, however, that the very success of such arguments as Paul's and Roger's led to the condemnation of their views. In the *TP*, Paul goes to the limit by insisting that -

...anything short of the animated and the soul itself can be made naturally from anything with regard to elementary form ... such as bodies composed of the four elements, as for example stones and metals.<sup>65</sup>

In other words, the powers of art are limited only by the human inability to make and infuse another soul. This belief puts the entire natural order under the rule of human art, an idea which Paul had already extracted from the *Liber de causis* and used as the opening salvo of his treatise.

Bacon, in a similar fit of hubris, goes so far as to say that alchemical gold, because it contains the four elements in an even better proportion than natural gold, can restore the human body to a condition of elemental equality proximate to the corporeal harmony of Adam and Eve and the resurrected at the end of time.<sup>66</sup> It is probable that Roger's views were considered heterodox even in his own lifetime: their extreme nature may even have contributed to Bacon's apparent imprisonment during the last fifteen years of his life.<sup>67</sup> Despite Thorndike's argument that Bacon's views on astrology and magic were similar to Albert's, and

therefore that his scientific interests were not the probable reason for his condemnation, we must insist that Roger's alchemical beliefs were extreme even for the thirteenth century.<sup>68</sup>

*V. Anti-Alchemical Sentiment in the Late Thirteenth Century,  
and the Result of the Debate*

What then was the opposite camp about, while Paul and Roger were concocting their alchemical manifestos? The first direct counter-attack by a Latin author that I have been able to locate is contained in the *Quodlibetal Questions* of the Thomist Aegidius Romanus (Giles of Rome), written between 1286 and 1291.<sup>69</sup> Before turning to Giles, however, it will be useful to summarize briefly the views of his teacher, Thomas Aquinas.

Determining Thomas's opinions on alchemy is not as straightforward a task as one might hope, since his genuine works were sometimes completed posthumously by others. This appears to have been the case with his commentary on the *Meteorologica* of Aristotle: the portions of the text that give a positive portrayal of alchemical transmutation were actually written by another author. The *Summa theologiae*, finished or broken off in 1272, refers several times to alchemy, but only in passing.<sup>70</sup> Fortunately, Thomas's commentary on the *Sentences* of Peter Lombard, probably written between 1252 and 1256, contains a revealing treatment of demonology in which alchemy - though not the main topic - is discussed.<sup>71</sup>

While commenting on Book 2 of the *Sentences* Thomas asks "whether demons can induce a true corporeal effect into corporeal matter." He then lists five authoritative opinions that deny the possibility of such demonic power. The last of these is the *Sciart artifices*: "Demons cannot work except through the method of art.

But art cannot give a substantial form, whence it is said in the chapter on minerals that the authors of alchemy should know that species cannot be transformed. Therefore neither can demons induce substantial forms."<sup>72</sup>

Thomas next defines legitimate art as a procedure that merely joins passive natural products to active natural powers in order to produce a required effect. A good example, Thomas says, is the lighting of a fire. The artisan conjoins the form of fire (the natural agent) and the wood (the passive material) in order to draw forth the effect of fire. Demons act in the same way: they "cannot produce new effects by creation," like God Himself; they can only apply natural agents to natural patients. When demons appear to raise the dead or perform other supernatural acts, they are acting by means of illusion only; the effects of such illusion are false and ephemeral.

Thomas returns to alchemy at the end of this distinction, in order to buttress his earlier comments -

Art by its own power cannot confer a substantial form, but it can do this by means of a natural agent, as is clear in the following [*hoc*], that the form of fire is produced in logs through art. There are some substantial forms, however, which art cannot produce by any means, since it cannot find the proper active and passive subjects. Even in these art can produce a similitude, as when alchemists produce something similar to gold as to exterior accidents. But it is still not true gold, since the substantial form of gold is not [induced] by the heat of fire - which alchemists use - but by the heat of the sun in a determinate place where the mineral power flourishes. Hence such [alchemical] gold does not operate according to the species [of real gold], and the same is true for the other things that they [alchemists] make.<sup>73</sup>

Thus it is impossible for the alchemist to join the form of a precious metal to the substance of a base one in the way that the form of fire is joined to wood, because this must be done deep within the earth, where the mineral power or *virtus* is subjected to a special strengthening. For the same reason, Thomas adds, "the

other things that they [alchemists] make " must also be deficient when compared with their naturally occurring counterparts. Thomas therefore rejects not only the alchemical creation of metals but the artificial synthesis of any chemical product. Such "alchemical" substances as ammonium chloride produced by the destructive decomposition of hair, or copper acetate made with vinegar left in a copper flask, are implicitly rejected as "fake" because they were not generated in the bowels of the earth, "where the mineral power flourishes." A form of this argument had already been rebutted by the *Book of Hermes*, where the pseudonymous author relied on the empirical testing of artificial reagents to confirm their equivalence to the natural forms. Furthermore, the *Book of Hermes* used the artificial incubation of chicks to disprove directly the necessity of a special *virtus loci*.

In the work of Giles of Rome these rather incidental remarks of Thomas are fleshed out to become a full-fledged attack on alchemy. Like Thomas, Giles relies on the *Sciant artifices* and the argument that the generation of metals requires a specific *virtus loci*, a mineralizing power found deep within the earth. Similarly, Giles, like Thomas, does not consider alchemy in the context of natural philosophy - although he too wrote commentaries on *De generatione et corruptione* and the *Meteors* - but in a treatise primarily concerned with theology. Furthermore, the question "whether man can make gold" belongs to the subsection of the *Quodlibeta* devoted to the subject of man, and here man is being treated "in relation to his art," not "in relation to nature."

Giles's *quaestio* actually contains two questions: first "whether man can make true gold by art," and second "given that he can make gold, whether it be permissible to sell such gold." Replying to the prior question, Giles first answers affirmatively - man can make gold because he can make glass and electrum. Similarly, it is possible to induce a sensitive soul into a given subject, because "the magicians of Pharaoh made living serpents." Since the sensitive

form is nobler than that of gold, it should therefore be possible to induce the form of gold into a particular subject.

Then arguing *in contrarium*, Giles continues -

as is said in a certain commentary upon the *Meteors* which is said to be by Avicenna, "the artificers of alchemy should know...."<sup>74</sup>

Giles's primary authority is therefore none other than Avicenna in the *De congelatione*. After quoting the "Sciant artifices," Giles proceeds to paraphrase Avicenna's argument that nature is better than art, saying that art is only a principle of artificial things, whereas gold is not artificial but natural. A rather involved argument follows, in which Giles maintains that generation occurs in many forms: some generated things require a "material principle:" horses for example, are only generated from the equine *menstruum* of another horse. In addition, horses need a specific place of generation, i.e. the equine womb. Certain less perfect creatures, on the other hand, such as bees, which are generated spontaneously in dead cattle, need only a "material principle" (putrefying matter) but not a specific place of generation. Other imperfect creatures, however, such as wine generated from grapes, need both "material principle" and place of generation, for wine is produced only "in the depth of the grape" (*in ventre vitis*). It is therefore credible that metals need a specific place of generation, i.e. the center of the earth.

Interestingly, Giles does not *prove* that metals need a determinate place of generation, saying merely that "It is believable" (*Sic etiam credibile est quod...*). His argument is not based on the axiom that species cannot be transmuted, but on the observational authority of Avicenna, whose testimony Giles accepts as empirical fact. Giles is not concerned with proving that metals cannot be transmuted, but only with explaining why they cannot.

Having shown that bees need no specific place of generation, whereas vegetable products sometimes do, it is easy for Giles to rebut the argument that since the Pharaoh's *magi* infused a sensitive soul into inert matter, man should be able to infuse the less perfect form of gold. Giles merely replies that there is no direct correspondence between perfection and mode of generation, since bees, which are more perfect than plants, can be generated anywhere, as long as putrefying matter is present, but plants require a seed.

Finally Giles responds to the argument that artisans make glass and electrum, and so should be able to make gold. This argument he likewise solves by reference to the spontaneous generation of certain animals: glass is like the spontaneously generated animal, while the metals are like creatures requiring seed. Electrum, on the other hand, is just a mixture of "three parts gold and one of silver." That art can make electrum only proves that it can mix different metals, but since gold is not a mixture of metals, it does not prove that gold can artificially be made.

The second question, "given that man can make gold, whether it is permissible to sell such gold," Giles refuses to entertain seriously, since he is unequivocally convinced that artificial gold cannot be made. At this point Giles reveals the true nature of his argument, saying,

...it would be hard to make such gold, whose falsity would not be detected by cupellation. But given that such gold could be made, it would still not be permissible to use it as money, since gold and such metals are used in medicines, and in other things administering to the human body. If such gold were therefore alchemical, it might greatly harm the human complexion.<sup>75</sup>

According to Giles, even if alchemical gold could withstand the assayer's test of cupellation, it would still not possess all the qualities of natural gold: it might therefore harm the body of one who ingested it. It follows that such a product would not be real

gold, despite the assayer's judgement. No doubt Giles would have said the same if such artificial gold withstood the further test of cementation, and even had the same specific weight as natural gold (which it could not have), for to him, mineral gold and artificial gold can never be the same, regardless of their properties. Like Avicenna, Giles has adopted the immutable principle that artificial products can never be the same as their natural models. As for the example of electrum, that is not a product but a mixture of products, whereas glass is a human invention and not an *imitatio naturae*.

Giles's rejection of alchemy is not, as we said earlier, based on the premise that species cannot be transmuted. In another distinction of the *Quodlibetal Questions*, he even proves that a new species, "which never before has been made," can be produced by art with the aid of nature.<sup>76</sup> Such a species will not, however, be as good as any produced by nature alone, but will be sterile, like the mule.<sup>77</sup> Again, Giles is operating on the principle that, as Avicenna said, "artificial things are not like natural ones, nor so certain," since "art is weaker than nature and does not equal it."

The last three decades of the thirteenth century witness the beginning of that increasingly hostile attitude taken by religious authorities toward alchemy which culminates eventually in the denunciation *Contra alchymistas* written by the well-known inquisitor Nicholas Eymeric in 1396.<sup>78</sup> Giles's attack was preceded, for example, by a number of interdictions issued by the religious orders. To mention only the Dominicans, we find condemnations of alchemy propounded by the Narbonne Provincial Chapter in 1272, the Bordeaux General Chapter in 1287, the Trèves General Chapter in 1289, and the Barcelona General Chapter in 1323.<sup>79</sup> The movement to prohibit alchemy was given papal authority in 1317,<sup>80</sup> when John XXII issued his well-known bull *Spondent quas non exhibent*, according to Eymeric after the pope had held a public disputation between alchemists and their detractors.<sup>81</sup> This papal

document, we should note, is directed specifically against alchemists who employ their artificial gold for counterfeiting, and contains little theoretical justification. Nonetheless, the bull does say the following -

...<the alchemists>, by means of a sophistic transmutation, counterfeit that which is not allowed in the nature of things, <the making of> real gold and silver.<sup>82</sup>

It appears then that John did not believe alchemical transmutation to be possible, whether practiced by charlatans or the self-deluded, for he states outright that this is not "in the nature of things." At the same time, however, his condemnation is motivated by purely fiscal reasons, for the debasement of coin by counterfeiters, alchemical or otherwise, presented a serious problem to the medieval commonwealth.<sup>83</sup>

What was the reason for this great backlash against alchemy that seems to have begun around the time when Paul of Taranto was writing his *Theorica et practica*? We have already suggested that the alchemical proponents were themselves in part responsible, by arrogating too much power to the claims of their art. At the same time, however, other causes were at work. The consistorial advocate Oldrado da Ponte in fact came out in support of alchemy in a well known *consilium* probably written in the first decade of the fourteenth century. The opening of Oldrado's *consilium* contains a quotation from the ninth or tenth century *Canon Episcopi*, a document intended to prohibit belief in witches, who according to certain old pagan beliefs, could assume monstrous shapes:<sup>84</sup>

<It seems> that the art of alchemy should be prohibited, because the *Canon Episcopi*, question 26, 1, says that "whoever believes that anything created [*creaturam*] can be either mutated

or transferred into another species or into another similitude, except by the creator Himself, is an infidel, and worse than a pagan."<sup>85</sup>

It is peculiar that Oldrado should have taken a document that originally had no concern with alchemy to apply directly to that art. In this he was pre-empted, however, by the thirteenth century commentator of Gratian, Martinus Polonus, whose *Margarita Decreti* already contains Oldrado's reference to the *Canon episcopi*.<sup>86</sup> But Martinus gives us no clue as to his opponents. Was the *Canon episcopi* really being used by antagonists of alchemy?

If one inspects the passage above without respect to its original context, it could indeed seem to be a sort of official decree of the message propounded by the *Sciant artifices*. The passage explicitly states that only God Himself can transmute species, and that anyone who believes otherwise is not a Christian. Oldrado's response to the *Canon Episcopi* is also revealing. Instead of replying that this edict has nothing to do with alchemy, he answers in the following manner:

<Alchemists> do not say that one species is mutated into another (as is imputed to them), because this is not possible. But they say that one species of metal (such as gold) can be produced from another species of metal (such as tin).<sup>87</sup>

Interestingly, Oldrado accepts the authority of the *Canon Episcopi* in a role for which that document was never intended. Oldrado's rebuttal does not argue with the principle that specific transmutation is impossible. Instead, Oldrado merely points out that the species of the metal is not transmuted, but only the metal itself. The origin of this strange-sounding claim was probably a late thirteenth-century alchemical work ascribed spuriously to Roger Bacon, the *Breve breviarium*. It is quite likely that the author of the *Breve breviarium* originated this defence himself, as it seems to be developed at greater length here than in any other medieval

alchemical text. By claiming that the species of the metals are not transmuted, but only the metals themselves, the *Breve breviarium* means that the group of characteristics that make silver silver (its argenteity) and gold (its aureity) do not change if an individual piece of silver is transmuted into an individual piece of gold.<sup>88</sup> Gold will still be defined, for example, as a "yellow, soft, malleable, fusible, heavy, body" and silver as a "white, soft, malleable, fusible, body, of moderate weight." Nonetheless, an individual piece of silver can be physically transmuted so that its matter will conform to the definition of gold. Hence, the physical characteristics of the individual piece of silver will have been changed to the degree that they now belong to the species of gold.

Oldrado's *consilium*, although taking the same approach as the *Breve breviarium*, differs from that text in its motivation. While the *Breve breviarium's* argument seems to be directed solely against the *De congelatione*, Oldrado is responding to the *Canon Episcopi*, which explicitly said that only God could transmute species. Oldrado's response is therefore intended to bear the onus of doctrinal correctness, whereas the *Breve breviarium's* - at least overtly - was not. We have already seen Thomas Aquinas and Giles of Rome treat alchemy in a theological context, where Thomas even mentioned alchemists in the same breath as demons. Like Thomas and Giles, Oldrado sees alchemy in a theological light, while the earlier authors had focused merely on its naturalistic implications. This growing tendency to theologize the issue of alchemy, I propose, provides the main reason for the increased number of condemnations tendered against that art during the late thirteenth and fourteenth centuries. We should not forget that Innocent III and Gregory IX had already established the papal Inquisition in the first half of the thirteenth century, and that by the second half that institution was "fully organized."<sup>89</sup> Oldrado's need to answer to the *Canon Episcopi* was not necessarily an anomaly: it may well have reflected the obsession

with heterodoxy that began with the Albigensian Crusade and eventually resulted in the witch hunts of the sixteenth and seventeenth centuries.

Despite the efforts of Aegidius Romanus, John XXII, and later Nicholas Eymeric, Latin alchemy could not be wiped out by proclamatory or official means. The vision of human power in the realm of technology raised by the *Liber Hermetis*, Roger Bacon, and Paul of Taranto was too seductive to be repressed for long. Alchemy continued to thrive in the fourteenth and fifteenth centuries, leading to such huge corpora as those attributed to Arnald of Villanova and Ramon Lull (for which the reader may consult our chapter five). But the texts of alchemy removed themselves ever further from the disputational ambience of the medieval university. *Figurae* and allegories became more and more the proper mode of communication in alchemical literature, with a concomitant loss of intellectual rigor.

The historian should not be blind to the fact that the alchemical debate initiated in the thirteenth century had repercussions in European culture at large long after it had become stale and formulaic in the alchemical texts themselves. While Pico della Mirandola, propagandist for the "dignity of man," used works of a general Hermetic character to support his message, his contemporary Ludovico Lazarelli, "a most ardent Hermetist," in the words of Frances Yates, transcribed the *Margarita pretiosa* of Petrus Bonus for his master Mercurio da Corregio.<sup>90</sup>

The role of alchemical literature in shaping the reformatory vision of Paracelsus von Hohenheim (d. 1542), in addition, cannot be overstated.<sup>91</sup> To some extent the same may be said for the "archimagus" of the sixteenth century, Agrippa von Nettesheim,<sup>92</sup> while the technological apologist John Dee, whose *Mathematicall Preface* of 1570 demonstrated the practical application of Euclid's *Elements*, was heavily indebted to the *corpus* of Roger Bacon, including a number of alchemical works spuriously attributed to the

friar.<sup>93</sup> It goes without saying, finally, that the *ars - natura* contrast so prominent in the work of Francis Bacon must be re-examined in the light of this alchemical debate initiated in the thirteenth century.<sup>94</sup>

Our purpose in this introduction is not to prove the continued influence of alchemy on the development of applied science and technology throughout the Scientific Revolution, however, but merely to show that here, in these obscure treatises of the thirteenth century, a propagandistic literature of technological development was born. During this innovative period, alchemical writers and their allies produced a literary *corpus* which was among the earliest in Latin to actively promote the doctrine that art can equal or outdo the products of nature, and that man can even change the order of the natural world by altering the species of those products. This technological dream, however premature, was to have a lasting effect on the direction taken by Western culture.

## Chapter Notes

<sup>1</sup> Robert Halleux, *Les textes alchimiques, Typologie des sources du moyen âge occidental* (Turnhout: 1979), Fasc. 39, p. 49, p. 70. I have used the title *De compositione alchemiae* (although that may be an invention of later times) in order to distinguish this text from others in the Khalid-Morienus cycle. This seems more satisfactory than calling the text itself *Morienus*.

<sup>2</sup> Robert Halleux, *Les ouvrages alchimiques de Jean de Rupescissa, Histoire littéraire de la France* (Paris: 1981), XLI, pp. 241-84. Halleux, for example, gives a partial list of *codices* containing John of Rupescissa's XIVth century *De quinta essentia*, which nonetheless runs to 142 manuscripts. Cf. Halleux, 1981, pp. 278-82.

<sup>3</sup> Cf. Part V of the present chapter.

<sup>4</sup> James Otte, "The Life and Writings of Alfredus Anglicus," *Viator*, III (1972), pp. 275-91. Cf. also his *Alfred of Sareshel's Commentary on the Meteora of Aristotle* (Leiden: 1988).

<sup>5</sup> E.J. Holmyard and D.C. Mandeville, *Avicennae de congelatione et conglutinatione* (Paris: 1927), pp. 1-11.

<sup>6</sup> Cf. Appendix I of the present work for Latin.

<sup>7</sup> *Ibid.*, p. 41, n. 5.

<sup>8</sup> Aristotle, *De physico auditu, Aristotelis opera cum Averrois commentariis* (Venice: 1562), IV, f. 78rb: "Et omnino ars alia quidem perficit que natura non potest efficere, alia vero imitatur." The influence of this passage on alchemical writers has already been noted by Reijer Hooykaas, *Religion and the Rise of Modern Science* (Edinburgh: 1972), pp. 55-8. Hooykaas is wrong, however, in saying that "In general <the alchemists> did not pretend that their fabrication by art equalled the generation of Nature, but they referred rather to the <second> procedure of art mentioned by Aristotle." This is precisely the opposite of the truth, since alchemical practice - when carried out sincerely - was founded on the belief that artificial versions of natural products were as good or better than their exemplars.

<sup>9</sup> Paulus de Tarento, *Theorica et practica*, 6v, 18-20 of the critical edition contained in William Newman, *The Summa perfectionis and Late Medieval Alchemy*, doctoral dissertation, Harvard University, 1986, vol. III.

<sup>10</sup> Chiara Crisciani, "The Conception of Alchemy as Expressed in the *Pretiosa Margarita Novella* of Petrus Bonus of Ferrara," *Ambix* XX (November, 1973), pp. 147-62.

<sup>11</sup> Lynn Thorndike, *A History of Magic and Experimental Science* (New York: 1934), III, pp. 147-62.

<sup>12</sup> Petrus Bonus, *Margarita pretiosa*, in *Bibliotheca chemica curiosa*, ed. J.J. Manget (Geneva: 1702), II, p. 22B: "...nunquam audiverimus aliquam affirmationem, nec in scripturis aliquorum viderimus: quia semper consuetudo fuit, facere rationes ad hanc artem destruendum, ad construendum autem nemo consuevit propter difficultatem...."

<sup>13</sup> *Ibid.*, p. 9B: "Quidam etiam Alchemistarum, sicut Geber et Morienus, in suis Alchemicis, ipsam disputaverunt tanquam potentes hoc, sed valde breviter et obscure, arguentes ad partem negativam, et solventes; ad affirmativam autem, solum quaedam exempla adducentes, et sermonibus typicis et figuris affirmantes, et docentes artem esse omnino certam."

<sup>14</sup> *Ibid.*, pp. 10B-1B.

<sup>15</sup> *Ibid.*, pp. 58B-9A.

<sup>16</sup> Julius Ruska, "Zwei Bücher De Compositione Alchemiae und ihre Vorreden," *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, XI (November, 1928), 1./2., pp. 28-37. Also - Lee Stavenhagen, "The Original Text of the Latin *Morienus*," *Ambix*, XVII (March, 1970), pp. 1-12.

<sup>17</sup> Petrus Bonus, *op. cit.*, 23 bot.: "...unde Morienus et Lilius: Alchemia est ars ministralis, septem Metallorum essentiam continens, qualiterque formarum a diminutione ad complementum naturale deducantur, ostendens."

<sup>18</sup> Trinity College 1400, f. 133r: "Incipiunt interrogationes et responsiones Morieni de omnibus in quibus tota efficacia magisterii Hermetis constare probatur."

<sup>19</sup> Early *Mss* containing the *Liber Hermetis*: (XIIIth-XIVth century) Cambridge, Trinity College 1400, ff. 131r-133r; Oxford, Bodleian Lib., Bodley 679, ff. 20r-21r; London, B.M. Add., 41486, ff. 218r-222r; Paris, BN 6514, ff. 135r-135v; (XIVth century) London, B.M. Sloane 1754, ff. 60r-62r, Palermo, Bib. Com. 4QqA10, f. 37v (incomplete).

<sup>20</sup> Robert Halleux, "Albert le grand et l'alchimie," *Revue des sciences philosophiques et théologiques*, LXVI (January, 1982), No. 1, pp. 57-80. Halleux gives Albert's sources on pp. 65-75.

<sup>21</sup> I have identified the following sources in Vincent's two *Specula*: Aristotle (i.e. Avicenna), *De congelatione*; Averroes (i.e. Nicolaus Peripateticus), *De vaporibus*; pseudo-Avicenna, *De anima in arte alkimia*; Avicenna, *Epistola ad Hasen*; Jābir ibn Ḥayyān, *Liber de septuaginta*; Morienus, *De compositione alchemiae* (presumably); pseudo-Rāzī, *De aluminibus et salibus*.

<sup>22</sup> Robert Multhauf, *The Origins of Chemistry* (London: 1966), mentions some of Roger's sources on p. 188. To these must be added Artepheus, *Clavis maioris sapientiae*; Avicenna, *De re tecta* (or *Epistola ad Hasen*); and pseudo-Rāzī, *De aluminibus et salibus*.

<sup>23</sup> Ibrahim Madkour, *l'Organon d'Aristote dans le monde Arabe, Etudes Musulmanes*, X (Paris: 1969), p. 70, 299. For the term itself, cf. Holmyard and Mandeville, p. 24.

<sup>24</sup> Dorothy Wyckoff, *Albertus Magnus: Book of Minerals* (Oxford: 1967), p. 233.

<sup>25</sup> M. Paulmier-Foucart, "L'atelier Vincent de Beauvais. Recherches sur l'état des connaissances au Moyen Age d'après une encyclopédie du XIIIe siècle," *Le Moyen Age*, 85:1979, pp. 87-99. Cf. also Spicae, *Cahiers de l'atelier Vincent de Beauvais I*:1978, pp. 6-28, 91-122. Also S. Lusignan, *Préface au "Speculum maius" de Vincent de Beauvais. Réfraction et diffraction* (Montréal: 1979), and A.D. von den Brincken, "Von der Geschichtsbetrachtung bei Vincenz von Beauvais. Die Apologia Auctoris zum Speculum Maius," *Deutsches Archiv für Erforschung des Mittelalters*, 34:1978, 2; pp. 410-499.

<sup>26</sup> Vincent, *Speculum doctrinale* (Venice: 1494), Liber XI, Cap. CV.

<sup>27</sup> *Ibid.* "Ad fabrilem quidem propter metallorum examinationem, commixtionem, disgregationem, transmutationem. Ad medicinam itidem propter substantiarum vel qualitatum salubrium a noxiis que frequenter etiam in medicinis simplicibus permixte sunt separationem."

<sup>28</sup> *Ibid.* "Alkimia proprie est ars transmutandi corpora mineralia a propriis speciebus ad alias, ut sunt metalla et huiusmodi."

<sup>29</sup> These passages have already been identified as belonging to the *Liber Nicolai Peripatetici* by Stanislaw Wielgus, "Quaestiones Nicolai Peripatetici," *Medievalia Philosophica Polonorum*, XVII, 1973, p. 58.

<sup>30</sup> Vincent, *op. cit.*, Liber VIII, Cap. XLII, LXXXIII.

<sup>31</sup> Julius Ruska, "Die Alchemie des Avicenna," *Isis*, XXI, 1934, pp. 14-51.

<sup>32</sup> Vincent, *op. cit.*, LXXXV. "Nonnulli etiam illud ultimum capitulum meteororum ubi agitur de transmutatione metallorum dicunt non esse Aristotilis(!). Sed additum ex verbis cuiusdam alterius auctoris."

<sup>33</sup> Halleux, 1982, p. 58.

<sup>34</sup> Wyckoff, *op. cit.*, p. xxx.

<sup>35</sup> *Ibid.*, p. 9.

<sup>36</sup> Halleux, 1982, pp. 65-7, gives some precise information about the *Lapidary* of pseudo-Aristotle.

<sup>37</sup> Wyckoff, *op. cit.*, p. 177.

<sup>38</sup> Halleux, 1979, p. 27.

<sup>39</sup> Wyckoff, *op. cit.*, pp. 172-3. Here, as elsewhere in her translation, Wyckoff uses the expression "specific form," where Albert employs the Latin "species." Although I agree that Albert sometimes meant "specific form" where he says "species," it is not satisfactory, in the interest of textual accuracy, to translate him this way universally.

<sup>40</sup> *Ibid.* 177.

<sup>41</sup> Wyckoff's translation is here not satisfactory, as she has Albert actually using the term "specific form" where the Latin reads "species." Cf. Wyckoff, p. 178. We here give the Latin text, as reproduced from: Albertus Magnus, *Mineralium libri quinque*, in *B. Alberti Magni...opera omnia*, ed. Auguste Borgnet (Paris: 1890), V, p. 71B: "Alchimia autem per hunc modum procedit, scilicet corrumpens unum a specie sua removendo: et cum iuvamine eorum quae in materia sunt, alterius speciem inducendo.... in his enim ex virtutibus horum omnis metalli species inducitur."

<sup>42</sup> Albert, *op. cit.*, 68a: "Experimenta autem alchimicorum graves duas nobis hic ingerunt dubitationes. Videntur enim illi dicere quod sola auri species est forma metallorum." Here Albert, though attacking the views of the alchemists, implicitly equates "species" and "forma." In the following passage (69A) he speaks of a "corruption" of species: "Quod si forte concederetur quod substantiam auri inducat, adhuc non est sufficiens probatio ad hoc quod non sit nisi una species metallorum: quoniam calcinando et sublimando et distillando et caeteris operationibus quibus elixir per materiam metallorum faciunt penetrare, corrumpere potest species metallorum quae primitus infuerunt materiae metallorum...."

<sup>43</sup> Madkour, *op. cit.*, 70.

<sup>44</sup> Georges C. Anawati, "Avicenne et l'alchimie," in *Accademia Nazionale dei Lincei: Atti dei Convegni*, XIII, *Convegno Internazionale* (April 9-15, 1969), pp. 285-341. At pp. 300-1, Anawati paraphrases another Avicennian text, the *R. fī ibḥāl aḥkām al-nujūm* or *R. al-Ishara ila ilm fasad aḥkām al-nujūm*, to the following effect: "Ce sont des absurdités [specific transmutation]; car pour tout ce que Dieu a créé moyennant la force de la nature, l'imitation artificielle est impossible; comme au contraire les productions artificielles et scientifiques n'appartiennent d'aucune manière à la nature."

<sup>45</sup> Wyckoff, *op. cit.*, 178-9.



<sup>46</sup> *DSB*, I, p. 378.

<sup>47</sup> Roger Bacon, *Opus tertium*, in *Opera quaedam hactenus inedita*, ed. J.S. Brewer (London: 1859), I, pp. 39-40: "Sed alia est scientia, quae est de rerum generatione ex elementis, et de omnibus rebus inanimatis: ut de elementis, et de humoribus simplicibus et compositis: de lapidibus communibus, gemmis, marmoribus; de auro et caeteris metallis; de sulphuribus, et salibus, et atramentis; de azurio, et minio, et caeteris coloribus; de oleis et bituminibus ardentibus, et aliis infinitis, de quibus nihil habemus in libris Aristotelis; nec naturales philosophantes sciunt de his, nec totum vulgus Latinorum. Et quia haec scientia ignoratur a vulgo studentium, necesse est ut ignorent omnia, quae sequuntur, de rebus naturalibus; scilicet de generatione animalium, ut vegetabilium, et animalium, et hominum: quia ignoratis prioribus, necesse est ignorari quae posteriora sunt. Generatio enim hominum, et brutorum, et vegetabilium est ex elementis et humoribus, et communicat cum generatione rerum inanimatarum. Unde, propter ignorantiam istius scientiae, non potest sciri naturalis philosophia vulgata, nec speculativa medicina, nec per consequens practica; non solum quia naturalis philosophia et speculativa medicina necessariae sunt ad practicam eius, sed quia omnes simplices medicinae de rebus inanimatis accipiuntur de hac scientia....nec nomina sciri possunt, nec significata, nisi per hanc scientiam; et haec scientia est alkimia speculativa, quae speculatur de omnibus inanimatis et tota generatione rerum ab elementis. Est autem alkimia operativa et practica, quae docet facere metalla nobilia, et colores, et alia multa melius et copiosius per artificium, quam per naturam fiant. Et huiusmodi scientia est major omnibus praecedentibus, quia majores utilitates producit. Nam non solum expensas et alia infinita reipublicae potest dare, sed docet invenire talia, quae vitam humanam possunt prolongare in multa tempora, ad quae per naturam produci potest."

<sup>48</sup> This chain of being is perhaps made clearer at another point: "Hic autem volens ponere radicalem generationem rerum ostendam quomodo ex elementis generantur humores, et ex humoribus omnia inanimata, vegetabilia, et animalia, et homines." Bacon, *Opus minus, Opera quaedam hactenus inedita*, I (London: 1859) p. 359.

<sup>49</sup> Bacon, *Questiones supra de plantis*, in *Opera hactenus inedita*, ed. Robert Steele, (London: 1932) XI, p. 241, pp. 251-2.

<sup>50</sup> *Ibid.*, p. 241: "Contra: a privatione ad habitum non fit regressio, nisi per resolutionem ad materiam primam ut dicitur .ix. *Metaphysice* et in quarto *Meteororum*."

<sup>51</sup> *Ibid.*, p. 251.

<sup>52</sup> *Ibid.*: "Item, quarto *Meteororum*, 'sciant artifices alkimie species metallorum transmutari non posse,' quare similiter nec species plantarum."

<sup>53</sup> *Ibid.*, p. 252: "Vel dicendum quod natura potest transmutare species, non tamen ars, et hoc tangit Aristoteles in quarto *Meteororum* 'sciant artifices alkimie etc.', quia dixit 'artifices,' id est, per artem non potest transmutari res secundum speciem, et non negat quod non possit per naturam."

<sup>54</sup> Bacon, *Opus minus*, p. 375.

<sup>55</sup> Bacon, *Communium naturalium*, in *Opera hactenus inedita*, ed. Robert Steele, n.d., II, p. 7: "Et taceant stulti qui abutuntur autoritate illa in fine prime translationis *Meteororum*, quam contra veritatem allegant, dicentes scriptum esse 'Sciant artifices Alkimie species rerum transmutari non posse,' ac si esset verbum

Aristotelis, cum nichil ejus sit a principio illius capituli 'Terra pura lapis non fit' et cetera, set additum ab Alvedo."

<sup>56</sup> Bacon, *Liber secretum secretorum*, in *Opera quaedam hactenus inedita*, ed. Robert Steele, V, pp. 117-27, et *sparsim*. This is the text of the *Secretum secretorum* with Bacon's commentary.

<sup>57</sup> *DSB*, XIV, p. 35: Bacon met Grosseteste, who was to influence the whole subsequent career of the friar, in 1247.

<sup>58</sup> William Newman, "New Light on the Identity of "Geber," *Sudhoffs Archiv*, 1985, 69:76-90; and Newman, "The Genesis of the *Summa perfectionis*," *Archives internationales d'histoire des sciences*, 1985, 35:240-302.

<sup>59</sup> Cf. Newman, *The Summa perfectionis and Late Medieval Alchemy*, doctoral dissertation, Harvard University, 1986, vol. III, f. 1v, 17-21..

<sup>60</sup> *Ibid.*, 2r, 7-9.

<sup>61</sup> *Ibid.*, 2v, 17-8.

<sup>62</sup> *Ibid.*, 3r, 14-7.

<sup>63</sup> *Ibid.*, 3r, 29 - 3v, 4.

<sup>64</sup> *Ibid.*, 4r, 12-5.

<sup>65</sup> *Ibid.*, 6v, 18-20.

<sup>66</sup> Bacon, *Frater Rogerus Bacon in libro sex scientiarum in tertio gradu sapientiae*...., in *Opera hactenus inedita*, ed. A.G. Little, IX, pp. 183-4.

<sup>67</sup> Lynn Thorndike, *op. cit.*, II, pp. 628-9.

<sup>68</sup> *Ibid.* Despite my disagreement with Thorndike here, he is quite correct in considering the doctrines of the *Epistola de secretibus operibus* attributed to Bacon to be a form of applied science. See the *HMES*, vol. II, p. 663.

<sup>69</sup> Aegidius Romanus, *B. Aegidii Columnae Romani...Quodlibeta revisa, correcta, et varie illustrato, studio M.F. Petri Damasi de Coninck* (Louvain: 1646), pp. 147-9 (= *Quaestio III, Quodlibeti VIII, Membri III*).

<sup>70</sup> Thomas Aquinas, *In meteorologicorum continuatio*, in *Opera omnia curante Roberto Busa S.I.* (Stuttgart: Frommann-Holzboog, 1980), vol. VII, p. 627, cols. 1 and 2; and Aquinas, *Summa theologiae, ibid.*, vol. II, p. 623, cols. 2,3; p. 873, cols. 1,2. See also Francesco Migliorino, "Alchimia lecita e illecita nel Trecento: Oldrado da Ponte," *Quaderni Medievali*, 1981, 11 (June):33.

<sup>71</sup> Thomas Aquinas, *In quatuor libros sententiarum*, in Aquinas, *Opera*, vol. I, p. 145, cols. 1-3. On the probable date of composition see William O. Wallace and James Weisheipl, "Thomas Aquinas," in *The New Catholic Encyclopedia*, vol. XIV, p. 104.

<sup>72</sup> Aquinas, *In quatuor libros sententiarum*, p. 145, col. 1: "Utrum daemones possint inducere in materia corporali verum effectum corporalem. ...Praeterea, daemones non operantur nisi per modum artis. Sed ars non potest dare formam substantialem; unde dicitur in cap. de *numeris*: sciant auctores alchimiae, species transformari non posse. Ergo nec daemones formas substantiales inducere possint." The text used by Busa contains a manifest error: *numeris* should be corrected to *minaris*.

<sup>73</sup> *Ibid.*: "Ad quantum dicendum, quod ars virtute sua non potest formam substantialem conferre, quod tamen potest virtute naturalis agentis; sicut patet in hoc quod per artem inducitur forma ignis in lignis. Sed quaedam formae substantiales sunt quae nullo modo ars inducere potest, quia propria activa et passiva invenire non potest, sed in his potest aliquid simile facere; sicut alchimistae faciunt aliquid simile auro quantum ad accidentia exteriora; sed tamen non faciunt

verum aurum; quia forma substantialis auri non est per calorem ignis quo utuntur alchimistae, sed per calorem solis in loco determinato, ubi viget virtus mineralis: et ideo tale aurum non habet operationem consequentem speciem; et similiter in aliis quae eorum operatione fiunt."

<sup>74</sup> *Ibid.*, p. 147: "...ut dicitur in quodam comment.

super *Metheoris*, quod dicitur esse Avicennae: sciunt artifices alchimiae...."

<sup>75</sup> *Ibid.*, p. 149: "...durum enim esset facere aurum per alchimiam, cujus falsitas non deprehenderetur per cinerium: dato tamen, quod fieret tale aurum, non deberet expendi, quia aurum et talia metalla aliquando ponuntur in medicinis, et in aliis deservientibus ad humanum corpus."

<sup>76</sup> *Ibid.*, pp. 381-5.

<sup>77</sup> *Ibid.*, p. 384.

<sup>78</sup> Halleux, 1979, p. 126, n. 30.

<sup>79</sup> C. Narbey, "Le moine Roger Bacon, et le mouvement scientifique au XIIIe siècle," *Revue des questions historiques*, XXXV (Paris: 1884) p. 157. Halleux, 1979, p. 127, adds additional condemnations by the religious orders.

<sup>80</sup> Francesco Migliorino, "Alchimia lecita e illecita nel Trecento: Oldrado da Ponte," *Quaderni medievali*, XI, (June: 1981), p. 15.

<sup>81</sup> Halleux, 1979, p. 126.

<sup>82</sup> *Ibid.*, p. 124: "...quod non est in rerum natura esse verum aurum vel argentum sophistica transmutatione confingant."

<sup>83</sup> Migliorano, *op. cit.*, p. 16, p. 32.

<sup>84</sup> Norman Cohn, *Europe's Inner Demons* (London: 1975), pp. 210-1.

<sup>85</sup> Oldrado da Ponte, *Consilium 74, de sortilegia, num. I*, in Johannes Chrisippus Fanianus, *De iure artis alchimiae...*, in Manget, *op. cit.*, I, pp. 211: "Et quod ars Alchimiae sit prohibita, quia dicit text. 26. q. I. c. *episc.* et quod quisquis credit posse fieri aliquam creaturam aut in melius mutari aut transferri in aliam speciem, aut in aliam similitudinem, nisi ab creatore, infidelis est et pagano deterior."

<sup>86</sup> Jean-Pierre Baud has shown that Oldrado's invocation of the *Canon Episcopi* derives from the *Margarita decreti* of Martinus Polonus, who died in 1278 or 1279. Cf. Baud, *Le procès de l'alchimie* (Strasbourg, 1983), pp. 17-23.

<sup>87</sup> Oldradus, *op. cit.*, p. 211, "...nec ipsi dicunt unam speciem mutari in alteram (ut eis imponitur) quia hoc non est possibile. Sed dicunt quod ex una specie metalli (scilicet stanno) potest alia species metalli (scilicet aurum) produci."

<sup>88</sup> Pseudo-Roger Bacon, *Breve breviarium in Sanioris medicinae magistri Rogeri Baconi Angli de arte chymiae scripta* (Frankfurt, 1603), pp. 123-126, on pp. 125-126: "Sic revera species non mutantur, sed individua: et sic illud intelligitur ... species ergo argenti, quae est argenteitas non permutatur in speciem auri, quae est aureitas; quoniam species vere permutari non possunt, quia non sunt subiectae per se accretionibus [*sic codex*; MS Oxford, BL, Digby 119, fol. 66r, *leg. actionibus ut vid*] sensibilibus, nec in se compositionem partitam habent, vel contrariam, quae sit causa permutationis vel subiectum .... Ex hoc argentum vel aurum factum est subiectum alterius speciei, quam alia complevit et induxit materiae pugatio atque digestio." The text of the *Breve breviarium* exists in fragmentary form in a manuscript that, according to oral communication from M.-Th. d'Alverny, derives from the late 13th century (MS Paris, BN, Lat. 6514, fols. 126-129). The inauthenticity of the ascription to Roger seems assured by the text's dependence on Albertus Magnus's *De mineralibus* for the theory that sulfur and other reagents

contain a three-fold humidity (pp. 110, 165, etc.). For a description of this theory, and Albert's source, see our introduction to the sources of the *Summa perfectionis*.

<sup>89</sup> Cohn, *op. cit.*, p. 24.

<sup>90</sup> Crisciani, *op. cit.*, p. 165, n. 5; and Frances Yates, *Giordano Bruno and the Hermetic Tradition* (London: 1964), p. 50.

<sup>91</sup> Walter Pagel, *Paracelsus: an Introduction to Philosophical Medicine in the Era of the Renaissance* (Basel: 1958).

<sup>92</sup> William Newman, "Thomas Vaughan as an Interpreter of Agrippa von Nettesheim," *Ambix*, XXIX (November, 1982), pp. 125-40.

<sup>93</sup> Nicholas Clulee, "John Dee's Mathematics and the Grading of Compound Qualities," *Ambix*, XVIII (November, 1971), pp. 178-211; Clulee, "Astrology, Magic, and Optics: Facets of John Dee's Early Natural Philosophy," *Renaissance Quarterly*, XXX (Winter, 1977), pp. 632-80. Both articles give ample witness to the heavy influence of Bacon. Dee also owned a number of important alchemical Mss., such as Oxford, Bodleian, Digby 119 and Glasgow, Hunterian 253. Of the Mss. listed in Dorothy Singer, *Catalogue of Latin and Alchemical Manuscripts in Great Britain and Ireland* (Brussels: 1928), at least one contains works ascribed to Bacon with notes by Dee: London, B.M. Sloane 2327, ff. 30r-v and 36r-8r.

<sup>94</sup> An interesting discussion of the position of Bacon and his contemporaries regarding the *ars - natura* dichotomy may be found in Paolo Rossi, *I filosofi e le macchine (1400-1700)* (Milan, 1962).

## Appendix I

The text of the *De congelatione et conglutinatione* prepared by E.J. Holmyard and D.C. Mandeville, *Avicennae de congelatione et conglutinatione lapidum* (Paris: 1927) is really no edition at all. In the words of Holmyard and Mandeville themselves (p. 13), they "made no attempt to establish a Latin text," but only copied a base manuscript and "collated it" with several others: they did not attempt to emend the readings of their fundamental manuscript, although it was quite defective. Consequently, the text of the *De congelatione* printed by these two scholars is incomprehensible in many places. We cannot produce a critical edition of the *De congelatione* here, but, by using the variants supplied in Holmyard's and Mandeville's "collation," along with one other source, it will be possible to arrive at a coherent text of the pertinent section. The other source employed by us is the version of the *De congelatione* printed in J.J. Manget, *Bibliotheca chemica curiosa* (Geneva: 1702), I, pp. 636-8. Holmyard and Mandeville reckoned Manget's text to be of a different family than any of the Mss. or printed versions used by them (p. 14), but did not include its variants. Our purpose, let us repeat, is not to produce a critical text, but only one that is capable of translation. We have not inspected the manuscripts or printed texts used by Holmyard and Mandeville, relying only on the alternate readings that they themselves supply.

## Sigla

- A. The text of Holmyard and Mandeville (a transcription of Cambridge, Trinity 1400, ff. 8v-11v).
- Tb. Cambridge, Trinty 1122, ff. 192v-194v.
- B. *Aristotelis, philosophorum maximi, secretum...* (Bologna: 1501).
- L. *Secreta secretorum Aristotelis...* (Lyons: 1528).
- C. *Avicennae de congelatione et conglutinatione lapidum*, in *Bibliotheca chemica curiosa*, ed. J.J. Manget (Geneva: 1702), I, pp. 636-8.

Et artifices gelacionem fere similem artificialiter  
 faciunt quamvis artificialia non eodem modo sunt quo  
 naturalia nec tam certa licet propinqua sint similia et  
 ideo creditur quod compositio eius naturalis fiat hoc  
 5 modo vel vicino huic sed ars est debilior quam natura  
 et non consequitur eam quamvis multum labore. Quare  
 sciant artifices alkimie species metallorum  
 transmutari non posse. Sed similia facere possunt,  
 et tingere rubeum citrino ut videatur aurum et  
 10 album tingere colore quo volunt donec sit  
 multum simile auro vel eri. Possunt quoque plumbi  
 immundicias abstergere, ipsum tamen semper  
 erit plumbum. Quamquam videatur argentum,  
 optinebunt tamen in eo aliene qualitates

1. similem: sensibilem BL//2. quo: quo et C//3. licet propinqua sint: habet C//4. fiat: sit A//5. vicino: vicina A//et non: nec C//6. consequitur: sequitur C//quamvis: licet C//Quare om. C//7. sciant: sciant autem BLTb Sciant vero C//metallorum: vere BL aeris Tb rerum C//8. transmutari: mutare A permutari BL permutare Tb//similia: similia vel BL similia alia Tb similia illis C//9. tingere: pingere C//citrino: citrone Tb//alt. et: aut A//10. album tingere: tingere albo A album pingere C//colore quo volunt om. A//sit: sint Tb//11. multum: materie Tb//auro: argento A aut auro Tb//aut: vel Tb//quoque: aut ATb om. BL//12. ipsum: verum ATbBL//13. crit: esset Tb//Quamquam: et si BL quamvis TbC//14. optinebunt tamen: sed obtinebunt BL optinebuntur Tb sed tunc optime erunt C//aliene: aliae C//qualitates: qualitates ATb//

- 15 ut errent in eo homines ut qui accipiunt salem et salem armoniacum. Ceterum quod differentia specifica aliquo tollatur ingenio non credo possibile quia in talibus non est quod una in aliam convertatur quia ista sensibilia non sunt
- 20 de quibus mutantur species sed sunt accidentia et proprietates. Differentie metallorum enim non sunt cognite et cum differentia non sit cognita, quomodo poterit sciri utrum tollatur nec ne, vel quomodo tolli possit?
- 25 Sed expoliatio intus accidentium ut saporis, coloris,

15. *pr.* ut: *om.* A ne BL//errent *om.* A//in eo *om.* AC//homines *om.* ATb//alt. ut *om.* ATbBL//qui: *om.* A nisi quia BL//accipiunt: *om.* A accipiunt in eo BL//saltem et: *om.* ABL solem et salem et Tb//16. salem armoniacum: *om.* A sal armoniacum BL et argentum Tb//quod: que Tb//17. aliquo *om.* C//non: ego non BL//18. quia in talibus: et BLC//una *om.* ATb//in aliam *om.* ATbBL//19. quia: quod BL//20. de quibus: differentia C//mutantur: qua permutantur C//accidentia: accidentalialia A//21. proprietates: proprietatis A//metallorum enim: autem eorum metallorum BL autem eorum C//22. et: *om.* BL quia C//23. non sit cognita: sit ignota C//poterit: potest C//24. tollatur: cola B colla L tollitur Tb//25. intus *om.* TbC//accidentium: activum Tb//ut: fieri potest ut Tb//saporis: vaporum Tb vaporis et C//coloris: colorum Tb//

- ponderis, vel saltem diminutio non impossibilis, quia contra hoc ratio non stat. Ceterum proportio istarum substantiarum compositionis non erit in omnibus eadem. Hec compositio
- 30 in aliam mutari non poterit compositionem nisi forte in primam reducatur materiam, et sic in aliud quam prius erat permutetur. Hoc autem per solam liquefactionem non fit, sed accidunt ei ex hoc res quedam extranee.

26. ponderis: ponderum Tb//non impossibilis: non est impossibile non est possibile Tb *om.* C//27. quia contra hoc: quia tunc hec ABL *om.* C//ratio non stat *om.* A//Ceterum: sed C//post Ceterum *add.* qui in *ras.* A//28. proportio: propositio Tb//istarum: terrarum ABL//compositionis: compositis ABL *om.* C//29. eadem *om.* Tb//compositio: ergo BL igitur TbC//30. aliam: illam C//mutari: permutari C//compositionem *om.* C//reducatur: reducantur ABLTb [*apud* Holmyard & Mandeville]//32. permutetur: permutatur A permutentur Tb permutantur C//34. accidunt: acciduntur AB//ex hoc *om.* C//34. quedam *om.* C//

## Appendix II

The base manuscript is BN Paris lat. 6514, f. 135v (the entire text falls between 135r-v, but I have only transcribed the arguments for and against alchemy). This, of course, will not be a critical edition, since I have not inspected even the totality of the early manuscripts.

## Sigla

- P BN Paris lat. 6514, f. 135v (base manuscript).  
 T Cambridge, Trinity 1400, ff. 131v-2r.  
 L British Library, Additional 41486, ff. 220v-1v.

Metallina corpora utpote opera nature naturalia sunt, sed opera humana artificialia et non naturalia sunt.

5 Item singulorum metallorum componentia in quantitate determinata sunt, secundum quantitatem illam quam mortales nesciunt. Igitur illa componere non possunt.

10 Item locus nativitatis eorum est sinus terre ut locus fetus animalis est venter. Igitur sicut fetus non fit nisi in animalis ventre, ita nec metalla nisi in sinu terre.

Item metalla tempus determinatum ut fiant habent, sed id ab hominibus ignoratur. Igitur et ea facere ignoratum est ab hominibus.

4. componentia: componentiam P//5. illam: istam L//6. igitur: ergo L//9. est om. T//Igitur: om. P ergo L//12-4. Item-hominibus om. L//12. determinatum: determinant P//habent: habeant ut vid. T//14. ignoratum est: necesse est ignorare T//ab hominibus om. T//

15 Item metalla specie differunt. Igitur sicut nec ab homine asinus, sic nec ex metallis alia metalla fiunt.

20 Item fit quod eorum colores permulent, sed ignis illas permutationes dissolvit. Igitur frustra mutata sunt.

Item philosophi si hanc artem veram esse ut ceteras scirent, ut ceteras eam docuissent.

25 Item sequaces eius nullum certum habent auctorem, sed cartas antiquas et fabulas facetas, verbi gratia: "retulit mihi quidam, 'accipe hoc et hoc, et adde hoc ad hoc, et fiet hoc ab hoc.'"

Item si esset ars vera, non adeo esset celata presertim tanto tempore, et tanta intentione quesita.

30 Imo opera humana cum naturalibus multimode eadem sunt, ut in igne et aere, aqua, terra, mineris, arboribus et bestiis ostendemus. Nam et ignis fulgoris naturalis et ignis de lapide eiectus uterque ignis

15. Igitur sicut: sic igitur P ergo sicut L//16. sic: ita TL//metalla om. P//18. quod: ut TL//permulent: permulentur L//19. Igitur: Ergo L//19-20. mutata sunt: permutati sunt T mutantur L//21. veram esse om. P//21-2. ut-ut: ut et TL//22. docuissent: aperte demonstrassent TL//24. facetas: fascetas ut vid. P//26. ad: et TL//ab: et TL//28. intentione: intenditione P inquisitione L//29. multimode: multitudine T//30. et om. PL//aere: aere P//aqua: aqua et L//31. ostendemus: ostendimus P//alt. et om. L//

est. Aer continens naturalis est et aer ex decoctione  
 artificialis uterque aer. Terra substituens  
 35 naturalis et terra ex reservatione aque  
 artificialis utraque terra est. Sal vero viride et  
 dragantum et thutia et sal armoniacus et  
 naturalia et artificialia sunt. Immo et  
 artificialia naturalibus potiora sunt, quod qui de  
 40 mineriis sciunt non contradicunt. Arbor spontanea  
 naturalis et arbor insita artificialis utraque arbor  
 est. Apes naturales et apes ex tauro artificiales  
 utraque apes sunt. Nec ars hec omnia facit, sed  
 naturam facientem adiuvat. Auxilium igitur huius  
 45 artis naturas rerum non permutat. Humana ergo opera et  
 naturalia secundum essentiam et artificialia secundum  
 artificium eadem esse possunt.

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33. *trans.* est post 34. *aer* TL//33-4. et-artificialis *om.* L//34. *aer*: aerem P//substituens: sustinens TL//35. *naturalis*: naturalis est P//aque: atque P//37. *dragantum*: dicitur *gagantum* P *dragagantum* L//*alt.* et *om.* L//38. post *naturalia add.* sunt in *ras.* T//artificialia: artificia P//39. quod: *non legitur* T quidam L//qui de: quidam P//42. *tauro om.* P//43. *utraque*: utraque P//44. *facientem*: faciente P//huius *om.* L//45. *opera*: corpora vel *opera* L//45-6. et *naturalia*: naturalia T *om.* L//

De quantitate componentium oppositio refellitur  
 per sal viride et alia supradicta que sine  
 50 determinatione quantitatis componentium assidue  
 facimus.

Loci oppositio cassatur quia sicut ex ovo in  
 ventre animalis nascitur, sic etsi sub mamilla vel  
 in fumariorum ponitur, animalis nascetur.

55 De tempore vero obiectio predicta sicut et illa de  
 quantitate componentium facillime debilitatur.

De speciali vero differentia cui dubium est  
 metalla specialiter non differere, cum et in una  
 diffinitione conveniant. Verbi gratia, corpus  
 60 compositum, in igne fusibile, non combustibile, sub  
 malleo extendibile. Immo ut verum fatear nulla fere  
 his similibus similia sunt quia unum aliud recipit et  
 commisceri patiuntur et in igne a se invicem  
 combibuntur, utpote qualitate accidentali tantum  
 65 differentia.

Quod autem ex dissolutione ignis ratione asserunt

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48. *componentium*: *opponentium* P//49. et *alia*: et cum P et cetera T//53. sic: sic et T//52. *ovo*: uno P uno *animalis* T//53. *animalis*: *animalis aliud* M//etsi: *om.* Pet T//54. in *om.* P//fumariorum: *fimario* TL//*animalis*: aliud P//nascetur: nascitur T//57. *speciali*: *spirituali* P//est *om.* TL//58. *cum*: cui P//61. *fere*: super L//*similibus*: *similibus fere* L//62. *quia*: quia et TL//64. *combibuntur*: *comburuntur* L//66. *Quod*: Quid T//*ratione*: rationem L//asserunt: auferunt T//

contradictione non eget, cum es album a tucia minime ab igne discoloratur.

- 70 Quid autem apertius si super hac arte auri esse voluerunt, cum plures de solido possesso auri esse potuerunt? Deinde ut amplius intelligant et hanc artem et celatam esse et auctores certos habuisse, cum non impossibile sit, in libro tamen testimonii comprobatur, quia omnes philosophi in libris suis eam
- 75 tetigerunt.

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67. album: album quidem TL//68. discoloratur: discoloratur L//69. Quid: Quod P//auri: avari TL//69-70. esse voluerunt: esset P//70. de solido: desolide T//posse: possesso *om.* P possessio T//auri: avari TL//71. ut: id P//intelligant: intelligunt P//72. celatam esse: *additio in mg. sed non legitur* T// certos: certum L//non *om.* P//74. comprobatur: prolixius comprobatur vel commatur T prolixii comprobatur vel confirmatur L//omnes: fere omnes TL//suis: eius *in ras. post* suis T//75. tetigerunt: sparsim tetigerunt L//

## CHAPTER TWO

### I. Introduction to the "Geber Problem"

In the foregoing chapter, we presented a general overview showing the reaction of thirteenth century Latin writers to a horde of alchemical documents newly translated from Arabic. As we demonstrated there, alchemy presented a forum for dispute about the possibility of transmuting the species of metals and other natural products, which became in effect a controversy about the power of technology at large. This debate grew in volume and intensity throughout the latter half of the thirteenth century, reaching a sort of culmination in the anti-alchemical bull of John XXII, "Spondent quas non exhibent," issued in 1317. But the literature supporting alchemy may be said to have reached its own climax a little earlier, with the writing of a text which was to influence not only apologists, but also chemical practitioners and theorists, and well into the seventeenth century. The *Summa perfectionis*, a work traditionally thought to have been written in the eighth century by an almost mythical adept, will be the focus of the present chapter.

Since the publication of Hermann Kopp's *Beiträge zur Geschichte der Chemie* (1869-1875),<sup>1</sup> the scholarly world has known of the *Summa perfectionis* of "Geber Arabus," supposedly written by the mysterious Islamic alchemist Jābir ibn Ḥayyān. The *Summa*, as George Sarton and Lynn Thorndike were later to remark,<sup>2</sup> played a large role in the development of occidental proto-chemistry: it was perhaps the most important "text-book" of alchemy in the late medieval West. Yet the questions surrounding the origin of the *Summa* have so resisted scholarly inquiry that their aggregate has come to be called the "Geber problem."

The text of the *Summa*, in the present critical edition, is divided into three books.<sup>3</sup> The first presents arguments for and

against the possibility of alchemical transmutation, followed by brief descriptions of the metals. The second is primarily devoted to a description and theoretical explanation of alchemical operations and apparatus. The third (part I) describes the essential nature of the metals in detail, presenting them in terms of a corpuscular theory. Part II of the third, finally, unfolds a complicated theory of "three orders of medicines" by which the transmutative agents perform their job, and culminates in an exposition of the theory and practice of assaying. Each of the three books thus contains specific themes of importance to the historical development of chemistry and metallurgy: the justification of alchemy as a science, the composition of the metals and of those reagents which act upon them, the making of apparatus, and the theory of transmutation are all dealt with at length. Thus we have the recognition of Kopp, Sarton, Thorndike, and others<sup>4</sup> that the *Summa* occupied a critical place in the development of late medieval alchemy.

The two questions forming the most immediate components of the "Geber problem" concern neither the contents of the *Summa* nor its subsequent influences; they focus rather on the identity of the author and the sources he used. It is true that the medieval witnesses are generally in agreement in attributing the *Summa* to an Arabic "Geber." The *Margarita pretiosa* of Petrus Bonus, written between 1330-1339, excerpted large sections from the *Summa*, which it attributes to "Geber Hispanus,"<sup>5</sup> apparently confusing Jābir ibn Ḥayyān with the XIth century astronomer Jābir ibn Aflaḥ of Seville. The earliest sure witness, the *Conciliator* of Petrus de Abano composed in the first ten years of the fourteenth century, extracts the *Summa's* description of mercury, which it attributes to "Ieber."<sup>6</sup> Nonetheless, a great many incongruities have led historians to doubt this ascription, and to deny that the *Summa* was translated from Arabic at all. Unfortunately, it has been quite difficult to prove this, because the author of the *Summa* not only refuses to cite any other writers by name, but also because he

appears to have rewritten his sources - almost totally avoiding literal transcription. Therefore we have in the *Summa* a text of considerable sophistication which names no authors and whose own author's precise dates, identity, and geographical origin have remained up to now unknown. Before proceeding to our own findings about the "Geber problem," let us briefly present the discoveries of previous scholars, in rough chronological order.

The first thoroughgoing description of the *Summa* appeared with the publication of Kopp's foregoing *Beiträge*. The German scholar laid the foundations of future Geber scholarship by performing three important tasks. First, he analyzed the Arabic bio-bibliography then available in translation, from which he determined that there was a historical alchemist of the eighth century called Abu Musa Dschabir Ben Hajjan Ben Abdallah el-Sufi el-Tarsufi el-Kufi, whose name became "Geber" in Latin.<sup>7</sup> Second, he compared the printed editions of those Geberian texts known to him - including the *Summa perfectionis* and three other works, the *De investigatione magisterii* (or *perfectionis*), *De inventione perfectionis*, and *Liber fornacum*<sup>8</sup> - from which he learned that many variants existed in the different printings.<sup>9</sup> Third, and most importantly, Kopp submitted his copy of the *Summa* to a trained Orientalist, in order to determine whether the Latin betrayed any traces of an Arabic original.<sup>10</sup>

Although the Arabist could find none of the tell-tale signs usually betraying an Arabo-Latin translation, Kopp could not rule out the possibility that the *Summa* was either the work of an unusually skilled and clever translator, or that it might represent the careful reworking of an Arabic original. Hence Kopp's *Beiträge*, while raising doubts about the genuineness of those works which we shall henceforth refer to as the *corpus geberianum* (with the addition of the *Testamentum*, for which see our note 8), concluded that these texts were in fact Latin translations of Arabic



treatises written in the eighth century by a historical Jābir ibn Ḥayyān (to modernize Kopp's transliteration).

The next step in the evolution of the "Geber problem" appeared with the publication of Marcelin Berthelot's *La chimie au moyen âge* in 1893.<sup>11</sup> Berthelot was struck by the fact that neither Vincent of Beauvais nor Albertus Magnus mentioned the *corpus geberianum*, although these authors were well acquainted with the alchemical literature circulating in Latin during the mid-thirteenth century.<sup>12</sup> In addition, Berthelot had published thirteen Arabic *opuscula* attributed to Jābir, translated by O. Houdas, and was thus able to compare the Arabic Jābir's work to that of the Latin Geber. Finally, Berthelot published the *Liber de septuaginta*, one of the several authentic translations of Arabic texts attributed to Jābir.<sup>13</sup> After reading these sources, Berthelot concluded that the Latin Geber was decidedly more rational than his Arabic counterpart - even when the latter was translated - and that the author of the *Summa* did not indulge in the Muslim *formulae* of his Arabic namesake.<sup>14</sup> Indeed, Berthelot went so far as to say that the sustained logical ordering of the *Summa* betrayed the signs of the author's scholastic training, and that the text was thus more probably of the thirteenth century than of the eighth or ninth.<sup>15</sup> Berthelot then extended his critique to the four other texts of the *corpus geberianum*, concluding from the fact that they contained mineral names not appearing in the *Summa* and processes of a seemingly more advanced nature, that they were by a later author (or authors) than that of the *Summa*.<sup>16</sup> Thus *La chimie au moyen âge* presented two forcefully stated arguments - that the *Summa* was not written by an Arabic Jābir ibn Ḥayyān but rather by a Latin pseudo-Jābir, and that the other members of the *corpus geberianum* had in turn been forged by other unknown pseudepigraphers.

The next major entrant to attempt a solution of the "Geber problem" - and who seems to have coined that expression - was

Eric John Holmyard, who published a number of articles in the 1920's that directed their polemics against the theses of Berthelot.<sup>17</sup> Holmyard read Arabic, and was therefore able to adduce manuscript evidence from Jābir's *Book of Properties* and *112 Books* refuting Berthelot's claim that the namesake of Geber was incapable of such sustained argument as his scion;<sup>18</sup> in a similar way, Holmyard showed that *formulae* of Arabic origin seemed to exist in the *corpus geberianum*.<sup>19</sup> As for Berthelot's allusion to the ignorance displayed by Albert and Vincent of the *Summa*, Holmyard merely replied that the latter text could have been translated after the middle of the thirteenth century.

Hence, although Holmyard's contemporaries, such as Julius Ruska and George Sarton, were not convinced that Jābir ibn Ḥayyān wrote the *corpus geberianum*, the issue was not closed. This situation altered dramatically with two publications appearing between 1935 and 1943: we shall treat the latter of these first, because it has had a considerable impact on the world of scholarship, whereas the former remains largely unknown. In 1942-3, Paul Kraus published his renowned *Jābir ibn Ḥayyān: Contribution à l'histoire des idées scientifiques dans l'Islam*. After sifting through all the relevant Muslim bio-bibliographers and examining scores of manuscripts, Kraus could prove that Jābir ibn Ḥayyān was the *nom de plume* of a group of Ismā'īlī propagandists writing in the ninth and tenth centuries.<sup>20</sup> The Arabic works attributed to Jābir were in fact forgeries ascribed to a quasi-mythical master who had died - if indeed he ever lived - perhaps a century before their composition.<sup>21</sup> This information was enough to demolish Holmyard's claim that the Latin Geber was Jābir, but not enough to deny that Geber might correspond to a particular Arabic pseudo-Jābir. As Kraus showed, however, none of the extant writings ascribed to Jābir ibn Ḥayyān could possibly be the originals of the *corpus geberianum*, for the texts were entirely dissimilar. The only hope for Holmyard's argument

now lay in the remote contingency that the *corpus* had been translated from Jābirian texts which not only had been subsequently lost, but whose very mention in the Arabic bibliographies had also perished.

It now seemed rather probable that Berthelot had been correct in rejecting any Arabic original for the *corpus geberianum*, since no mention of our five texts could be found in the Arabic literature. The argument for a Latin original had in fact been bolstered in 1935, when Julius Ruska published an article entitled "Übersetzung und Bearbeitungen von al-Rāzī's Buch *Geheimnis der Geheimnisse*."<sup>22</sup> In this study, Ruska ascertained several things of importance. First, he disclosed that the genuine *K. al-Asrār* of Abū Bakr Muḥammad ibn Zakariyya ar-Rāzī (865-925) had been translated into Latin as the *L. Ebu Bacchar er Raisy*. Ruska maintained that this or another translation of the *K. al-Asrār* (the degree of reworking makes it difficult to determine the affiliation) had been variously reworked in the thirteenth century - once with the rubric *L. secretorum de voce Bubacaris* (or *L. Bubacaris*) - and then in a second reworking based in its turn upon the *L. secretorum de voce Bubacaris*, to which the rubric *De investigatione perfectionis* was then added, along with a false ascription to Jābir ibn Ḥayyān. (This reworking of the *L. secretorum* had nothing in common with the printed *L. de investigatione* belonging to the *corpus geberianum*.) Perhaps because Ruska found the unknown Rhazean *De investigatione* in an early manuscript (Riccardiana 933, XIIIth-XIVth century), he allowed it to occupy the bulk of his research. Ruska thus learned that much of the original text of Rāzī had been suppressed, to be replaced with a number of theoretical discourses concerning the nature of minerals and salts. He was struck by the sophistication of these chapters, not only with regard to their content, but also with respect to their latinity, which was markedly better than that of the translated text. Ruska was especially impressed by the concluding section of the Riccardiana

manuscript's chapters *de atramentis et salibus*, to which he compared the *prohemium* of the *Summa*. Let us briefly examine the fruits of Ruska's research by placing his textual parallels in two columns -

*Summa*

Totam nostram scientiam,  
quam ex dictis antiquorum  
abbreviamus compilatione  
diversa in nostris voluminibus  
hic in Summa una redigemus,  
et quod in libris a  
nobis scriptis est  
diminutum, sufficienter  
in hac traditione huius  
nostri libri recompensavimus,  
et ipsorum defectum  
supplevimus sermone brevi.<sup>23</sup>

*De investigatione*

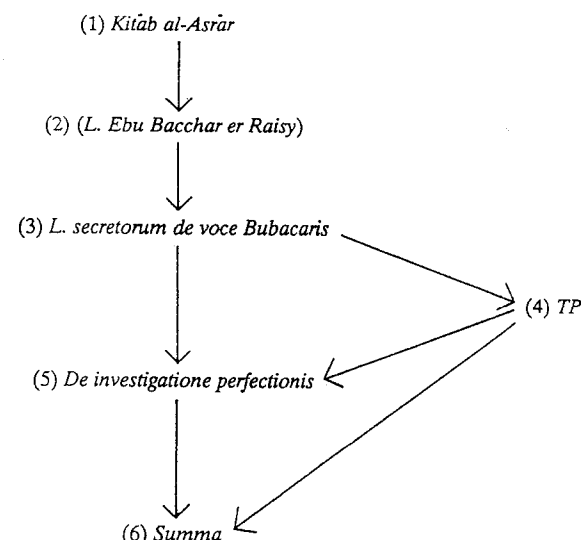
De quorum nominibus,  
naturis et operationibus  
hic dispersa in diversis  
voluminibus, posuimus  
capitula, et induimus  
opinionem diversas.  
Alibi tamen cum Deo  
summam omnium, quae  
sparsim tradidimus,  
aggregabimus cum veritate  
probationis in Summa una  
sermone brevi, in qua  
quicquid nostra volumina  
utile seu superfluum  
continent aut diminutum,  
hic per illam ibique per  
haec sanae mentis et  
diligentis indagacionis  
artifex absque errore  
reperiet et perveniet ad  
desideratum perfectae  
artis actum et expectatum  
laboris effectum.<sup>24</sup>

In the latter of these two quotations, the anonymous reworker of the *L. secretorum* announces, in a phraseology which is undeniably close to that of the *Summa*, that he proposes to write a *Summa* in which all his volumes will be explained. This, and the other textual parallels that Ruska proceeded to draw between the two treatises led him to hypothesize that "der Bearbeiter des *Secretum secretorum* [i.e. the *L. secretorum de voce Bubacaris*] auch der Verfasser der *Summa* gewesen ist."<sup>25</sup>

II. *The De investigatione perfectionis*  
and *Theorica et practica*

In 1985, we published two articles describing the discovery of a *Theorica et practica* ascribed in the manuscripts to one "Paulus de Tarento," supposedly a lecturer at the Franciscan monastery in Assisi.<sup>26</sup> As we showed there, this text contains large portions of the *De investigatione perfectionis* described by Ruska, and there is solid evidence that Paul of Taranto was the very reworker who transformed the *Liber secretorum de voce Bubacaris* into the *De investigatione*. The reader may wish to consult the chart on the following page while reading the present section, in order to keep the transmission of these texts clearly in mind.

It would be unnecessarily tedious to repeat our already printed arguments. There is yet further evidence that the author of the *TP* and the reworker of the *De investigatione* are one, however, and since this evidence confirms our earlier hypothesis that the *TP* is the earlier of the two texts, it will not be superfluous to give it here. Although we gave numerous parallel citations from the two texts in "New Light on the Identity of Geber," we did not analyze the sources of the *De investigatione* beyond stating the obvious fact that it is heavily dependent on the *Liber secretorum de voce Bubacaris*. A comparison of selected parallel passages from the *TP* and that text show, however, that Paul of Taranto reconsulted the sources of the *TP* before writing the *De investigatione*, and that he inserted new pieces from these unnamed sources into the latter work. This provides strong evidence that the authors were one, since the sources are not named in either text. First let us quote both texts' description of sal alkali, where the main source is clearly the *De aluminibus et salibus* of pseudo-Rāzī.



The above chart represents the following state of affairs: (1&2) Rāzī's *Kitāb al-Asrār* is first translated as the *L. Ebu Bacchar er Raisy*. (3) The *L. secretorum de voce Bubacaris* is then prepared, reworking either the *L. Ebu Bacchar* or another form of the *K. al-Asrār*. I have placed the *L. Ebu Bacchar er Raisy* in parentheses in order to indicate my uncertainty as to whether this reworking was based on that translation, another Latin form, or the Arabic original. Ruska himself (1935) was not clear about this point. (4) The *TP* is written, with the author relying heavily on the *L. secretorum de voce Bubacaris*. (5) The *De investigatione perfectionis* is composed, primarily as a reworking of the *L. secretorum*, but also containing the *TP*'s chapters on atraments, boraces, and salts, as well as a number of recipes drawn therefrom. (6) The *Summa* is written, incorporating ideas drawn from the *TP* and referring to the *De investigatione*.

Let the reader note that this diagram does not attempt to describe sources used by the *TP*, *De investigatione*, and *Summa* other than the text of Rāzī. Although other sources were used, our intention here is merely to show the development of these particular texts and their interplay with the *L. secretorum de voce Bubacaris*.

## TP

ed. Newman, 42v,36-52.

Melius autem omnibus modis paratur si post eius solutionem quaternam cum aqua pluviali septupla ipsius distilletur per filtrum et et post ipsius reductionem quaternam in corpus, solvatur cum aqua animalis. Et distilletur et congeletur eodem modo pluries donec quasi cristallus vertatur ad modum cere liquabilis fusibilisque. Tunc enim est sal valde nobilissimus et efficacissimus super omnes precedentes sales iam dictos, maxime ad congelationem mercurii. Valet autem maxime preparatus hic sal ad omnium calcinatorum corporum solutionem et spirituum omnium fixationem, maxime sublimatorum vel calcinatorum. Et figit omne volatile et mundificat omnes sordes, et auctivum est ponderum corporum plurimum. Fundatur post hoc etiam clausum et argillatum in vitreato donec liquescat ut adeps; et cum ipso eriguntur et reviviscunt corpora spiritusque, <et> cerantur omnes spiritus congelati fixique. Et hoc a veteribus dicitur sal atinchar et philosophorum acetum. Et etiam sal armoniacus eorum describitur....

The source for much of the above information about sal alkali is the *De aluminibus et salibus*. There pseudo-Râz1 describes a salt -

## DIP

ed. Newman, p. 233,11-19.

Melior tamen modus est, ut quater soluto et congelato cum aqua animali idest albuminum dissolvatur et congeletur, donec speciem cristalli assumat et fiat ut cera fusilis. Et sic preparatus valet pre aliis modis ad congelandum mercurium et omnium calcinatorum corporum et spirituum dissolutionem, et figit omne volatile, et abstergit sordes, et auget pondera mineralibus, et cum eo fuso invitreato ut adeps eriguntur corpora et spiritus calcinati. Et hic dicitur antinchar et philosophorum acetum.

...quod occulte tetigerunt philosophi et sapientes, et occultaverunt ipsum, et est sal armoniacus eorum, et acetum[!] ipsorum, et eorum sal, et tincar ipsorum; scias ergo illud.<sup>27</sup>

Thus we find both the *TP* and *DIP* relying on the *De aluminibus et salibus* for the same information, expressed in similar words. But the reader could argue that the *DIP* has merely derived this information from the *TP*, and not from the source of the *TP*. This is not the case with the two texts' description of common salt, however -

## TP

42r,9-33

Dissolvatur sal communis cum aqua pluviali ferventi, et distilletur per filtrum. Et non totaliter congeletur, sed cum prope congelationem extiterit, extrahas ipsum ab igne.... [169] est fusibilis, et currit super ignitam laminam sicut decet. perfecta, et ideo apud antiquos argentum populi appellatur.

## DIP

p. 228,16-229,7.

...calcinator, in aqua pluviali dissolvitur et congelatur in igne lentissimo, hoc septies iterando ad plus, ita quod non crepitet et fiat fusibilis.... Et ipse est qui calcinat et abluit corpora operatione

The two texts start out here with a process for purifying table salt with rainwater. They then begin to deviate markedly, and the *DIP* ends up by quoting the *De salibus et aluminibus* more or less verbatim, referring to salt as *argentum populi*. Let us here quote pseudo-Râz1 -

... et abluit corpora ex sorde, et corrodit sorditiem eorum. Et cum eo calcinantur corpora et non cum alio; et propter hoc nominaverunt ipsum sapientes "argentum communitatis."<sup>28</sup>

It is clear that Paul has here decided to alter his original recipe for the preparation of table salt, and in doing so has gone back to his favorite source, pseudo-Rāzī. The same pattern can be seen in other *loci* within the two texts, for example in their respective treatments of sal ammoniac -

*TP*  
43v,7-15.

Sal armoniacus est oleum coagulatum ex elementorum pinguedine per siccitatem et est siccus et et calidus mire subtilitatis et penetrationis. Est autem spiritus volans, et ad omne exir efficaciter faciens, sive sit ad album sive ad rubeum, valet. Nec est complementum alicuius medicine metallice sine eo, nec breve solvitur solvendum aliquid preter eum. Nec etiam est bona mixtura medicine cum corpore preter eum. Incerat autem omnes spiritus corporaque, ac dat bonam fusionem, ingressionem, sive profundationem unius ad alterum.

Here both texts tell us in similar wording that sal ammoniac is highly volatile and penetrative, and hence useful for producing alchemical medicines. Indeed, as the *TP* states, no *solvendum* can be dissolved without it, nor can any medicine penetrate into a metal properly so that good mixture can occur. The *DIP* tells us the same information, but not in the author's own words. As the following passage from the *De salibus et aluminibus* shows, the author of the *DIP* is actually quoting pseudo-Rāzī -

*DIP*  
p. 238,17-p. 241,19

Sal armoniacus fit ex flore vaporum balneorum, et urina dissolvendo et congelando, et ignis, est calidus et siccus mire subtilitatis et penetrationis.... et est spiritus volans et ad omne exir operans bonum, sive sit ad album, sive rubeum valet.... Et dixit unus de antiquis nostris: "nisi esset almizadir, non ingrederetur aliquid nec solveretur." Et non utaris ipso nisi separato aut sublevato, et operare cum eo et prosperabis Deo volente. Amplius incerat spiritus et profundat ea....

...et si ipse non esset, non completeretur hoc <elic> sir ;  
neque exsolveretur neque ingrederetur.<sup>29</sup>

It is absolutely clear that the *DIP* cannot be dependent on the *TP* here, since the former gives an almost exact quotation of pseudo-Rāzī, while the latter supplies only a vague paraphrase. Hence it is sure that the author has here gone to his original source - not to the *TP*. The reader who has followed us to this point may begin to wonder, perhaps, if the *DIP* has not only used the same sources as the *TP*, but is in fact the source of the latter work. We can show unequivocally that this is not the case, however, and that the *TP* is an earlier composition than the *DIP*. At numerous points in the *TP*, Paul of Taranto refers to earlier or later *loci* within his text. In some of the recipes carried over from the *TP* to the *DIP* these same references occur, but in at least one case, the result is confusion. Both texts describe the preparation of *spuma nitri* in almost identical wording -

*TP*  
44r,31-44v,6.

Et hoc per quindenam continuari debet, quousque liquefiat ut plumbum; et tunc erit optimum ad congelationem mercurii sicut sal alkali, et parari potest modo simili sicut illud, et illud sicut istud. Tunc vero non oportet mercurium sublimare, sed solum purgare sicut infra dicitur. Sic congeletur mercurius ad odorem saturni vel iovis, ut dictum est superius, et tunc ponatur unum de dicta spuma preparata, sicut est dictum, et duo de tali mercurio congelato, et minus quinquies cum aqua nitri combusti, de qua dicitur....

*DIP*  
p. 243,17-p. 244,8.

...et hoc per quindenam continuari debet, quousque liquescit ut plumbum, et tunc erit optimum ad congelationem mercurii sicut sal alkali. Et preparari potest simili modo sicut id, et id sicut istud. Tunc vero non oportet mercurium sublimare, sed solum purgare sicut infra dicitur. Sic congeletur mercurius ad odorem saturni vel iovis, ut dictum est superius; et tunc ponatur unum de dicta spuma preparata sicut est dictum, et duo de tali mercurio congelato etceterum ad ceretur ad minus quinquies cum aqua nitri combusti, de qua dicitur....

Here the two texts describe a method for congealing mercury with lead, tin, and *spuma nitri*. In both cases we are informed that this makes sublimation of the mercury unnecessary, "just as will be said below," and "of which will be spoken." But the *DIP* has nothing further to say about the congealment of mercury, nor anything more about its sublimation. Indeed, the text ends on the next folio. The *TP*, to the contrary, goes on five folios later to describe extensive "purgations" of mercury by washing, followed by its amalgamation with tin or lead (49r), just as the previous recipe promised. There seems no way to escape the fact, therefore, that the *DIP* has lifted this recipe from the *TP*, rather than the converse. But as we showed before, the author of the *DIP* knows the *TP*'s sources and in some cases has even gone back to the precise *locus* from whence the *TP* got a particularly juicy bit of information, even though the *TP* has not identified its source. This is surely sufficient evidence that the author of both texts is but one man - an alchemist who called himself Paul of Taranto.

There can be no reasonable doubt, then, that Paul of Taranto first composed the *Theorica et practica*, using the *Liber secretorum de voce Bubacaris*, the *De aluminibus et salibus*, and other sources, then reworking the *Liber secretorum de voce Bubacaris* so that it became the *De investigatione perfectionis*. Now we must address the relationship of the *TP* and *DIP* to the *Summa perfectionis*. As is well known, the *Summa* itself contains several references to previous works that the author claims as his own. Since these citations are important in determining the *De investigatione*'s relationship to the *Summa*, we shall quote them here. At 78rb,38-78va,2, the *Summa* makes its first mention of a *De investigatione*:

...et hanc proportionem [ignis] in alio nostro volumine quod de perfectionis investigatione intitulatur conscripsimus, quod secundum ordinem hunc precedit librum. In illo enim

quecunque investigavimus secundum nostre mentis rationem scripsimus. Hic vero quod vidimus et tetigimus complete secundum scientie ordinem determinavimus.

The author clearly makes the distinction here between the "reason of [his own] mind" (*nostre mentis rationem*) followed in the *De investigatione*, and the "order of science" (*scientie ordinem*) pursued in the *Summa*. In other words, the *Summa* represents the theoretical ordering of data described - but not explained - in the *De investigatione*. This two-fold process is further reflected in the titles of the works themselves. "Investigatio" means "searching out" or "finding": hence the *De investigatione* represents the process of discovery - both of facts themselves and of recipes recorded by previous authors. "Summa," on the other hand, means "totality" or "summary," here reflecting the sorting and evaluation of those raw data presented by the *De investigatione*.

A few lines later, the *Summa* clarifies this relationship further, saying (78va,43-78vb,2) -

Modos vero omnes preparationum determinavimus completius in libro qui de perfectionis investigatione intitulatur, quoniam in hoc abbreviavimus summas illarum.

Since the *De investigatione* describes "all methods of preparation more completely" than the *Summa*, we should expect it to be a text of primarily empirical interest. The text discovered by Ruska is precisely that. Based on the *Liber secretorum de voce Bubacaris*, the *De investigatione* also incorporates long passages taken from the *TP*'s practical section. Thus the text contains three levels - the remaining parts of Rāzī translated into Latin, the first reworker's interpolations, and the second set of interpolations taken partly from the *TP*. The contents of the *De investigatione* need not concern us further here, though we should add that the

references made by the *Summa* to the "proportion of fire"<sup>30</sup> and "methods of preparation"<sup>31</sup> can indeed be found therein.

The *Summa's* references to a *De investigatione* can only pertain to a text written before the *Summa* itself, both because the *Summa* refers to it as a completed work, and because the *Summa's* comments make it clear that the *De investigatione* belongs to an earlier stage in the author's ideological evolution, when he was still "searching out" the data that he would later organize in the *Summa*.

We see, then, that there is no obvious reason why the *De investigatione* studied by Ruska should not be the very *De investigatione* referred to in the body of the *Summa* itself. The problem is complicated considerably, however, by the fact that there are other texts in existence that also claim the honor of having been written by the author of the *Summa perfectionis*. We must surely consider them before accepting Ruska's hypothesis as true. As this consideration will involve several textual questions of a rather minute nature, the general reader may wish to skip over it.

### III. The Printed Geberian Opuscula

#### III.1. Berthelot's Arguments

As we have mentioned, the *Summa perfectionis* is often accompanied in its printed editions by four other texts attributed to "Geber" - a *Liber de investigatione perfectionis*, *Liber de inventione veritatis*, *Liber fornacum*, and *Testamentum*. While Hermann Kopp accepted that these works were genuine products by the author of the *Summa*, Marcelin Berthelot subsequently rejected them as later forgeries.<sup>32</sup> Although we have already described the entirely different *De investigatione* discovered by Ruska, our analysis would not be complete if we failed to discuss these four short treatises as well. We shall therefore analyze the arguments of Berthelot here and try to determine which of them are still valid. Let us here

quote the requisite passage from *La chimie au moyen âge*, where Berthelot first vented his scepticism:

Les opuscles *De investigatione perfectionis*, *De inventione perfectionis*, et le *Liber fornacum* ne sont pas autre chose que des extraits et des résumés de la *Summa*, qui y est citée à plusieurs reprises. Ils reproduisent les mêmes préparations et opérations, avec additions de noms et de faits plus modernes, tels que les noms de salpêtre, du sel de tartre, de l'alun de roche et de la plume, la mention des eaux dissolvantes obtenues en distillant un mélange de vitriol de Chypre, de salpêtre et d'alun - ce qui fournit de l'acide nitrique - ou bien en ajoutant à ces sels du sel ammoniac - ce qui rend le produit apte à dissoudre l'or, le soufre, et l'argent (eau régale). Tout cela manque dans la *Summa*, et ces préparations ne figurent à ma connaissance dans aucun manuscrit du XIIIe siècle, ou du commencement du XIVe.<sup>33</sup>

It is necessary to state, first of all, that Berthelot's ultimate decision regarding the inauthenticity of the four "Geberian" *opuscula* is entirely correct. Having affirmed this, we must adjoin the paradoxical conclusion that all his arguments are wrong.

Berthelot's distrust of the four *opuscula* hinged on his belief that they contain "more modern facts and names [of reagents]" than one can find in the *Summa*. These names and reagents included 1) *salpetrae*, 2) *sal tartari*, 3) *alumen roccae*, 4) *alumen plumae*, and 5) the mineral acids. It is entirely untrue that these names and products were unknown in the late XIIIth century or early XIVth century, as we shall now proceed to show.

1) The term *salpetrae* or *sal petre* does not occur in the *Summa*, but was circulating in variant forms from at least the mid-XIIIth century. The *Liber ignium ad comburendos hostes* of Marcus Graecus, written around 1250, uses the variant form *sal petrosum* to describe an inflammable reagent which can only be the modern saltpeter (potassium nitrate).<sup>34</sup>

2) *Sal tartari* is mentioned in the late XIIIth or early XIVth century *codex* Riccardiana 933, from which we have transcribed our

base manuscript of the Rhazean *De investigatione*. The term may be found on f. 15r, 16v, and at other places.

3) *Alumen roccae*, according to Ruska, is derived from the Arabic name for Edessa, "Ruhā."<sup>35</sup> It is likely that the "alumen de rocco" referred to in the early *Ars alchemie* attributed to Michael Scot is this very *Alumen roccae* (p. 538). The term occurs in Riccardiana 933 at 21v, as *alumen roche*.

4) *Alumen plume* occurs under the variant form *alumen plumatiolum* in the early XIVth century MS. Palermo Biblioteca Communale 4QqA10, f. 448r. The form *alumen de pluma* is found in the Salernitan *Alphita*, and Albertus Magnus refers to an alum "quod in scissuris plumosum apparet."<sup>36</sup>

5) Robert Multhauf has already noted several early XIVth century references to the mineral acids in non-chemical sources.<sup>37</sup> Similar recipes occur in the early XIVth century MS. Bologna 139(105), f. 248r: these would produce dilute nitric and hydrochloric acid.<sup>38</sup>

Since all five of the products mentioned by Berthelot can be found in manuscripts written in the very early XIVth century at the latest, and since the *Summa* itself was composed only in the last third of the XIIIth century (cf. Part VI of this chapter), it follows that the presence of these substances is not sufficient proof that the four "Geberian" *opuscula* are not by the author of the *Summa*. Such proof is abundantly at hand, however, if we consider certain problems of a purely textual nature. In order to do this, it will be necessary to describe the four *opuscula* themselves.

### III.2. Multhauf's Analysis of the *Opuscula*

A so-called *Liber investigationis magisterii* occurred with the first printing of the *Summa* itself, by the Roman printer Eucharius Silber, apparently in the 1480's,<sup>39</sup> bearing the incipit "Investigationem huius nobilis scientiae...(TK 776)." A variant

form of this text, along with a *Testamentum* attributed to Geber ("Ex omnibus rebus...," TK 534) appeared with the *Summa* in another Roman printing from c. 1524, by Marcellus Silber.<sup>40</sup> Finally, a third form of the text beginning "Investigationem huius nobilis..." came to press in 1541, this time with the *Summa* and two other texts, a *De inventione veritatis* (Consideravimus in nostris voluminibus..., TK 256) and *Liber de fornacibus construendis* ("Consideravimus consideratione non fantastica...," TK 255).<sup>41</sup> All subsequent printings of the *De investigatione*, *De inventione*, *Liber de fornacibus construendis* (*L. fornacum*), and *Testamentum* derive from these three editions.

No manuscripts or reliable witnesses of the Geberian *opuscula* dating before the early fifteenth century have yet been found.<sup>42</sup> Nonetheless, there is the fact that the *Summa* mentions a *De investigatione* twice and a *L. fornacum* once, as we have shown already. We argued there that the *De investigatione* must have been written before the *Summa*, both because it is referred to as a completed work, and because the reference makes it clear that the *De investigatione* represented an earlier stage in the author's development. The printed *De investigatione* refers back to the *Summa*, however, as though the latter text had been written first. As Robert Multhauf has noted, such anachronism is shared by the other three *opuscula* -

*De investigatione* (Ch. I) states in so many words that it was composed after the *Summa*, but the *Summa* (Ch. 70) says that the matter there treated ("preparation of lead and tin") was more fully dealt with in the *De investigatione magisterii*. The *Liber fornacum* (Ch. 3), on the sublimatory furnace, says that the author has written about this previously in the *Summa*. The *Summa* (Ch. 73), on the sublimation of arsenic, says that he has previously written on this in the *Liber fornacum*! The *Liber fornacum* (Ch. 14) also speaks of the *De investigatione* and *Testamentum* as earlier works. The *De inventione* speaks of the *Summa* as earlier. Neither it nor the *Testamentum* is mentioned in the *Summa*.<sup>43</sup>



Unfortunately, Multhauf was unable to capitalize on these important observations, due to his reliance on the printed translation of Ernst Darmstaedter, to whom his citations refer.<sup>44</sup> Not having consulted the manuscripts, Multhauf accepted George Sarton's claim that "The *De investigatione perfectionis* is in the thirteenth century Florence Riccardiana MS. 933."<sup>45</sup> But this, of course, is the reworking of the *Liber secretorum de voce Bubacaris*, and has nothing to do with the printed *De investigatione*. As we stated above, no manuscripts earlier than the fifteenth century are known to exist for any of the four *opuscula*.

Despite his ignorance of the manuscript tradition, Multhauf was able to show that the *De investigatione*, *De inventione*, and *L. fornacum* all refer to the *Summa* as a work previously written, while the *L. fornacum* mentions the *De investigatione* and *Testamentum*. Since it is quite impossible that the *De investigatione* referred to by the *Summa* could have been written after the composition of the *Summa*, it will follow that the printed *De investigatione*, at least, cannot be by the *Summa's* author, provided that its references to the *Summa* are not interpolations.

Before we consult the manuscripts in order to see if this is the case, we must ask another question, however. Since the *Summa* refers to a *De investigatione* and *L. fornacum*, it is easy to see how later forgers could have decided to concoct texts by those names. But Multhauf stated above that the *Summa* does not mention a *De inventione*. How then did this text come into being?

In order to solve this problem, I have inspected the *Summa's* two references to a *De investigatione* in nineteen late XIIIth and XIVth century Mss. All nineteen Mss. agree that the first reference should be to a *Liber de investigatione perfectionis*.<sup>46</sup> With the second reference, however, some variation occurs. Eleven of the Mss. cited agree that the text should again refer to a *Liber de*

*investigatione perfectionis*,<sup>47</sup> while the other eight refer instead to a *Liber de inventione perfectionis*.<sup>48</sup>

Multhauf's statement that the *Summa* does not refer to a *De inventione* is therefore only partially true, since some of the manuscripts do indeed read *inventione* instead of *investigatione*. It seems very probable, though such a thing is difficult to prove, that the author of the *Summa* simply made two references to a *De investigatione*, the second of which was later misread - due to scribal shorthand - as *De inventione*. It would at any rate be rather remarkable for an author to beg confusion by giving two different works virtually identical titles while also summarizing them in such a way that their contents too seem identical.

### III.3. The Anachronisms of the *Opuscula*

Now that we have shown the probable origin of the title *De inventione*, let us examine Multhauf's claim that the various "Geberian" *opuscula* contain anachronistic cross-references. The earliest manuscript known to contain any of the four *opuscula* is Yale University's MS. Mellon 5, written around 1400 in a German or Austrian script.<sup>49</sup> The *De investigatione* found there, however, does not begin with the incipit of the printed text going by that name, but starts "Consideravimus in nostris voluminibus...(CVIra)" like the work printed in 1541 (and reprinted in 1545 and 1572) as the *De inventione*! The same text as that contained in Mellon 5 is also found in a later XVth century *codex*, Bologna University 448(756), ff. 137r-56r. Here too the title *Liber geberi de perfectionis investigatione* links itself to the incipit "Consideravimus in nostris voluminibus...," rather than introducing the first lines of the printed *De investigatione*.

Furthermore, the text as it occurs in Mellon 5 and B.U. 448(756) corresponds throughout to the printed version of the *De inventione*, but with the following exceptions. Wherever the printed

version refers to itself as *L. de inventione* (p. 713, 724, 727, 733, 734, and 735 of the 1572 printing), the two Mss. consulted refer to themselves as the *L. de investigatione* (Mellon 5: CVIvb, CIXra, CIXva, CXIra, no reference. B.U. 448(756): 139v, 148r, 150r, 154r, 154v, 156r). It is relatively certain, then, that the text beginning "Consideravimus in nostris voluminibus...", was originally written to correspond to the reference made in the *Summa* to a volume entitled *De investigatione perfectionis*.

But as we pointed out above, some early manuscripts of the *Summa* also contain a single reference to a *De inventione*, which is very likely a distortion of the previous title brought on by the misreading of an abbreviation. One might then be tempted to suggest that the printed *De investigatione* had at some point in the manuscript tradition exchanged titles with the text printed as *De inventione*, and that the former had really been written in the attempt to forge a *De inventione*. But the manuscripts do not support such a theory.

We have examined the following XVth century *codices*, which all contain the text beginning "Investigationem huius nobilis scientie...:" Riccardiana 1164 (ff. 50r-4v), Riccardiana 1165 (ff. 37v-9v), Copenhagen Gl. Kgl. S. 236 (ff. 96r-9r), and Bologna 448(756) (ff. 157r-70v). Two of these, Bologna 448, f. 157r, and Copenhagen Gl. Kgl. S. 236, 99r, do not refer to the text as a *L. de investigatione*, but rather as a *Commentum geberis*. The Riccardiana manuscripts, on the other hand, refer to it as *L. de investigatione magisterii* (MS. 1164, f. 50r), and *Tractatus de investigatione secretorum nature* (MS. 1165, f. 37v). The body of the text refers to itself as "hec investigatio" (Ricc. 1164, 50r; Ricc. 1165, 37v; Cop. Gl. Kgl. S. 236, 96r; and Bologna 448, 157r), though without the specifying word "liber." The text corresponds, with some variation, to that appearing in the printed versions as the *Liber de investigatione*.

Thus the possibility that the two works respectively beginning with "Consideravimus..." and "Investigationem..." merely

interchanged titles during their manuscript transmission is clearly excluded. It is manifest, to the contrary, that both were originally written to fit the *Summa's* references to a *L. de investigatione*. Therefore we may posit that the two works beginning "Consideravimus..." and "Investigationem..." were actually written by two different authors, neither of whom wrote the *Summa*.

This is further supported by the fact that the two texts do not refer to each other, although both refer to the *Summa*, while if one author had written both texts and given them the titles *De investigatione* and *De inventione*, he would have undoubtedly expected the reader to link the two *opuscula* by the references made in the *Summa* to them. Would he not have certified this linkage by making his *De investigatione* refer to his *De inventione*, and *vice versa*?

The evidence therefore supports our contention that the "Investigationem..." and "Consideravimus..." were each originally intended to be considered *the Liber de investigatione*, and that they are therefore rivals, not partners. Once they were collected together, however, it gradually became necessary to give them separate titles. This process was carried one step farther either in the manuscripts used by the editor of the 1541 edition, when both texts were first printed together, or by the editor himself; for here the internal references made by the "Consideravimus..." to itself as the *L. de investigatione* were replaced by references to a *L. de inventione*.

Having shown that there is not one spurious *De investigatione*, but two, we must now point out that both the "Consideravimus..." and the "Investigationem..." refer to the *Summa* as a previously written text. The "Consideravimus..." uses such expressions as "Disputavimus sufficienter in summa nostra..." (1572, p. 723; Mellon 5, f. CVIIIv; B.U. 448, f. 147r), "tradidimus in summa nostra..." (1572, p. 725; Mellon 5, f. CIXrb; B.U. 448, f. 148v), "de qua mentionem fecimus in summa nostra..." (1572, 734; Mellon 5, f.

CXIra; B.U. 448, f. 154v), and others whose frequency and invariance make it extremely unlikely that they do not reflect the original words of the author.

The same situation occurs in the "Investigationem..." There the author is even more explicit, saying "non putet quis quod hanc posuimus investigationem ante librum nostrum qui summa perfectionis magisterii intitulus est...(1572, p. 473; B.U. 448, f. 157r; Ricc. 1165, 37v; and Cop. G. Kgl. S. 236, f. 96r). Although this is contradicted by a variant reading in Ricc. 1164 (50r) - "Non putet tamen quis quod hec investigatio librum nostrum qui summa perfectionis magisterii intitulus non precedat..." - that manuscript agrees with the others in saying "...de quibus singulis narrationem fecimus in summa perfectionis magisterii sufficienter..." (1572, p. 477; Ricc. 1164, f. 51r; Ricc. 1165, f. 37v; B.U. 448, f. 159v; and Cop. Gl. Kgl. S. 236, f. 97r), and "de quibus in summa nostri magisterii perfecti artificem allocuti sumus..." (1572, p. 495; Ricc. 1164, f. 54r; Ricc. 1165, f. 39r; B.U. 448, f. 169r; and Cop. Gl. Kgl. S. 236, f. 99r). It is quite certain, then, that these references, like those of the "Consideravimus...", are integral parts of the text, and not later additions.

That the *Liber fornacum* also contains such anachronisms was shown by Multhauf, in the passage cited above. In B.U. 448, the *L. fornacum* refers to the *Summa* as an earlier text on f. 183r (= 1572, p. 739), f. 190r (= 1572, p. 750), f. 192v, (= 1572, p. 754), f. 197r (= 1572, p. 761), and f. 201r (= 1572, p. 766). But as Multhauf noted, the *Summa* refers to a previously written *L. fornacum*.

Unfortunately the manuscript evidence for the *Summa's* statement is here contradictory, and rests on one easily misread word. Whereas Paris BN 6514, f. 79ra, says "narravimus in libro fornacum...", other early manuscripts, such as Palermo Bib. Com. 4QqA10, f. 130v, and Wien 2449, f. 44v, use "narrabimus." There are other criteria, however, that can be used to demonstrate the *L. fornacum's* inauthenticity. The much more frequent use of the

imperative over the subjunctive, the self-conscious employment of the mineral acids, and its constant use of determinate rather than relative weights all point to a different author than that of the *Summa*.

The *L. fornacum* seems closer in style and content to the "Consideravimus..." than to the "Investigationem..." This similarity is born out by the fact that both the *L. fornacum* and "Consideravimus..." refer to nitric acid as "aqua nostra dissolutiva,"<sup>50</sup> while the "Investigationem..." is completely silent on the subject of the mineral acids. As for Multhauf's assertion that the printed *L. fornacum* refers to the *De investigatione*, we should note that the printed *L. fornacum* also refers to a *De inventione* (as in 1572, p. 760). The same *locus* in B.U. 448, f. 196v, however, reveals the usual reference to "libro nostro de perfectionis investigatione."

Since the *L. fornacum* also refers to the *Testamentum* (1572, p. 748; B.U. 448, f. 188v), which in its turn refers to no members of the printed *corpus geberianum*, and sometimes occurs anonymously (as in the early XVth century MS. Marburg B.20, ff. 171r-3r), let us suggest the following possibility. The author of the "Consideravimus..." text could have also composed the *L. fornacum* and then affixed a "Geberian" attribution to the possibly pre-existent *Testamentum*. The "Investigationem..." text, on the other hand, is probably by a totally independent author, for the reasons stated above. The task of dating these four *opuscula* will have to await their appearance in a critical form.

Let us here summarize the conclusions made in this section up to now, before we pass to a related topic. The "Geberian" works entitled *De investigatione perfectionis* and *De inventione veritatis* in their printed editions, respectively beginning "Investigationem..." and "Consideravimus..." were written by two different authors, neither of whom composed the *Summa perfectionis*. Both texts

were written to correspond to the *Summa's* reference to a *Liber de investigatione* by "Geber."

These two works are nothing more than commentaries on the *Summa*, primarily intended to give its practical operations a more concrete form. In the manuscript tradition, the "Investigationem..." is overtly recognized as such, sometimes bearing the title *Commentum Geberis*, and both texts make redundant references to the *Summa* in the attempt to link their commentary more closely to the text. The *Liber fornacum*, like the former two texts, is also a practical commentary on the *Summa*, to which it frequently appeals. Since it appears to refer to the "Consideravimus..." and contains similar descriptions of mineral acids, it is very likely by the same author. The *L. fornacum* also refers to a *Testamentum*, but the printed *Testamentum* makes no reference whatsoever, not even mentioning the *Summa*. Consequently the author of the *L. fornacum*, who may well have also written the "Consideravimus...", either wrote the *Testamentum* as well or incorporated the pre-existent text into his network of citations.

#### IV. The Rhazean *De investigatione* and the Printed *Opuscula*

It is now conclusively proven that the four short works printed as additional texts by the author of the *Summa perfectionis* cannot have been written by him. In order to strengthen our defense of the genuineness of the *De investigatione* discovered by Ruska, let us here make a brief comparison of that volume with the spurious *opuscula*.

As we have stated repeatedly, three of the four false *geberiana* make numerous references to the *Summa*, both to link their commentary to the particular passages being explained, and to solidify their claim to identical authorship (the fourth, the

*Testamentum*, appears to have been rather whimsically included in the *corpus*). Although the genuine *De investigatione* is far longer than any of these pamphlets, it only makes two references to the *Summa*, and these are at the end of the work, where they would have no value as a link between commentary and text. Let us here quote the requisite passage from our edition of the *De investigatione* -

(23v) Quedam vero sunt aque videlicet ex animalibus et ex animatis egredientes, ut testudine, ovis, capillis, sanguine, et similibus, que non solum sunt solventes et figentes, sed etiam tingentes atque perficientes, et eorum fortiores et acutiores sunt capillorum aque vel olea distillata per distillationem inversam idest per descensorium. Accenduntur autem ante rectificationem ipsarum fere inextinguibiliter, et occidunt et abstergant lepre ulcera et que sunt huiusmodi, que sepe diversis confunduntur vocabulis. Alii namque aquam occulti lapidis, alii aquam animalis seu oleum, nuncupaverunt, quorum operationem, licet hic tradidimus ad doctrinam, aliene tamen considerationis est ab intentione nostra. Et a multorum excusamur que scripsimus acceptione per pauciora et meliora, que comperimus maioris esse efficacie et studii brevioris, nec non apud omnes plus naturali rationi propinqua. De quorum nominibus, naturis, et operationibus hic dispersa in diversis voluminibus, posuimus capitula et induimus opiniones diversas. Alibi tamen cum deo summam omnium que sparsim tradidimus aggregabimus cum veritate probationis, in summa una sermone brevi, in qua quicquid nostra volumina utile seu superfluum continent aut diminutum, hic per illam ibique per hec, sane mentis et diligentis indagacionis artifex absque errore reperiet, et perveniet ad desideratum perfecte artis actum et expectatum laboris effectum. Et nos non collegimus ob aliud multa ex antiquorum dictis et in voluminibus nostris ea multiplicavimus, nisi ut ex illis elicere secretum eorum, et vitare errores, et ex eorum coniecturis nostri roborare perscrutationem sermonis via brevi et veritate perfecta, ad quam faciente glorioso et sublimi deo, licet cum longi vigilia studii et magni laboris instantia usquequaque pervenimus, et eam totam in libro qui summa intitulabitur, non sub illorum scribemus enigmatem vel figuris, neque ita lucido trademus sermone, quin illum accidat necessario insipientes latere, eosque subire errorem. Sed traditionum omnium assumentes arcanum ex his que perquisivimus, vidimus, atque palpavimus, et certificati sumus cum experientia vera, tali sermone volente deo explicabimus.

Quod si se ad ea bone mentis artifex exercitaverit, se totum aut saltem partem artis excelsae fructum dei bono adinvenisse letabitur.

The length of this quotation will make it necessary to analyze its various elements sequentially. First, the author summarizes the previous material concerning "waters" produced from animal substances, such as "turtles, eggs, hair, and blood." Describing their traditional "cover-names," such as "water of the hidden stone," he then makes a rather remarkable statement: "Although we have here passed on these operations for the sake of teaching, <that doctrine> is nevertheless of a different consideration than our own intent." The author continues to say that the above processes can be replaced with "fewer and better," which are nearer to "natural reason." In this text, he has only "assumed" or "put on" the diverse opinions of various authors. Elsewhere, however, he will test all these recipes and collect the good ones into a rationally ordered *Summa*. In this *Summa* he will sift through all those *dicta antiquorum* and "elicit" their truth, so that the artificer may, by reading his text, arrive at the final goal of alchemy.

As we stated above, if this passage had been written by a forger like the authors of the four *opuscula*, it would be quite anomalous in that it would provide no link between the commentary and the particular passage being explained. But more important than that, the author of this *De investigatione* goes so far as to say that the doctrines collected here are inadequate: in his *De investigatione* he has uncritically recorded *dicta* which he plans to subject to rational analysis in his *Summa*. This *De investigatione* cannot therefore be considered a commentary on the *Summa*, as the "Investigationem...," "Consideravimus...," and *L. fornacum* were. To the contrary, from the viewpoint of an alchemist the Rhazean *De investigatione* has no expository value for the *Summa*, since the author, in the former work, has only "assumed the diverse opinions" of his sources.

The *De investigatione* discovered by Ruska is therefore different from the four traditional "Geberian" *opuscula* in three important respects. First, it does not make continual reference to the *Summa* in an attempt to link itself with particular passages in the commented text and to establish its authority. Second, the doctrines of the *De investigatione*, particularly those involving the use of organic reagents, are explicitly disclaimed at the end of the text, thus depriving this *De investigatione* of any value if it were in fact an *ex post facto* commentary on the *Summa*. Third, the *De investigatione* does not refer to the *Summa* as a completed work in the fashion of the "Investigationem...," "Consideravimus...," and *L. fornacum*, but instead considers the *Summa* to be only in the stage of planning.

These three points distinguish the Rhazean *De investigatione* not only from the four printed *pseudepigrapha*, but from spurious commentary literature in general, since the said characteristics would effectively vitiate any value that the *De investigatione* might have had as a commentary, if in fact it were such. If the *De investigatione* were spurious, we would have to conclude that it was written only as a sort of historical farce, since its author consciously disavowed any role for it as a commentary. But since the content of the *De investigatione* is entirely technical, adding nothing to the legend of the sage "Geber," we cannot conclude that it was written to expand a historical myth. We are left, I believe, with only one alternative - to accept the genuineness of the *De investigatione* discovered by Ruska.

#### V. "Geber" and the *Liber de septuaginta*

If the *De investigatione* analyzed by Ruska is really by the author of the *Summa*, then it follows from our foregoing analysis that the *Theorica et practica* must also stem from his pen. It is

therefore unnecessary to regurgitate our long comparison of the *TP* and *Summa* that appeared in 1985.<sup>51</sup> Nonetheless, it will be useful to recapitulate the findings made there concerning the stylistic and conceptual development of Paul of Taranto.

In the following section, we shall first demonstrate that the style and mode of presentation adopted by the *Summa* are largely based on the *L. de septuaginta* of Jābir ibn Ḥayyān, and that the *Summa* was the conscious product of a pseudepigraphical exercise whose goal was the arrogation of Jābir's authority. Having done this, we shall proceed to show the dependency of certain key doctrines found in the *Summa* upon the *L. de septuaginta*. A comparison of these doctrines with their nascent form in the *TP* will enjoin the conclusion that the *Summa*, if written by another author than that of the *TP*, would have had to draw not only from the *TP* for these teachings, but from the precise *locus* of the *L. de septuaginta* from whence the *TP* got them. But since the *TP* makes no reference at all to the *L. de septuaginta* by name, such a feat would have been most improbable. The reader will agree, I believe, that the author of the *Summa* must have had personal knowledge of the sources which went into the *TP*, and that he was therefore, in all probability, the author of both texts.

Unlike the *Summa*, the *70 Books (Liber de septuaginta)* - of which only about half seem to have survived in Latin - are a loosely related collection of *opuscula* rich in mythopoeia and analogy.<sup>52</sup> Ostensibly translated by Gerard of Cremona,<sup>53</sup> they are all but incomprehensible in their Latin form, and many of their doctrines would have seemed quite alien to any but the Ismā'īlī sect that coined them under the "trademark," as it were, of "Jābir ibn Ḥayyān."<sup>54</sup>

Despite their turbidity, the *70 Books* were extensively used during the late Middle Ages, and by the clearest thinkers. Albertus Magnus drew upon them for his *De mineralibus*,<sup>55</sup> and the alchemical systematist Petrus Bonus made extensive use of them.<sup>56</sup>

The reader should not be surprised, therefore, when we suggest that the *Summa* also contains material derived from the *70 Books*. He may be excused a moment of discomfort, however, when we proceed to say that the influence of the *70 Books* upon the *Summa* was nothing short of considerable. It will be all the more surprising if we assert that this influence was above all stylistic, since the confusion of the *70 Books* would seem at first to be the antithesis of the *Summa's* clarity. Nonetheless, the reader will presently see that the author of the *Summa* deliberately borrowed whole passages from the *70 Books* and rewrote them in the attempt to pass himself off as the Arabic Jābir. Let us begin at the very start of the *Summa*, to which we shall compare the first of the *70 Books*.

*Summa*  
61ra,3-11.

Totam nostram scientiam  
quam ex libris antiquorum  
abbreviavimus compilatione  
diversa in nostris  
voluminibus hic redigamus  
in summa una et quod in  
libris a nobis scriptis  
diminutum est sufficienter  
in hac traditione huius  
nostri libri  
recompensavimus et  
ipsorum defectum  
supplevimus sermone  
brevis. Et quod occultum  
fuit a nobis in parte  
una manifestum fecimus  
illud in parte eadem in  
hoc nostro volumine, ut  
sapientibus patefiat  
complementum tam  
excellentissime nobilisque  
partis philosophie.

*L. de septuaginta*  
ed. M. Berthelot, in  
*Mémoires de l'académie des sciences*,  
XLIX, 1906, p.310.

Fuit ergo necesse componere  
libros ex quibus exponam ea  
que promissa sunt ex meis  
verbis, et intentiones meas  
extraneas, et alienum quod  
occultavimus in locis  
diversis et scientiis aliis.  
Erunt enim hii summe  
librorum nostrorum, qui  
promissa sunt et qui  
sequuntur. In hiis namque  
administravimus quidquid  
est necessarium. Feci  
autem hos .lxx. libros,  
et in unoquoque eorum  
posui scientiam aliquam.  
Aliquo nomine ipsum  
nominavi.

At the beginning of the *Summa*, its author says that he is writing a *Summa* in which whatever he has hidden in the various parts of his other books will be explained. At the beginning of the *70 Books*, Jābir, like Geber, announces that he has hidden some of his knowledge in the various places of his other books, and that his *70 Books* will therefore fill them out and be their *summe*. To be sure, the similarity in structure between the two texts ends here, but the juxtaposition of two "Gebers" and their *summe* - despite the fact that the real "Jābir's"<sup>57</sup> are plural - seems rather much for coincidence.

It has long been remarked, in addition, that the language of the Latin Geber betrays some Arabic touches. Although one nowadays has the tendency to react against the old habit of attributing an Arabic source to every "nutu Dei," or "in nomine Dei clementie et misericordie," we can nonetheless show that the *Summa* contains whole formulaic passages rewritten from the *70 Books*. Let us quote the following passages from the *Summa* and *70 Books* -

*Summa*  
62ra,12-9

...non nos inique corrodas  
nec nobis blasphemias  
iniungas, sed tue imputa  
ignorantie et presumptioni.  
Non igitur hec scientia  
bene convenit pauperi vel  
indigenti, sed potius est  
ei inimica et adversaria.  
Nec etiam adinvenire  
nitatur sophisticam metam  
operis sed soli sit  
complemento intentus,  
quoniam ars nostra in  
potentia divina servatur  
et cui vult elargitur et  
subtrahit qui est

*L. de septuaginta*  
311

Hoc quam nisi ei qui non  
legerit hoc hunc meum  
librum, nisi donaverit ei  
deus fortuite. Ipse enim  
largitur cui vult. Et  
similiter si contingeret  
alicui homini, ut in  
principio lectionis, vel  
post multas lectiones, vel  
in principio operationis  
aut post multas operationes,  
ut (non) intelligerent(!)  
illud ex meis libris;  
infortunatus esset et esset  
sicut ille cui deus nihil  
tribuit. Non ergo

gloriosus et sublimis  
et omni iustitia et  
bonitate repletus.

calumpnietis me super hoc.

Here both texts make the same plea that the reader not blame his source if he fail to succeed at alchemy. The two authors use precisely the same justification in similar language, namely that God has chosen those whom he wishes to succeed, and that alchemy is reserved for them alone. Those who are not of the elect will not profit from alchemy at all, but to the contrary will be harmed thereby. Let us then turn to a third set of examples, where this moralistic tone is maintained -

*Summa*  
64vb,39-ra3

Blasphemati sunt igitur  
in eternum, quia  
blasphemias posteris  
relinquerunt ex errore  
suo, et maledictionem  
super philosophantes  
effuderunt, et non  
veritatem sed diabolicam  
instigationem post mortes  
eorum dimiserunt. Et ego  
blasphemandus sim nisi  
errores illorum  
corrigam et veritatem  
tradam in hac scientia,  
prout melius exigit hec  
ars. Hoc enim magisterium  
occulto sermone non indiget  
nec manifesto penitus.  
Tradimus igitur eam  
sermone tali quem  
prudentes latere non  
accidet. Hic autem  
mediocribus profundissimus  
erit, fatuis autem terminos  
utrosque miserabiliter  
concludet in hac una  
eademque nostra traditione.

*L. de septuaginta*  
350

Excommunicatus sit qui  
legerit hunc meum librum  
et invenerit in eo rem  
cum preparatione sua,  
nisi experiatur ipsam ad  
hoc, ut sciat veritatem  
nostram. Ego sim  
excommunicatus, si dixerō  
aliquid diminutum, aut  
occultum, aut cum alio  
commixtum, nisi quod  
dixerō esse occultum.

In the *Summa's* rendition of the above passage, the term "blasphematus" has been substituted for "excommunicatus," and the meaning has been somewhat altered. In the *70 Books*, those who will be excommunicated are the would-be alchemists, who because they have experimented insufficiently, will fail to comprehend the meaning of the text. The author in turn would have to be excommunicated if he did not tell the truth, and let it be known that he is writing obliquely.

In the *Summa*, on the other hand, those to be blamed are the false alchemists, who have spread lies about their inadequate procedures. The author of the *Summa* would also have to be blasphemed if he did not correct their lies. The connecting point between the *Summa's* version and that of the *70 Books* lies in the fact that the false alchemists have lied because they have not understood; their obtuseness in turn derives from the inadequacy of their experimentation, just as the experimentation of the "excommunicatus" in the *70 Books* was inadequate. There is no escaping the fact that the author of the *Summa* has rewritten this passage to fit his own purposes, just as he rewrote the former sections.

These particular *formulae* are completely lacking in the other Arabo-Latin texts which could have served as the *Summa's* sources.<sup>58</sup> The conclusion to be drawn from this is that the *70 Books* formed the primary literary and stylistic basis of the *Summa*, whose author was intentionally copying their inflated initiatic style.

Having shown that the *Summa* contains an important stylistic element borrowed from the *70 Books*, we may now proceed to demonstrate a doctrinal influence as well. This is not an easy task, in part because the *Summa* is essentially a work of Aristotelian inspiration, and hence largely unconcerned with Jābir's "four natures" or the "theory of the balance," and partly because the *Summa* has used other sources as well as the *70 Books*. It is hardly

surprising that the author of the *Summa* would have preferred the descriptions of technology presented in the *L. secretorum de voce Bubacaris* to the half-enunciated recipes of the badly translated *70 Books*, whose incomprehensibility has been remarked upon by Ruska.<sup>59</sup>

Nevertheless, I believe that one can chart a doctrinal influence of the *70 Books* upon the *Summa*, and in a critical area, namely that of the three medicines. Although this influence is based upon vague references, the whole *70 Books* having the air of an exercise in obscurantism, we have already shown that the author of the *Summa* has extensively rewritten several passages from the *70 Books*, while changing them to suit his own purposes.

Let us first adduce "Geber's" general remarks concerning the three medicines, then passing to the statements of Jābir. At 79va,16-45, the *Summa* announces that there are "three orders of medicines"; the first order concerns every medicine that "impresses" a given "alteration" upon a deficient metal in such a way that the "alteration" can later be removed, as happens in the case of copper and iron sublimed to whiteness with mercury.

A medicine of the second order, to the contrary, alters its subject in a permanent fashion, but it can only alter one "difference"; the other "corruptions" will thus remain. As an example of a second degree medicine, the author mentions the process of calcination, by which every fugitive substance is removed from a metal, with the metal otherwise remaining corrupt.

Finally, the *Summa* passes to its description of third degree medicines, which it says to remove all corruptions at once, and in a permanent fashion; no particular examples of this medicine are given, since it is "unica sola." Hence we have a clear hierarchy of three medicines, beginning with the simplest and ending with the most complex. Let us now compare this description with a passage from the *70 Books*, which although vague, contains the seed idea of



the "tres ordines medicinarum." On p. 345, Jābir has the following to say -

...scias quod conversio horum corporum ad substantiam completam fit secundum tres modos. Aut cum erit elixyr magno et convertes ipsum in uno hora, cum re que longo tempore fuit preparata sicut clare substantiam. Et hic est unus trium modorum. Aut ut convertas ipsum ab hac minera corrupta ad mineram bonam. Et hoc est ut cum igne solum prepares. Et hic est modus quo corpora ad suam primam naturam convertuntur. Et est ille quem dicemus in hiis nostris libris. Scias ipsum. Tercius vero modus est ut prepares unumquodque horum corporum cum medicinis propinquis, que operantur in sua hora, sicut illa que in longum preparantur tempore.

Here we have "three methods" of converting the imperfect metals to their "complete substance," i.e. to gold or silver. The first method employs the "great elixir," which has been prepared over a long period of time, and which transmutes its subject in "one hour."

The second method, to the contrary, involves the transmutation from "a corrupt mineral to a good mineral," resulting in the former's conversion to its "prime nature." Puzzlingly, Jābir states that this method operates with fire alone, making it sound like the reduction of ores: this is improbable, however, for he adds that "It is this which we will describe in these books of ours," and the reduction of ores is not further described. Finally, Jābir adds that there is a third method by which "you prepare each of these (metallic) bodies with their medicines, which work in their hour, just as that which is prepared over a long time." The implication is obviously that these medicines are not prepared over a long period of time, that "sua hora" is not "una hora," but more, and that they are more easily accessible than the "great elixir," or nearer to the nature of the imperfect metals, being "propinqu(e)."

Thus the "three methods" of the *70 Books* present a hierarchy of medicines in roughly the same fashion as the *Summa*; the main difference, other than that of Jābir's greater ambiguity, is that the

*70 Books* employ a descending order, while the *Summa* describes an ascending one.

Directly following these statements, Jābir continues with some further remarks that throw a great deal of obscurity upon the hierarchy just erected by him -

Et hec sunt res bone et subtiles et eorum conversio cum igne solum, sine medicinis et sine aliis rebus. Et alius modus. Et ipse est modus compositionum. Et hoc est ut componas quedam eorum cum aliis. Et fiet ex eis substantia clara bona sine medicinis omnino; nisi eius de quibus non curantur. Et in modo componendi est alius modus. Et hic est ut componantur aliqua corpora, ut sunt cum medicinis preparata. Et proveniet ex eis bona res et cuiuscunque horum que dixi ponam exemplum. Nisi secundum ipsum operaris et ut apud te sit verum et facile, elixyr magnum convertit corpora, sicut diximus in nostris libris qui preterierunt. Non est ergo necesse ut probemus hoc et hoc est bonum exemplum. Neque negatur nisi ab eo qui negat magisterium. Et loqui cum illo est alterius modi. Et hoc est ut probetur illi quod magisterium est verum. Scias hoc. Significatio vero quod preparatio eorum cum igne solum sine medicinis est bona.

The difficulty of interpreting this passage, whose confusion is no doubt partly due to the Latin translator's ineptitude, need hardly be remarked upon. First, after saying that his "third method" involved the use of "propinqu(e) medicine," Jābir now seems to say that these medicines are "good and subtle," and that their conversion occurs by means of fire alone, "without medicines and without further things." If Jābir is referring to the conversion of those medicines of the "third method" themselves, his statement is not so illogical, though unclear.

Then Jābir proceeds to add that an "alius modus," involving the composition of bodies without the aid of medicines, may also be employed. Finally, Jābir says that this final method needs no "probatio" of its efficacy other than the "probatio per sensum" supplied by example.

But, after having referred to an "example" of this "modus compositionum," he then proceeds to give an example of the "alterius modi": that he actually means the second of the above three methods seems assured by the fact that he repeats the expression "cum igne solum" which he already used for the "second method." Hence the example then given, which we shall now quote, would appear to the reader - whether rightly or wrongly - to refer to the second of the three methods, and not to the "modus compositionum" -

Est ut facias de plumbo cerusam et litargirium. Deinde sublimatur et quod inde proveniet fiet quod non est plumbum. Et ipsum tamen est plumbum; sed pulchrum habet colorem et eius virtus non est virtus plumbi. Et hec est propinqua significatio.

Now if we return to the *Summa's* description of a medicine of the second order, the reader will recall that the author explicitly used calcination as an example of a process inducing an alteration of that degree. But the production of litharge from lead, if not ceruse, is achieved by precisely that process. Moreover, Jābir is quite insistent in making his point that "that which will be made is not lead. And yet that is lead, though it has a beautiful color and its virtue is not the virtue of lead." Both these observations, that alteration of the second type may be induced by calcination, and that the product will still bear some of its original characteristics, are also found in the *Summa's* description of a second order medicine.

We have already shown, furthermore, that the *Summa* has rewritten passages from the *70 Books* in a rather thorough-going way. It therefore seems quite possible that this section, along with another which we shall proceed to analyze, supplied the author of the *Summa* with his concept of three medicines. Let us therefore provide a direct comparison of the *Summa's* final chapter with the *Postremus Liber* of the *70 Books*:

*Summa*  
84va,32-b,14

Dicimus igitur quoniam totius operis intentionis summa non est nisi ut sumatur lapis in capitulis notus. Deinde vero cum operis instantia assiduetur super illum opus sublimationis primi gradus, et per hoc mundatur a corrumpente impuritate. Et est scilicet sublimationis perfectio, et cum ea subtilietur lapis donec in ultimam subtilitatis puritatem deveniat, et ultimo volatilis fiat. Abhinc vero cum fixationis modis figatur donec in ignis asperitate quiescat. Et hic secundus preparationis gradus appellatur, et in hoc quidem una preparationis meta consistit. Sed et tertio similiter lapis administratur gradu qui in ultimo constat preparationis complemento. Et est scilicet ut iam dudum fixum lapidem cum modis sublimationis volatilem facias et volatilem fixum et fixum solutum et solutum iterato volatilem, et iterato volatilem fixum quousque flueret et alteret in complemento solifico et lunifico certo. Ex reiteratione igitur preparationis huius gradus tertii in medicina resultat bonitatis alterationis multiplicatio. Ex diversitate igitur

*L. de septuaginta*  
pp. 362-3.

Dico quod lapis maior esse debet secundum quod dico iam manifestum est quod ipse est compositus ex iijor elementis: ex aqua et aere et igne et terra. Cuiusque quorum preparatio debet esse sicut preparatio corporis sui. Hoc est quod postquam iam manifestum est quod secundum preparationem primam necessarie sunt aque et aeri septingente distillationes, eorum unius. Cuiusque sunt necessarie septingente et spiritus et pondera sunt, secundum quod diximus prius. Sed quod calores ex eis sumantur verum est. Et hoc primus ordo est et est finis preparationis secunde maioris. Secundus vero ordo est minor isto et est super decimam primi. Sed regula elementorum istius decime est ut sint equalia, ut qui ponunt super ea aliud elementum melius, nature ipsorum non destruentur. Neque destruuntur, nisi propter rem que non est sui ordinis. Et ideo diximus inprimis in preparatione suorum elementorum in illum super suum comparem aliquid augeret, ut hic est ordo secundus, qui est minor altero isto. Et quod est in eo iam plenarie explanabimus. Ordo vero tertius est primi decime, et est decima secundi, et sermo in es est sicut in secundo. Intellige hoc. In

reiterationis operis super lapidem in gradibus suis resultat multiplicationis bonitatis alterationis diversitas, ut ex medicinis quedam sui duplum, quedam vero decuplum, quedam centuplum, quedam vero millesimum, et quedam infinitum solificum et verum perfectionis lunificum transmutet corpus.

coloribus vero est magnum secretum. Et sic capitulum primum inhumatum fuerit quinque mensibus, erit melius aut sex. Et post hoc non est finis. Et si confundentur, fieret bonum cum pinguedine illa. Scias hoc. Et operare secundum istud, quod est ex magnis secretis. Proiectio huius primi non habet finem illum. Et hoc est quod unum tingit duo mille millia et ducenta millia decies. Et non necesse operari secundum hoc in capitulo primo cadit .II. super milles mille et ducenta millia, et tertium cadit super centum .XX. millia. Hec ergo sunt preparationes que sunt in capitulo primo. Scias hoc.

In the *Postremus Liber* of the *70 Books* we find the explicit mention of three *ordines* in the order of their potency. It appears that the order is again descending, as in the case of the three "modi" already described, for the second is "minus isto (primo) est super decimam primi," while the third is "decima secundi." The progression by decimals refers, apparently, to the quantity of matter capable of undergoing transmutation by each of the three orders. Thus the medicine of the third order "tints" one one hundredth of the quantity "tinted" by a medicine of the first, while a medicine of the second order "tints" a tenth thereof. The numerical series that are then introduced seem intended to support this theory, but they have perhaps been distorted either by the translator or by scribes.

Hence we have now found three explicit orders mentioned in the *70 Books*, in addition to the "three methods" already described. Let us now compare the above three orders of Jābir with those of "Geber." In the last chapter of the *Summa* (reproduced above), we

have a compendious description of "tres ordines medicinarum." The author of the *Summa* insists that the distinguishing characteristic of the third and final order is the great number of sublimations that its medicines must undergo. Jābir, similarly, underlined that his first order - the analogue of Geber's third - required "septingente distillationes."

Finally, and perhaps most important, both the *Summa* and the *70 Books* present a numerical series by which the medicines of the three orders are related to the quantity of metal that each is capable of transmuting. The *Summa* gives the series 2/1, 10/1, 100/1, 1000/1..., where the numerator represents the base metal, and the denominator represents the medicine. The *70 Books* present a slightly different series, for the medicines are only compared to one another, and not directly to the quantity of base metal transmuted, resulting in the ranking 100 : 10 : 1. Yet in each case the comparisons are based on the decimal series, if we disregard the *Summa's* anomalous introduction of a double quantity, and in each case they are intended to express fundamentally the same thing, namely a comparison of the strength of the different orders of medicines.

It remains, therefore, that we summarize our conclusions. First we showed that the initiatic *formulae* of the *Summa* were largely based on parallel examples drawn from the *70 Books*. The author of the *Summa* intentionally adopted the language of the *70 Books* in the attempt to make his own text seem to be a genuine work by Jābir ibn Ḥayyān. But in doing so, he showed himself to be quite capable of changing the meaning of his Jābirian model, often in a drastic way.

Having witnessed this fact, we passed to those examples in the *70 Books* which described three methods of producing medicines or three orders of the medicines themselves. Although these passages are quite vague and contradictory, and though they contain many divergences from their parallels in the *Summa*, the

foregoing demonstration of the *Summa*-author's method of rewriting Jābir now allows us to think that he could well have derived his inspiration for a hierarchy of three medicines from these nebulous allusions to "tres modi" and "tres ordines."

Before passing to our final conclusions, let us point out that the explicit adoption of the *L. de septuaginta*'s style in the *Summa* explains many of the minor stylistic differences between the *Summa* and *TP*. The *De investigatione* contains numerous elements of the *Summa*'s initiatic style, while the *TP* does not. Such expressions as "et hoc est magnum artis secretum, scias hoc,"<sup>60</sup> and "Benedictus igitur sit gloriosus et sublimis Deus, qui nihil fecit regimine carens"<sup>61</sup> are completely lacking in the *TP*, though quite conspicuous in the *Summa* and *De investigatione*. But the *TP* is not attributed to an Arabic author; therefore the real author would have felt no need to adopt a pseudo-Arabic style. While the *TP* is a scholastic dissertation on the nature of alchemy, the *Summa* and *De investigatione* are full-blown attempts to supplant the genuine *corpus* of Jābir ibn Ḥayyān.

It will now be a simple matter to show that the *Summa* cannot have been composed by a second writer relying on the *TP*. The *TP* after saying at 36r that the spirits must be fixed before being joined to the metals, proceeds thus -

(6-10) Sed modica flamma combustis relinquerent metalla  
sordida magis quam fuerant prius, sicut de eris citrinatione patet  
per fumum tutie in cooperto crucibulo, ac de quibuscunque  
imperfectis metallis in gradu primo. Et hec est veritas fixationis.

This reference to the imperfect medicines of the first order is followed a few lines later by a more explicit mention -

(49v,4-8) Ex hoc etiam perfici poterit medicina secundi  
et tertii ordinis per imbibitiones cum aqua lune et  
iovis per solutiones, et maxime cum admixtione aluminis  
plume et dealbati sulphuris, iunctione secundum modum  
pretactum.

At 50v,43-6, we find a final reference to the three orders -

...si habeas cum medicinis de mercurio et sulphure  
rectificatis sicut decet, ex hoc ascendere poteris  
ad perfectionem primi, secundi, et tertii ordinis in  
opere veritatis.

The reader will note that while all these examples clearly refer to the same scheme of three medicines as that which the *Summa* espouses, they contain no mention of a numerical series by which the orders are related. Since we have already shown the dependence of the *Summa*'s series on that of the *L. de septuaginta*, it follows that if the author of the *Summa* were here borrowing from the *TP*, he must also have located the obscure statements of the *L. de septuaginta* which undoubtedly provided the inspiration of the *TP* itself, and then have fused the two sources. But since the *TP* makes no reference whatsoever to the *L. de septuaginta* by name, the probability of this having been the case is very small.

On the other hand, since we showed in "The Genesis of the *Summa perfectionis*" the unlikelihood of a second author's having drawn on the *Summa* to compose the *TP*, it is equally improbable that the *TP*'s references to three orders represent abbreviated borrowings from the *Summa*.<sup>62</sup> Therefore it remains to be concluded that the author of the *TP* first extracted these ideas from the *L. de septuaginta*, then developing them further and inserting them into the *Summa* ascribed to the same author (i.e. "Geber") in much the same way that he extracted material on salts, alums, and atraments from the *L. secretorum de voce Bubacaris*, developed these subjects in his *TP*, and then reinserted them into the newly christened *De investigatione perfectionis*. For a graphic representation of this series of transmission, the reader may again consult the diagram printed at the beginning of this section.

### VI. The Dating of "Geber"

Before passing to our conclusion, a few words on the witnesses of the *De investigatione*, *Theorica et practica*, and *Summa* will be in order. Due to the vast popularity of the *Summa*, early manuscripts and witnesses of it are legion. The case is not so with the other two texts, however, which had a more restricted circulation. Fortunately, the work identified by Ruska as the genuine *De investigatione* is extant in a vellum manuscript of the late XIIIth or early XIVth century (Firenze, Riccardiana 933), hence assuring that it was in existence around the probable time of the *Summa's* composition.

The *Theorica et practica*, unlike the *De investigatione*, is mentioned in a book-list contained in the well known codex 4QqA10 of the Palermo Communal Library, which S. Harrison Thomson dated at c. 1325. This provides the only early witness of that text known by me. The manuscripts of the *TP*, unlike those of the *De investigatione*, are quite late, the earliest of them probably being contained in the fifteenth century alchemical codex Rylands 65, of the Manchester University Library. Although we have elsewhere given a detailed analysis of the *TP's* place in the plurality of forms debate that supports a late thirteenth century date of composition, such an *exposé* should really accompany an edition of the *TP*, which we hope to publish at another time. As for the *Summa*, we have already given it an approximate dating at the beginning of this chapter. Since Peter of Abano quotes the text by name in his *Conciliator*, written in the first decade of the XIVth century, the *Summa* must have been written before 1310. In addition, the text is not mentioned by Albertus Magnus, Vincent of Beauvais, or Roger Bacon, and is therefore unlikely to have been in circulation before the late XIIIth century. Let us here mention another witness of the *Summa*, which we previously passed over.

The dialogue between Ademar, ostensibly a Carthusian monk from Paris, and his brother William, mentions not only the *Summa perfectionis*, but also a *Liber de investigatione veritatis* and *Liber fornacum* ascribed to Geber. The colophon of this work mentions 1331 as its date of composition, but as Thorndike has shown, it seems only to exist in late manuscripts.<sup>63</sup> Nonetheless, since Ademar refers not only to the *Summa*, but also to the *De investigatione* and a *Liber fornacum*, his dialogue could provide an important witness. We have already stated, however, that the *De investigatione* is mentioned twice in the *Summa* itself. A similar reference may also be found to the *Liber fornacum*, for at 79ra,7-9, the *Summa* says the following -

...post arsenici sublimationem assentur cum proportione  
sui ignis, cuius modum narravimus in libro fornacum.

We must therefore ask whether Ademar has actually seen a *De investigatione* and *Liber fornacum*, or merely extracted these references from the *Summa* itself. We have consulted Ademar's dialogue in the following XVth century manuscripts: Firenze, Riccardiana 1164, ff. 56r-61v; Munich, Bayerische Staatsbibliothek 26059, ff. 86r-101v; and Paris, Bibliothèque nationale 14005, ff. 91r-97v. We shall give his reference to the three texts of "Geber" as it occurs in Riccardiana 1164 -

Hic autem princeps philosophorum Geber composuit librum  
fornacum, librum de investigatione veritatis, et summam  
magnam qui dicitur liber perfecti magisterii.

Ademar makes no further references to the *Liber de investigatione* or *Liber fornacum*, and the many citations that follow (complete with chapter references) derive from the *Summa perfectionis*. We must therefore conclude that he drew his knowledge of the *Liber de investigatione* and *Liber fornacum* from

that source, and that his text is consequently without value as a witness of the two latter works.

### VII. Conclusion

It would seem, then, that we have given ample justification for our thesis that the author of the *Summa* and *TP* was Paul of Taranto. At this point it will be wise, perhaps, to add the *caveat* that such a thesis by its very nature cannot be considered absolutely sure. A particular uncertainty lies in the identification of the author himself. There appear to be no records of a "Paulus de Tarento qui fuit lector fratrum minorum in Assisio," outside of the alchemical literature. Neither Wadding nor Sbaralea know anything of such a figure. Nor have I found him in Salimbene's *Cronica*,<sup>64</sup> which serves as the main source for the alchemical pursuits of Elias of Cortona. The files of the Collegio San Bonaventura<sup>65</sup> and the Istituto Storico dei Cappucini<sup>66</sup> are similarly devoid of any contemporary references. This would seem rather odd, given that the position of *lector* was not an unimportant one, especially in such a prominent center of Franciscan activity as Assisi. The singular darkness of the "Paulus de Tarento" makes it tempting to label him as one more pseudonymous author to be added to the mythology of medieval alchemy. Against this supposition we must raise the following three arguments. First, the use of pseudonyms by late medieval alchemists seems to have served two purposes - that of hiding the author's identity and that of gaining an audience for the text. To judge by the huge *corpora* going under such names as Aristotle, Hermes, Albertus Magnus, Rhazes, and not least Geber, it would seem that the second motivation far outweighed the first. Why then would anyone pick a pseudonym of such outstanding obscurity as "Paulus de Tarento," which, if it does not designate the author of our text, would seem to refer to no-one at all? Second, the *TP* is completely lacking in

bombastic references meant to support an authorial ascription. Although these are not found in all alchemical forgeries, such repeated *formulae* as "ego Raymundus de Insula Majoricarum"<sup>67</sup> or other complicated "autobiographical" apparatus usually reveal a pseudonym where they do occur. Finally, as we also stated before, the author of the *TP* had a genuine knowledge of Taranto and its environs, which adds support to the ascription "Paulus de Tarento."

Let us therefore mention a final fact which may provide a partial solution to this problem. The earliest known reference to Paul of Taranto is found in the inventory of "Frater Dominicus monachus monasterii Sancti Proculi in Bononia," written around 1325. We shall here quote the entry as it stands -

Item liber fratris Pauli ordinis minorum qui incipit: Iam siquidem in prima parte huius nostri operis.<sup>68</sup>

The reader will note that here, unlike the colophon of the text itself, we find no mention of Paul's role as a lecturer in Assisi. Since this is our earliest known mention of Paul of Taranto, it should be given weight over those references found in the manuscripts, which are all late. Let us therefore tentatively posit that "qui fuit lector fratrum Minorum in Assisio" is a later addition to the ascription as found in Dominicus's inventory. Such a supposition would not be improbable, given the body of alchemical legend that began to surround such Franciscans as Roger Bacon, Raymundus Gaufredus, and Frater Elias within a century of the order's founding.<sup>69</sup> Hence it would not be surprising if a rather minor Franciscan, such as Paul of Taranto seems to have been, later had accretions added to his name in the attempt to magnify his importance.

## Chapter Notes

<sup>1</sup> Hermann Kopp, *Beiträge zur Geschichte der Chemie, Drittes Stück* (Braunschweig, 1875), pp. 13-53.

<sup>2</sup> George Sarton, *Introduction to the History of Science* (Baltimore, 1931), II, 1043; Lynn Thorndike, *A History of Magic and Experimental Science* (New York), 1934, III, 41.

<sup>3</sup> The *Summa* occurs in this form, for example, in the base MS. from which I have prepared my edition, Paris B.N. lat. 6514, 61r-84v (mis-marked 83v in *cod.*), In *Gebri...Summa perfectionis magisterii in sua natura*, printed in J.J. Manget, *Bibliotheca chemica curiosa...Genevae, 1702*, I., pp. 519-557, Book III, part II, becomes Book IV.

<sup>4</sup> In addition to the authors cited already, we should mention the appreciation of R.J. Forbes, *A Short History of the Art of Distillation* (Leiden, 1948), 63; E.J. Holmyard, "The Identity of Geber," *Nature*, No. 2780, III, Feb. 10, 1923, pp. 191-3; and Robert Multhaupt, *The Origins of Chemistry* (London, 1966), pp. 171-2.

<sup>5</sup> Petrus Bonus, *Margarita pretiosa*, in Manget (1702), II, 59B.

<sup>6</sup> Petrus de Abano, *Conciliator controversiarum...*, *Venetis, apud Juntas, MDLXV*, 208va. I owe the idea of consulting Peter of Abano to Prof. Nancy Siraisi.

<sup>7</sup> Kopp (1875), 13.

<sup>8</sup> *Ibid.*, pp. 26-9. Kopp does not mention another work usually associated with the above four, namely the *Testamentum Gebri*, first printed in the *Gebri...Summa perfectionis in sua natura...* (Rome, ca. 1525).

<sup>9</sup> Kopp (1875), pp. 29-36, n.22.

<sup>10</sup> *Ibid.*, pp. 32-3, n. 22 (cont'd).

<sup>11</sup> M. Berthelot, *La chimie au moyen âge* (Paris, 1893), I, pp. 336-50. E.O. von Lippmann more recently adduced a string of references to show that Berthelot was not the first to question the *Summa's* attribution to an Arab. Lippmann upheld Berthelot's judgment, however, if not his priority. Cf. Lippmann, *Entstehung und Ausbreitung der Alchemie* (Berlin, 1919), 485.

<sup>12</sup> Berthelot (1893), 342.

<sup>13</sup> M. Berthelot, ed., "Geber - le livre des soixante-dix," in *Mémoires de l'Académie des Sciences*, XLIX, 1906, pp. 310-63. The *L. septuaginta* and two other authentic Latin translations - the *L. triginta verborum* and the *L. misericordie*--are treated by Paul Kraus, *Jābir ibn Ḥayyān: Contribution à l'histoire des idées scientifiques dans l'Islam*, in *Mémoires présentés à l'Institut d'Égypte*, Cairo, 1943, I, 42, 45, and 5. For additional information, cf. Robert Halleux, *Les textes alchimiques*, in *Typologie des sources du moyen âge occidental*, Fasc. 32 (Turnhout, 1979), pp. 25-6.

<sup>14</sup> Berthelot (1893), 344.

<sup>15</sup> *Ibid.*, 342.

<sup>16</sup> *Ibid.*, pp. 343-4.

<sup>17</sup> Holmyard's position was defended in modified form by J.R. Partington, who thought that the *Summa* had been translated from either an Arabic original or from a Greek, Syriac, or Hebrew one: cf. Partington,

"The Identity of Geber," in *Nature*, Feb. 17, 1923, pp. 219-20. I have found Holmyard's views on the "Geber problem" presented in the following works: Holmyard, "Arabic Chemistry" *Nature*, Oct. 28, 1922, No. 2765, CX, pp. 573-4; \_\_\_\_, "Arabic Chemistry," *Science Progress*, Oct., 1922, No. 66, XVII, pp. 252-61; \_\_\_\_, "Jābir ibn Ḥayyān," *Proceedings of the Royal Society of Medicine, Section of the History of Medicine*, Nov., 1922, XVI, No. 1, pp. 46-57; \_\_\_\_, "Chemistry in Medieval Islam," *Chemistry and Industry*, XLII, No. 16, pp. 387-90; \_\_\_\_, "A Critical Examination of Berthelot's Work upon Arabic Chemistry," *Isis*, 1924, VI, # 4, No. 19, pp. 479-99; \_\_\_\_, "The Present Position of the Geber Problem," *Science Progress*, Jan., 1925, XIX, No. 75, pp. 414-26; \_\_\_\_, "An Essay on Jābir ibn Ḥayyān," in *Studien zur Geschichte der Chemie: Festgabe (für) Edmund O. von Lippmann, hrsn. von Julius Ruska* (Berlin, 1927), pp. 28-37; \_\_\_\_, *The Works of Geber* (London, 1928).

<sup>18</sup> Holmyard, 1923, 192.

<sup>19</sup> *Ibid.*

<sup>20</sup> Kraus (1943), I, XVII-LXV.

<sup>21</sup> We should note here that the position of Kraus has been attacked in recent years by Fuat Sezgin, who argues for a historical Jābir. For references to Sezgin's work, and a brief recapitulation, cf. Manfred Ullmann, *Die Natur- und Geheimpwissenschaften im Islam*, in *Handbuch der Orientalistik, Erste Abt., Ergbd. VI, Zweiter Abschnitt* (Leiden, 1972), pp. 199-200. Sezgin's attack was met with an apology for Kraus by Martin Plessner (Ullmann, 199); nor has Ullmann himself rejected the position of Kraus, in favor of Sezgin's view (*Ibid.*, 200). Cf. also *Jābir ibn Ḥayyān: Dix traités d'alchimie*, Pierre Lory, ed. (Paris, 1983).

<sup>22</sup> Julius Ruska, "Übersetzung und Bearbeitungen von al-Rāzī's Buch *Geheimnis der Geheimnisse*," *Quellen und Studien*, IV, Heft 3, 1935, pp. 1-87 (= 153-238). Joachim Telle has also drawn attention to this article recently, in *Die Deutsche Literatur des Mittelalters: Verfasserlexikon* (Berlin, 1980), II, col. 1105-1109.

<sup>23</sup> Ruska (1935), 86.

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*, 87.

<sup>26</sup> William Newman, "New Light on the Identity of Geber," *Sudhoffs Archiv*, 1985, 69:76-90; and Newman, "The Genesis of the *Summa perfectionis*," *Archives internationales d'histoire des sciences*, 1985, 35:240-302.

<sup>27</sup> <pseudo-Rāzī>, *Liber de aluminibus et salibus*, R. Steele, ed., "Practical Chemistry in the Twelfth Century," *Isis*, 1929, 12: p. 18.

<sup>28</sup> *Ibid.*, p. 16.

<sup>29</sup> *Ibid.*, p. 19.

<sup>30</sup> Precepts concerning the management of fire may be found in the *De investigatione perfectionis* (MS. Riccardiana 933) at 11r,40-5, 18v,45-54, et *sparsim*. The two passages here referred to are presented in the form of *secreta* interjected into the text of the former *L. secretorum de voce Bubacaris*.

<sup>31</sup> The *Summa's* reference to the "methods of preparation" is so vague that one hesitates to identify a specific passage from the *De*

investigatione therewith, though the *De investigatione* runs the gamut of alchemical operations.

<sup>32</sup> *Vide supra*, Part I.

<sup>33</sup> M. Berthelot, *La chimie au moyen âge* (Paris: 1893), I, p. 343.

<sup>34</sup> Dietlinde Goltz, "Studien zur Geschichte der Mineralnamen....," in *Sudhoffs Archiv, Beiheft 14* (Wiesbaden: 1972), pp. 167-8.

<sup>35</sup> Ruska, 1935, p. 69, n. 1. S. Harrison Thomson, "The Texts of Michael Scot's *Ars alchemie*," *Osiris*, 1938, 5:538.

<sup>36</sup> Salvatore de Renzi, *Collectio Salernitana* (Naples, 1852-59), III, p. 275. Albertus Magnus, *Libri quinque mineralium*, Auguste Borgnet, ed., *Opera omnia*, (Paris: Vives, 1890), vol. V, p. 100.

<sup>37</sup> Robert Multhauf, *The Origins of Chemistry* (London: 1966), p. 207.

<sup>38</sup> MS. Bologna 139(105), f. 248: <I> Aqua corrosiva: Nota quod aqua corrosiva minuens corporum pondera fit ex sale armoniaci et coperosa in equali proportione distillando aquam per alembicum....<II> Aqua solvens argentum: Aqua solvens argentum et quidem alia metalla fit ex vitriollo romano et sale armoniaco in equali proportione et hec aqua dissolvit ferrum....

<sup>39</sup> Eucharius Silber, ed., *Liber Geber* (Rome: c. 1486-90).

<sup>40</sup> Marcellus Silber, ed., *Gebri...Summa perfectionis in sua natura* (includes *De investigatione* and *Testamentum*) (Rome: c. 1525).

<sup>41</sup> Chrysogonus Polydorus, ed., *In hoc volumine de Alchemia...* (Nuremberg: 1541).

<sup>42</sup> Cf. the introduction to our edition, where we describe the manuscript tradition of the *Summa*.

<sup>43</sup> Multhauf, *op. cit.*, p. 172, n. 85.

<sup>44</sup> *Ibid.*, p. 171, n. 82.

<sup>45</sup> *Ibid.*, p. 171, n. 83.

<sup>46</sup> Mss.: Cambridge, Trinity 1122, 72v; Cues 299, 68va; Firenze BN II,I,364, 20ra,3; Firenze, Riccardiana 933, 41r,17; Glasgow, Hunter 253, 147v,37; London, Royal College of Physicians 354, 49v,9; Montpellier, Bibliothèque universitaire, section médecine 260, 35v; Munchen, CLM 353, 108ra; New Haven, Yale, Mellon 2, p. 111,29; Oxford, Bod., Ash., 1384, 45v; Palermo, Bib. Com., 4QqA10, 130r; Paris, BN 6514, 78rb; Paris, BN 6514, 184ra; Paris, BN 7156, 107ra,17; Reims, 986, 39v; Roma, Vat. Pal. lat., 1339, 56v.; St. Gallen, Vadiana 300, 51rb,20; Wien 2449, 43r; and Wolfenbüttel 4504, 221v.

<sup>47</sup> Mss.: St. Gallen, Vadiana 300, 51va,9; New Haven, Yale, Mellon 2, p. 112, 43; Glasgow, Hunter 253, 148r,13; Firenze, Riccardiana 933, 41r,39; Cambridge, Trinity 1122, 73r; Montpellier 260, 36r; Oxford, Bod., Ash., 1384, 46r; Palermo, Bib. Com. 4QqA10, 130r; Reims 986, 40r; Wien 2449, 43v; and Wolfenbüttel 4504, 221v.

<sup>48</sup> Mss.: Paris, BN 7156, 107rb,18; London, Royal College of Physicians 354, 50r,20; Firenze B.N.II,I,364, 20rb,9; BN 6514, 78vb; BN 6514, 184rb; CLM 353, 108va; Cues 299, 68vb; and Vat. Pal. 1339, 57r.

<sup>49</sup> Laurence Witten II and Richard Pachella, *Alchemy and the Occult...* (New Haven: 1977), III, pp. 26-41.

<sup>50</sup> "Geber," *Liber de fornacibus construendis*, in Avicenna, et al., *Artis chemicae principes...* (Basel: 1572) p. 751; "Geber," *De inventione veritatis*, p. 729, p. 734.

<sup>51</sup> Newman, "Genesis" (cited, n. 26), pp. 260-287.

<sup>52</sup> Julius Ruska, "Die Siebzig Bücher des Gābir ibn Ḥajjān," in *Studien zur Geschichte der Chemie, Festgabe: Edmund O. Lippmann*, ed. J. Ruska (Berlin: 1927), pp. 38-47.

<sup>53</sup> Cf. entry 65 of the list based on that of Gerard's *socii* and published by Richard LeMay, *DSB*, XV, 1978, Supp. I, p. 185.

<sup>54</sup> Paul Kraus, *Jābir ibn Ḥayyān: Contribution à l'histoire des idées scientifiques dans l'Islam*, in *Mémoires présentés à l'Institut d'Égypte* (Cairo: 1943), I, pp. I-LXV.

<sup>55</sup> Halleux, 1982, pp. 62-3, p. 75.

<sup>56</sup> Petrus Bonus, *op. cit.*, p. 38B, 44A, 45A, et *passim*. Bonus, like many late medieval writers, attributed the *70 Books* to Rhazes, while otherwise quoting them correctly.

<sup>57</sup> By "the real 'Jābir's' *summe*" I mean the *70 Books*, which were of course written by Arabic pseudepigraphers using the name of Jābir ibn Ḥayyān. Whether any such person as a "real Jābir" ever existed is quite beside the point for our purposes. It is convenient to refer to the *70 Books* as the products of a real Jābir, however, since they were at least translated from the Arabic text attributed to that author, in contradistinction to the *Summa*, which was originally composed by a Western author writing in Latin.

<sup>58</sup> Cf. our analysis of the *Summa's* sources preceding the critical edition of the text.

<sup>59</sup> Ruska, 1935, p. 63.

<sup>60</sup> <pseudo-Geber>, *De investigatione perfectionis*, William Newman, ed., *The Summa perfectionis and Late Medieval Alchemy*, doctoral dissertation, Harvard University, 1986, vol. III, p. 239, lines 18-19.

<sup>61</sup> *Ibid.*, p. 242, lines 13-14.

<sup>62</sup> Let us note here that the *TP* has in other places drawn additional material from the *70 Books* which is not found in the *Summa*. At 46v,29 and 50r,18, for example, the *TP* uses the Jābirian expression "ignis lapidis" as a *Deckname* for a particular reagent. This term occurs in Berthelot's edition of the *L. septuaginta* at p. 313, p. 331, et *sparsim*. For our argument concerning the *Summa* and the *TP*, cf. "Genesis," 1985 (cited n. 26), pp. 260-287.

<sup>63</sup> Thorndike, *HMES*, III, p. 135.

<sup>64</sup> Salimbene de Adam, *Cronica*, ed. Holder-Egger, in *MGH SS*, XXXII.

<sup>65</sup> Here I would like to acknowledge the kind help of Jacques G. Bougerol, O.F.M., C. Cenci, O.F.M., and Clement Schmitt, O.F.M., all associated with the Collegio San Bonaventura in Grottaferrata. Above all, I must acknowledge the aid of Barnabus Hughes, O.F.M., of the California State University in Northridge, for his considerable advice on the *modus operandi* of researching medieval Franciscans in Italy.



<sup>66</sup> This information, along with much more, was received from O. Schmucki, O.F.M.cap., Director of the Istituto Storico dei Cappuccini in Rome, to whom I must express my thanks.

<sup>67</sup> pseudo-Ramon Lull, *Epistola accuratationis*, in Manget, *op. cit.*, I, p. 863B.

<sup>68</sup> S. Harrison Thomson, "The Texts of Michael Scot's *Ars alchemie*," in *Osiris*, V (1938), p. 525, n. 6.

<sup>69</sup> Cf. Walter Pagel, "The Paracelsian Elias Artista and the Alchemical Tradition," in Rosemarie Dilg-Frank, *Kreatur und Kosmos* (Stuttgart: 1981), pp. 9-10, for some introductory information.

## CHAPTER THREE

### *The Mineral Science of Paul of Taranto*

#### *I. Introduction*

The reader who has consulted our general Introduction should realize that the term "alchemy" meant a number of different things in the thirteenth century. As we showed there, Roger Bacon thought alchemy to be the proper font of all sublunary natural science, while Albertus Magnus considered it a mere subdivision of the "science of minerals." This disagreement hints at some of the difficulty faced by the modern commentator of alchemical texts. Let us say first of all that the term *alkimia* is in no way cognate to "chemistry," although many chemical themes were treated by alchemists. Even the most matter-of-fact alchemical texts incorporate considerable material from the disciplines now known as "metallurgy," "geology," and "physics," not to mention more specific areas such as "dyeing technology" and "glassmaking." It is a grave mistake to think that a person skilled in chemistry alone will have the technical competence to explain the old recipes in modern scientific terms. An additional barrier to such exegesis derives from the fact that alchemical writers often employed unpurified reagents, leading to unpredictable results. Furthermore, these reagents were often given names that impede or defy rational analysis. Finally we have the biggest obstacle of all, the fact that alchemical literature of all times contains "thought-experiments" recorded alongside real results, with no distinction between fanciful invention and sober data.

These characteristics are not peculiar to alchemy, however, but are shared by most branches of pre-modern applied science, in particular medicine and pharmacology. The failure of medieval doctors to distinguish between symptom and cause has not impeded the study of early medicine, nor has the attribution of

marvellous powers to perfectly mundane herbs. The historian of alchemy must therefore be satisfied to explain those data which he can, and hope that the discovery of new material will allow further explanation at a later time. In all cases the application of convoluted and overly sophisticated chemical arguments should be avoided: we must strive for the simplest explanation, even if this involves a resort to "physical" or "metallurgical" phenomena rather than purely "chemical" ones.

Our approach to the alchemy of Paul of Taranto will therefore take the following course: we shall try to group the reagents and processes described by him into the most general categories possible. By this means we shall be able - in some cases - to arrive at the lowest common denominator uniting a particular set of substances or operations. This method is distinctly different from that employed by chemists such as Berthelot<sup>1</sup> and Darmstaedter<sup>2</sup>, who "translated" individual recipes into chemical notation without making a concerted effort to compare these recipes to others in the same document. Fortunately, part of our work has already been done by Paul and his forebears, since his three works and their sources recognized the need for mineralogical classes. Let us therefore proceed to the texts themselves.

### II.1. Mineralogical Classification in the TP, *De investigatione, and Summa*

In order to show the classificational method pursued by Paul of Taranto, we shall begin with the *De investigatione*, since this includes large extracts from his main source, the *Liber secretorum de voce Bubacaris*. The *L. secretorum* in fact contained one of the most straightforward and comprehensive treatments of mineralogy received by the Latin West. We shall therefore give its classes in outline form, with the analysis performed on their Arabic original

by Ruska<sup>3</sup> and H. E. Stapleton.<sup>4</sup> We have given the mineral names as they occur in our edition of the *De investigatione* (pp. 1-9). We have also given some alternate forms as they exist in the *Liber secretorum de voce Bubacaris*, as found in Paris BN lat. 6514, ff. 101v-12v.

### II.2. Rāzī's Classification of Minerals

#### I. *Terrena* ("Earthy things.")

##### A. Four Spirits [i.e. volatile substances].

1. Quicksilver.
2. Sal ammoniac [ammonium chloride:  $\text{NH}_4\text{Cl}$ ].
  - a. Mineral form.
  - b. Dirty, yellow form.
  - c. Artificial form produced from hair.
3. Auripigment. [arsenic sulfide: *vide infra*].
  - a. Impure, mixed with stones and earth.
  - b. Yellow, opaque, earthy [impure  $\text{As}_2\text{S}_3$ ].
  - c. Yellow, golden, "alive" [purer  $\text{As}_2\text{S}_3$ ].
  - d. Yellow mixed with red [mixture of above with  $\text{As}_4\text{S}_4$ ].
  - e. Red, with dirty "eyes" [impure  $\text{As}_4\text{S}_4$ ].
  - f. Pure red, capable of splitting [purer form of above].
4. Sulfur.
  - a. Red, difficult to find [an apparently fabulous substance described in many Arabic texts<sup>5</sup>].
  - b. Yellow, color of "pure varnish" [evidently a crystalline form of sulfur<sup>6</sup>].
  - c. Yellow, grainy [possibly mineral sulfur with its matrix].
  - d. White mixed with earth [an obviously impure

form].

e. Black [either sulfur mixed with asphalt, or iron sulfides.<sup>7</sup>

B. Seven Bodies [i.e. the seven known metals].

1. Gold.
2. Silver.
3. Copper.
4. Tin.
5. Iron.
6. Lead.
7. "Karesin" or "Catesim" [a transcription of the Arabic khār ṣīnī, "Chinese iron," possibly a bronze composed of copper, zinc, and nickel<sup>8</sup>].

C. Thirteen Stones.

1. Marchasita [= Arab. marqashīthā: the minerals now known as "pyrites," including "fool's gold" (FeS<sub>2</sub>). The individual types mentioned by Rhazes cannot be positively identified].
  - a. Similar to silver in color.
  - b. Red, like copper.
  - c. Black, like iron.
  - d. Golden.
2. Magnesia [= Arab. maḡhnīsiyā: an old alchemical "cover-name" used to denote various substances. *Vide infra*].
  - a. Like black earth, presenting "shining eyes" upon breaking [probably manganese oxide with small reflective crystals<sup>9</sup>].
  - b. Ferrous, bitter, and masculine.

c. Similar to copper, with "shining eyes," feminine [probably "manganese-spar," i.e. the mineral rhodochrosite or rhodonite<sup>10</sup>].

3. Edaus (or daus, as in *LS*, 101v, 18) [= Arab. dauṣ: either an iron ore composed of iron oxide, or iron filings, or even iron slag<sup>11</sup>].
  4. Thutia [= Arab. tutiyā: zinc compounds, especially zinc carbonate (ZnCO<sub>3</sub>) and oxide, the former occurring naturally, the latter as a sublimation product of brass-making<sup>12</sup>].
  5. Azur [= Arab. lāzward: our lapis lazuli<sup>13</sup>].
  6. Dehenegi [= Arab. dahnaj: our malachite (CuCO<sub>3</sub>·Cu(OH)<sub>2</sub>)<sup>14</sup>].
  7. Ferruzegi [= Arab. firūzaj: our turquoise<sup>15</sup>].
  8. Emathita (elsewhere sedina or sedena) [= Arab. shādanaj: our hematite or "bloodstone," a naturally occurring form of Fe<sub>2</sub>O<sub>3</sub>, capable of being polished<sup>16</sup>].
  9. Cuchul [= Arab. kuḥl: our antimony sulfide and lead sulfide (galena), often confused<sup>17</sup>].
  10. Spehen [apparently a misreading of Isfahan, meant as a locative modifier of the above<sup>18</sup>].
  11. Funcu [= Lat. succen < Arab. ash-shukk, arsenic oxide<sup>19</sup>].
  12. Talca [= Arab. talq: not our "talc," but mica or layered gypsum<sup>20</sup>].
  13. Gipsa [= Arab. jībīn: our gypsum (CaSO<sub>4</sub>)<sup>21</sup>].
  14. Glass.
- D. Six Atraments [the class of "atraments" contained metallic sulfates and their impurities].

1. Black atrament [impure  $\text{FeSO}_4$ ].
2. Alum [a rather vague category including  $\text{KAl}(\text{SO}_4)_2$  in varying degrees of purity as well as other metallic sulfates].
3. Calcandis or white atrament [= Arab. qalqant: weathering product of copper/iron ores or alum<sup>22</sup>].
4. Calcande or green atrament [= Arab. qalqādis: iron and/or copper sulfate].
5. Calcatar or yellow atrament [= Arab. qalqatār: "decomposition product of sulfide- and sulfate rich copper/iron ores on the one hand, and burnt iron vitriol <i.e. iron sulfate>, thus iron oxide on the other."<sup>23</sup>].
6. Surianum or red atrament [= Arab. sūrī or sūrīn: same as calcatar<sup>24</sup>].

E. Six Boraces [= Arab. bauraq (i.e.  $\text{Na}_2\text{B}_4\text{O}_7$ )].

1. Red borax.
2. Goldsmiths' borax [borax was often used as a flux by metalworkers; hence the expression "goldsmiths' borax"].
3. Borax Zarunde [= Arab. Zarāwand, a geographical locale<sup>25</sup>].
4. Borax arabie or alkarbi [= Arab. algharab, "willow," apparently in reference to a borax-like gum extracted therefrom<sup>26</sup>].
5. Nitrum [= Arab. naṭrūn: here apparently soda ( $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ ), often confused with borax]<sup>27</sup>.
6. Tinchar [= Arab. tinkār: another designation for borax].
- <7. Borax of bread [this does not appear in the list of seven boraces but occurs later in the

text. Probably potash or soda sprinkled on bread to produce a shiny surface]<sup>28</sup>.>

F. Eleven Salts.

1. Common salt [presumably  $\text{NaCl}$ ].
2. Bitter salt [perhaps a type of rock-salt].
3. Salt of calx [slaked lime ( $\text{Ca}(\text{OH})_2$ )].
4. Pure salt [presumably  $\text{NaCl}$ ].
5. Sal gemma [rock-salt ( $\text{NaCl}$ )].
6. Salt of naphtha [presumably  $\text{NaCl}$  contaminated with asphalt].
7. Indian salt [not identifiable].
8. Sal effini [= Lat. *essini* < Arab. aṣ-ṣīnī: Chinese salt. Not identifiable<sup>29</sup>].
9. Sal alkali [= Arab. al-Qali: soda].
10. Salt of urine [ $\text{NaNH}_4\text{HPO}_4$ , produced by decomposition and drying of urine<sup>30</sup>].
11. Salt of cinder [potash ( $\text{K}_2\text{CO}_3$ )<sup>31</sup>].

II. *Nascentia* (This category is made up of plants.)

III. *Viventia* (Animals and animal-products.)

When Paul of Taranto reworked the *L. secretorum de voce Bubacaris*, he incorporated Rāzī's list of reagents verbatim into his *De investigatione*, along with their methods of preparation. He therefore had a formidable "dictionary" of mineralogy at his disposal, since Rāzī had gone to great lengths to categorize these reagents according to color, taste, appearance, and use. Despite this careful and impressive attempt at classification, the scheme purveyed by the *L. secretorum* had serious defects from a Western point of view. First, the locatives employed by Rāzī, such as Zarāwand and Yamanī, had no sense in Latin. Second, the minerals themselves were often quite different from their Western counterparts, even when they had been properly

identified. An alum from Pozzuolo might be quite different from an alum of Yemen. Third, Rāzī's classification was entirely empirical: it made no attempt to arrive at the general characteristics defining the different categories of minerals; nor did it compare the minerals among themselves. Instead, Rāzī took his categories from the common usage of apothecaries and tradespeople, without questioning their validity.

If we now examine the *TP's* handling of these topics, we shall find a different situation, and one which is highly characteristic of the Latin West in the thirteenth century. Paul of Taranto is not content with a mere recapitulation of the Rhazean categories: he wants to discover their *raison d'être*. In order to do this, he begins with the most general category common to the minerals, "a single nature of the *perspicuum*." [15v,20-2]. From this he descends to the category of corporeity, determining that all the minerals possess the same *corporeitas* in the genus of quantity, but not in the genus of substance, since mercury is always fluid, while the other minerals are solid. Then Paul descends to the particular properties of sulfur, "arsenic," atraments, salts, alums, and mercury, to distinguish these categories further. In order to do justice to the rest of Paul's classification, we must present it in the form of a chart.

### *II.3. The Mineralogical Classification of the TP (ff.15v-17v)*

#### I. Common to all minerals:

A. Common nature of the *perspicuum*.

B. All have same corporeity in the genus of quantity, but not in the genus of substance, since mercury is always fluid, unlike the others.

#### II. Common to sulfur, "arsenic" (i.e. arsenic sulfides), atraments and some salts (i.e. sal ammoniac,

sal alkali, saltpeter): Liquefiability in fire without additional modification.

#### III. Common to sulfur, "arsenic," but not atraments or salts: Capability of undergoing oleaginous combustion.

#### IV. Common to sulfur, but not to "arsenic" or atraments: Capability of undergoing complete dissolution into oil.

#### V. Common to atraments and "arsenic," but not to sulfur: Ability to be calcined by roasting.

#### VI. Common to sulfur and "arsenic," but not to atraments:

A. Ability to be incorporated into the substance of a medicine for "dyeing" metals yellow or red (atraments can only impart a yellow dye).

B. Blackening in fire (atraments redden).

C. Sharing of all colors (i.e. sulfur and "arsenic" can be white, yellow, or red; atraments can be all these, but also black and green; salts, on the other hand, are mostly white or "crystalline").

#### VII. Common to atraments, salts, and alums, but not to "arsenic" or sulfur: deliquescence.

#### VIII. Common to no two classes: taste (atraments are bitter, while sulfur and "arsenic" are "dissimilarly oily." Salts, on the other hand, are dissimilar, while alums are astringent).

#### IX. Common to salts, alums, some atraments, but not to sulfur or "arsenic": effect (i.e. they penetrate, dissolve, corrode, and "sift" or purge the impurities from other metals, especially alum).

#### X. Common only to mercury:

A. Cannot either be liquefied by heat (i.e. it is already fluid), or made to deliquesce, or be

incinerated or hardened (except by great ingenuity).

- B. Can be given metallic fusion complete with the capability of withstanding great heat.
  - C. Can become silver or gold.
  - D. Can penetrate and "destroy" the body of gold (i.e. form an amalgam).
  - E. Can be used to gild other metals.
- XI. Common only to salts: Generation by many different methods (multiply in mines, on soil, on beaches, in rivers, in wells, in the sea, both naturally and artificially).

By far the majority of Paul's remarks about the nature of these minerals are correct. Since most of these observations are absent in the text of Rāzī, there is no escaping the fact that many of them are the result of a consistently applied battery of experiments performed by the author himself. Paul's analysis of the fusibility, deliquescence, combustion, taste, and color of the various minerals, and his subsequent organization of these characteristics witness a degree both of rigor and of synthesis absent in the Arabo-Latin sources (with the exception of the *De congelatione* of Avicenna). Such experimental sophistication should not surprise us in a thirteenth century writer, however, since the 1200's also produced Pierre de Maricourt, the most rigorous experimental investigator of magnetism until the Scientific Revolution,<sup>32</sup> and Theodoric of Freiberg, who discovered the true cause of the rainbow by experimental means.<sup>33</sup>

Paul's justification of the Rhazean classification by experimental means should perhaps tell us that these groupings of minerals do not testify to a mere superficial similarity among their members. If we examine these classes again, the reader will see

that they have withstood the vagaries of time with a remarkable degree of conformity to modern usage. Quicksilver and sulfur of course mean precisely the same things to Rāzī and Paul that they do to us. By "arsenic" Paul refers not to our element As, but rather to its sulfide compounds  $As_4S_4$  (realgar) and  $As_2S_3$  (orpiment). The term "atraments" or "vitriols" comprises an entire class of substances, but they are cognate with what we call "metallic sulfates," such as  $FeSO_4$  (iron sulfate) and  $KAl(SO_4)_2$  (alum). The class of "alums" added by Paul is of course redundant from the modern point of view, but not incomprehensible. As for "boraces," which appear later in the *TP* and *De investigatione*,<sup>34</sup> these largely conform to impure forms of our "borax," though the "artificial" forms of this mineral include substitutes such as soda and alum.<sup>35</sup>

#### II.4. The Problem of "Salts"

Only when we arrive at the category of salts do great problems emerge. Although we must reserve detailed treatment of these minerals for our commentary on the texts themselves, we may here say that the modern definition of a salt as the product of a reaction between an acid and a base, metal, or metallic oxide, in no way typifies the Rhazean class of "salts," which includes such diverse substances as potash and table salt. The key to understanding this multiplex category probably lies in the artificial "salts" rather than their natural counterparts. As Paul says in the *De investigatione*,

(pp. 242-3) Salt can be made from all animal, vegetable, and mineral things, if they be burnt, incinerated, dissolved, distilled, and congealed. And their virtue will be stronger whose qualities were <originally> subtler and drier.

Not only the properties of aridity and sharpness characterize an artificial salt, but also its mode of production, which consists of calcination, followed by solution in water, distillation, and resolidification. Paul has in fact generalized this sequence from the production of such reagents as *sal alkali* and *sal cineris* in the form described by Rāzī.<sup>36</sup>

So far we have discussed the categories "quicksilver," "sulfur," "atraments," "alums," "boraces," and "salts." A further division may be found in the distinction between "spirits" and "bodies," which Paul of Taranto borrowed wholesale from the *L. secretorum de voce Bubacaris*. The ultimate source for this bifurcation lies not with Rāzī, of course, but in the writings of Greek alchemists who, in the first centuries of our era, distinguished between *sōmata*, "bodies," and *pneumata*, "spirits," respectively meaning the metals and the volatile substances known to them. Hence Rāzī, like other Arabic alchemists, classes the volatile reagents mercury, sulfur, arsenic sulfide, and *sal ammoniac* in the category of "spirits," while the metals, according to the Greek usage, belong in the division of "bodies."

In adopting the division of metals and volatile substances into "bodies" and "spirits," Paul of Taranto again had to satisfy the needs of his contemporaries. Thus he explains that the appellation "spirit" does not mean that a substance "is not in the genus of body," according as "body is in the genus of substance due to its insensible matter and qualities or principles of acting or being acted on according to nature," or as "body is in the genus of quantity."<sup>37</sup> The terms "body" and "spirit" as the alchemists use them have nothing to do with the scholastic distinction between *corporeitas* and *spiritualitas*: they simply refer to the metals and those volatile reagents that act upon them. Having clarified this point, Paul proceeds to use the terms "body" and "spirit" in precisely the way they were employed by Rāzī.

### II.5. The Notion of "Affinity" and the Class of "Stones"

But what of the minerals classified by Rāzī as "stones"?

This class included such important substances as "marchasita" (the pyrites), "magnesia" (manganese compounds), "tutia" (zinc carbonate or oxide), and "talc" (mica or gypsum). In fact these minerals do not play a very important role in the *TP*. They appear occasionally as reagents but do not receive the comprehensive treatment given the other categories. The reason for Paul's lack of interest appears at 6v, 26-31 -

We know from effect and sense that the component principles of all the metals are quicksilver and sulfur, although certain have an affinity toward these and may be used in their place, by means of an ingenious technique. <Among these are> arsenic, which is said to be principally similar to [*affine*] sulfur as to form, but to mercury as to matter, and talc, which is principally similar [*affine*] to mercury, and tutia, magnesia, and marchasita, which are intermediate between each.

The concept of "affinity" expressed here is not that of the chemistry of the seventeenth century and later. Paul speaks rather of a *functional* affinity between minerals, a sort of qualitative similarity that allows one reagent to be substituted in the place of another. According to the *TP*, "arsenic," "talc," tutia, magnesia, and marchasita, are intermediates between mercury and sulfur, participating in the qualities of both. Since "arsenic" so perfectly blends the properties of mercury and sulfur, however, partaking of the form of sulfur and the matter of mercury, it seems to belong to a more elevated hierarchical position than the other minerals, and so deserves further treatment. "Talc," tutia, magnesia, and marchasita, on the other hand, are seen almost as by-products here: they need no further independent description than that implicit in an explanation of the three principles mercury, sulfur, and arsenic.

The "affinity" which Paul mentions above between mercury and "talc" on the one hand and between tutia and both principles, is clarified at 31r,11-23, where he says that the best medicine for a hard metal is mercury or something similar (*affine*) to it, and the best medicine for a soft metal such as tin is sulfur or its *confine*. But since Paul has earlier said that tutia, "which stands very close [*magis affinis*] to sulfur according to form and species" is good for copper, and that "talc," which "is very close to mercury according to its whole substance" is useful for hardening tin, he must now face the potential charge of contradicting himself. He therefore clarifies his use of the adjective *affine* as follows -

...the vapor of tutia and not its crude substance is valuable to copper for a golden color alone, and talc is useful to the soft metals for its hardness and dryness. There the natural, non-substantive accidents are compared to the metals, but here their whole prepared substances.

Thus we have two sorts of "affinity" - one which pertains to the substance of a mineral, and another which belongs to its accidents. It appears that the whitening vapor of tutia and the hardness of talc are accidental properties, while their respective affinity to sulfur and mercury derive from a substantial identity. It is likely that Paul is making an unspoken association between accident/form on the one hand, and substance/matter on the other. Thus the "less material" vapor of tutia and the "immaterial" properties of hardness and dryness in talc are opposed to the material substrate respectively composing the two minerals.

We must now turn to the *Summa* if we wish further information about the category of minerals that Rāzī called "stones." As early as the *Summa's* introductory chapters on the arguments of the "sophists" who deny alchemy, we encounter the minerals sulfur, mercury, arsenic, tutia, magnesia, marchasita, sal ammoniac, and borax. At 64rb,33-41, for example, we learn that quicksilver and tutia do not contain the burning type of "sulfureity,"

but only the volatile. Magnesia and marchasita, on the other hand, possess "every genus of sulfureity, but marchasita more, and magnesia less." "Geber" then ranks the minerals in the order of their volatility - mercury and sal ammoniac are the most "fugitive," followed by sulfur, then "arsenic," then marchasita, then magnesia, and finally tutia. On the next folio (65rb,16-7), we find "salts, alums, niters, and boraces" grouped together, just as quicksilver, sulfur, "arsenic," sal ammoniac, marchasita, magnesia, and tutia appeared together above. Obviously we have a division here into volatile and non-volatile minerals: consequently the old classification of Rāzī, used also in the *TP*, is no longer sufficient, since that employed other criteria in addition to volatility.

Further information on marchasita, magnesia, and tutia is available in the *Summa's* chapters on sublimation. We learn at 69vb,25-9, for example, that marchasita is composed of a "double substance," namely pure sulfur and "mortified quicksilver" (i.e. mercury rendered non-volatile). At 74vb,3-22, the information that magnesia contains dirtier mercury and sulfur than marchasita, and that tutia is nothing but a "vapor of the white bodies" (an exhalation of molten brass) is offered.

#### II.6. The Problem of "Talc"

The *Summa* therefore considers marchasita and magnesia to be composed of the metallic principles sulfur and mercury; tutia is a mere exhalation of the metals. But what has become of "talc," a substance which the *TP* considered substantially *affine* to mercury? References to talc are rare in the *Summa*: it is found only in the chapters on sublimation and on the preparation of inferior "first order" medicines. We learn from the *Summa's* description of the sublimation of mercury (69va,7-vb19) that this "spirit" must be sublimed with "dregs" (*feces*) which separate its "humidity" and "dirtiness" from it. But since mercury has the tendency to unite



both with metals and sulfurous things, it is best that it be sublimed with dregs which bear no affinity to it. Otherwise the alchemist is likely to produce a "dirty" compound of mercury and its dregs. Here we encounter a list of substances which have no affinity to mercury, and so become eligible as "dregs." The list includes calcined egg-shells, calcined marble, ground glass, "every prepared genus of salt," and astonishingly, "talc"!

How can it be that the same author in the *TP* said that "talc" is quite similar (*magis affine*) to mercury, and in the *Summa* that it has no affinity (*affinitatem*) to that substance at all? Although this is a striking contradiction, a brief foray into the *De investigatione* will reveal that our author has undergone a certain evolution of thought. In a section which he has added to the erstwhile *L. secretorum de voce Bubacaris*, "Geber" advises that mercury be sublimed with "talc" (p.45,17). This information is lacking in the parallel *locus* of the *TP* (33v,1-6). Speaking even more explicitly at p.100,7-12 of the *De investigatione*, "Geber" says the following -

The sublimation of talc and of the two gypsums is difficult, because they are hardly sublimed, if ever, and are not dissolved except by means of a difficult and extraneous technique. Therefore we exclude them from our work and do not use them, except as dregs of the spirits to be sublimed - especially mercury - on account of the slight affinity which it has with them.

Here "talc" is consigned to precisely the role that the *Summa* grants it - a relatively inert "sponge" for the impurities of mercury. In the *De investigatione* Paul has already adopted the position that "talc" has little affinity with mercury, and that it may therefore be used to provide the "dregs" for mercury's sublimation. As we saw above, the *TP* did not include "talc" in its list of "dregs" for mercury, and announced that it was in fact *affine* to that mineral. It is therefore clear that the change in Paul's attitude occurred after he wrote the *TP*, but before his composition of the *De investigatione*.

At this point, we can only offer two possible reasons for Paul's change of attitude towards "talc." First, since the *L. secretorum de voce Bubacaris* mentions no "affinity" between "talc" and mercury, it is likely that Paul drew that information from another source. Indeed, one "Isaac filius Semei de babilonia" reports the following information about "talc" in a Munich manuscript concerning "octo lapides" -

Secundus <lapis> est Talch idest mercurius albus fixus et calcinatus et solutus facit opera alta.<sup>38</sup>

Although there is no evidence that this text by "Isaac" was Paul's source, it does at least show that the latter was not alone in associating "talc" with mercury. His later abandonment of this theory could then have been the result either of his own laboratory experience or the reliance on a further source, for the use of "talc" in the sublimation of mercury does appear in the Arabo-Latin literature.<sup>39</sup>

A second reason for the "demotion" of "talc" to the status of an inert subliming agent fits squarely into the general theoretical development of Paul's three works. The *Summa* is far less interested in vegetable and animal products than the *TP* or *De investigatione*. The same may be said for atraments, salts, and boraces, which were described at length in the *TP* and *De investigatione*. At the same time, however, the *Summa* witnesses a heightened concern with marchasita, magnesia, and tutia. Hence the interest displayed in "talc" in the *TP* followed by its relative neglect in the other two works, may be seen as part of the same pattern. But why has Paul shifted his concern from the former group of minerals to the latter? The answer to this question may be found in Paul's rejection of the multifarious reagents of the Rhazean tradition, found at the end of the *De investigatione* (cf. our Chapter II). There Paul said that he could replace these many chemicals, which were "not of [his] intention," by "fewer and better,"

which were closer to "natural reason." In order to appreciate the significance of this passage, we must now turn to Paul's general theoretical development between his writing of the *TP* and the *Summa*, and to the influence of Avicenna (or pseudo-Avicenna) on this evolution.

### *III.1. The Theoretical Development of Paul of Taranto*

The Latin alchemy of thirteenth century Christendom was anything but a static discipline. In the following section we shall in fact propose that Paul of Taranto was attempting a reform of alchemy that would both provide that discipline with a coherent theoretical framework and make its experimental procedure fully conformable to that theory. In order to understand this claim, it will be necessary briefly to review the scientific heritage transmitted to the alchemists of the medieval West. Two of the most important Arabic alchemical texts translated into Latin were the *70 Books* of Jābir and the *Book of Secrets* of Rāzī. These texts propound a theory of transmutation based on the induction of new properties - such as color, malleability, and weight - into an old metal. These changes are brought about by agents variously called "medicines," "elixirs," or "tinctures." The mechanism by which these agents perform their job is usually described in very sketchy fashion. In the work of Jābir, however, we do find an adaptation of Galen's metrical pharmacopeia, in which drugs are given a quantitative value according to their relative amounts of heat, cold, wetness, and dryness.<sup>40</sup> Since, according to Jābir, every metal contains its opposite hidden within, it is possible to bring forth that metal's potential by utilizing medicines of an intensity opposite - but equal to - the metal's exterior characteristics (in the simplest form of the theory). This theory could not long survive in the Latin West, however, for the fourth book of Aristotle's *Meteors* explicitly states that the metals are homoeomerous: all their parts are the

same (*Commentum 41*). This was also found to be true by experience, for as Albertus says, when lead is consumed by sulfur we do not find a residue of gold, although Jābir had claimed that lead was internally gold.<sup>41</sup> It is fair to say, therefore, that the Jābirian alchemy inherited from Islam lacked a physical underpinning which XIIIth century Aristotelianism could find acceptable.

A further problem lay in the integration of laboratory practice with the existent theory, such as it was. Much of the technology employed by the earliest Western alchemists was derived from the twin arts of the fabric dyer and the painter.<sup>42</sup> The alchemists of the Roman Imperial period were essentially trying to extend one realm of technology - tinting - to another - jewelry-making. Hence one finds the Greek alchemical papyri from the third or fourth century A.D. to contain numerous recipes for artificial gem-stones which require that a pebble or piece of glass first be soaked in a mordant, then dyed, just as cloth would be. As a result of this technical borrowing, we find alchemical recipes from the earliest times on to focus extensively on chemically induced color changes.<sup>43</sup> Although the Arabic alchemists, notably Rāzī, were also obsessed with the dyeing of stones and metals, I have found little to indicate that they were still aware of the origin of their technology. This is likewise the case with the late medieval Latin authors, who also employ the noun *tinctura*, "dye" for an agent of transmutation. It is important to note that although the theoretical justification for these dyeing techniques had been lost by the thirteenth century, or rather before, the recipes themselves were often faithfully transmitted.

### III.2. *The Stage of the Theorica et practica*

The alchemy inherited by Paul of Taranto and his contemporaries was therefore deficient in two respects. It lacked a sound physical basis, and what theory it had was not well linked to its practice. Let us now briefly return to Paul's *Theorica et practica*, in order to see what he made of this confusing situation. The theoretical part of the *Theorica et practica* primarily attempts to bestow scientific legitimacy upon alchemy by linking that discipline to Aristotelian physics and cosmology. Paul begins by drawing on the pseudo-Aristotelian *L. de causis* for the axiom that nature is the subject of intellect. From this it follows that man, who is the representative of intellect in the natural world, has the right to alter nature. Similarly, because science is the goal of intellect, it follows that nature is the subject of science, and that man can truly know the operations of nature. Paul then proceeds to the particulars of physics, saying that the four elements - fire, air, water, and earth - have subterranean counterparts within the earth which are of a different nature than the external variants (ff. 11v-12r). This is proven to sense by the suffocating air that we find in caverns, the unquenchable, molten fire that issues from volcanoes, and other phenomena.

Paul's description of the principles mercury and sulfur begins with several proofs that these are indeed the immediate components of the metals. The most tangible proof, of course, is that "if anyone joins and composes them according to the proper method, he will produce the metals." In addition, Paul points out that mercury can be congealed by vapor of lead with the result that silver is formed - in modern terms, an amalgam is being produced. This proves that an affinity exists between mercury and the metals, and such affinity can only result from identity of nature. As for sulfur, experience shows that metals calcined by great heat give off this substance, for their smoke smells like brimstone, and their calx

is yellow. Paul then gives extensive proofs extrapolated from Aristotle's *De generatione et corruptione* and *De anima* to show that the simultaneous existence of four elements and two principles does not violate the Aristotelian maxim that one subject may not have two substantial forms. In the course of this exposition and elsewhere, he says that mercury approximates abstract matter in a metal, and sulfur approximates form, thus giving a hylomorphic explanation for the generation of metals.

He asserts, however, that mercury and sulfur, because they are not well compacted, mixed, or glued together - a reference to their volatility - are very close in nature to the simple subterranean elements (15r). In fact, they retain the "excellencies" (the *hyperochai* of Aristotle's *De generatione Bk. II*) of the elements, meaning that, unlike normal reagents, mercury and sulfur have not lost the undiluted virtues of heat, cold, wetness, and dryness that normally become blunted by mixture (3v). Therefore alchemists, unlike apothecaries, work directly with the "hands of nature," by whose help they can immediately produce whatever metal they like (3r).

In addition to this theory based on the four Aristotelian qualities, the *Theorica et practica* embodies a corpuscular philosophy of considerable interest (cf. ff. 18r-20v). By reference to *minima* or *intima*, that is the smallest physical particles of a body, Paul explains such phenomena as weight, density, and coherence. In his description of mercury, for example, Paul says that that principle is very heavy, thanks to the close-packing of its particles. He then generalizes this theory to the other metals, saying that their weight is caused by the minuteness and close-packing of their parts in a constricted union. Finally, he proceeds to the practical application of this theory, namely that the particles of mercury can be made to enter between those of the imperfect metals, thus "glueing" the latter's parts together, which in turn will supply the constricted union and close-packing productive of great weight.

The same close-packing, because it reduces or eliminates internal porosity, explains the resistance of gold to corrosion. Because gold is composed primarily of very small mercury particles, its pores are completely blocked: no flame or corrosive agent can therefore penetrate and destroy its integrity.

The *Theorica et practica* thus uses both corpuscular and hylomorphic ideas to explain the activity of the metals. It does not extend these considerations to other reagents, however, which nonetheless play a large role in Paul's practice. Ammonium chloride, borax, copper and iron sulfate, as well as the distillation products of eggs, blood, and numerous plants all go to make up his alchemical arsenal. But the recipes in which these reagents occur are given little theoretical justification, and it would be difficult to make many of them agree with the theories earlier expressed. Let us now turn to the *De investigatione* again, to see how this text compares with the *Theorica et practica*.

### III.3. The *De investigatione* and the Problem of Sal Ammoniac

The *De investigatione* is a bridge between the *TP* and *Summa* in several respects. One of these lies in its treatment of "organic" reagents, in particular sal ammoniac. The presence of sal ammoniac points to the fact that the *De investigatione*, like the *Theorica et practica*, still employs "organic" reagents derived from plants and animals. Indeed, here we find all of those mentioned in the *Theorica et practica* along with a plethora of further recipes drawn from the reworked *L. secretorum de voce Bubacaris*. Yet at the end of the text we find the enigmatic passage already reproduced (in Chapter II), in which the author rejects these processes and reagents because they are not conformable to "natural reason." A sort of foreshadowing of this statement may be

found in earlier sections of the *De investigatione*, for example, when the author states that

Sal armoniacum[!] non tingitur nisi sublimetur, nec unquam commiscetur corpori ut cum eo maneat, sed introducit tincturas per minimas corporis partes, et demum recedit substantia eius tota.<sup>44</sup>

If we compare this to pseudo-Rāzī's *De aluminibus et salibus*, upon which the *De investigatione* has heavily relied, it is hard to avoid the impression that Paul of Taranto has experienced a disillusionment with sal ammoniac. As pseudo-Rāzī says -

Scias quod sal ammoniacus est melior salium, et ipsorum nobilior in regimine.... et est lapis qui generat et pererit, et remanet vestigium generationis ejus dum permanet seculum....<sup>45</sup>

The *De investigatione* explicitly rejects the statement of pseudo-Rāzī that sal ammoniac can remain permanently in a mixture, due to its volatility. This is surely related to the *Summa's* rejection of sal ammoniac as a cerating agent, which we shall encounter shortly. In order to show how far the *De investigatione* has progressed beyond the *TP* in the its treatment of sal ammoniac, however, it will be useful to quote a parallel passage -

*TP*  
43v, 17-25.

Resolvit autem in aquam omnia plusquam alii sales, et specialiter mercurium, omnesque spiritus sublimatos, et corpora calcinata. Sed hic minime operatur nisi sit sublimatus... Ipsum est autem quod maxime facit rubeum mercurium sublimatum cum eo, ut fiat aqua currens.

*DIP*  
p. 239, 17-240,14.

...que huiusmodi calces super marmore in loco rorido cito solvuntur in aquam; et hoc est magnum artis secretum, scias hoc. Et est spiritus volans, qui non commiscetur cum quibus sociatur mixtione firma.... Coimbibit etiam sibi mercurium crudum et calcinat eum si lento igne sublevatur ab eo et mercurius ipse in aquam dissolvitur, fere tamen inutilem.

In the above passage, the *TP* takes a quite traditional view of sal ammoniac, borrowed mostly from the *De aluminibus et salibus*. The *De investigatione*, however, repeats its earlier caveat that sal ammoniac cannot undergo a permanent mixture with other substances due to its volatility. Following this, the *De investigatione* remarks that mercury dissolved by means of sal ammoniac is "virtually useless," where the *TP* proffers no criticism of this product. It is perhaps worth noting that the *Summa* too occasionally berates dissolved calces as "useless," such as solutions of gold calx (66va,29) and silver calx (66vb,12-14). It may well be that the *Summa* has just such solutions in mind as that dismissed in the *De investigatione* passage above. At any rate it is clear that the *De investigatione* shares some, if not all, of the *Summa's* disregard for sal ammoniac. It is likely that this growing distrust of sal ammoniac is due not only to the empirical observation of this reagent's inability to form permanent mixtures, but also to a broader theoretical concern. In order to confirm this, let us now turn to the *Summa*.

#### III.4. *The Summa and De re tecta*

In its chapter on the alchemical process of ceration, the *Summa* berates incompetent alchemists who have used techniques that are "erroneous, and wholly removed from the principles of this magistry" (73va). At first it might seem that the expression "principia" is used here to mean sulfur and mercury, as the term is employed in the *Theorica et practica*. In fact, however, the principles just described are not physical substances. At another spot, the *Summa* states that "others supposing from natural principles that any humidity is necessarily converted into dryness by the heat of fire, have attempted with constant perseverance to

make it remain during combustion." At still another point, Paul says that the alchemist cannot "follow nature in all her principles," referring to the fact that metals produced by nature take millenia to mature (63rb). It appears, then, that the expression "principia naturalia" in the *Summa* can mean something like "the normative processes of nature" a concept not unlike that of "natural law." This provides a clue as to why the use of organic products is finally rejected both in the *De investigatione* and the *Summa*. Nature produces metals in the bowels of the earth, without the aid of animal or vegetable matter. The goal of alchemy is to imitate nature as much as possible, an axiom which the *Summa* never tires of repeating. The alchemist should therefore restrict himself to the use of those reagents which nature herself uses, in particular mercury and sulfur.

Before expounding on the ramifications of this theory, we must ask where the author got it. After analyzing all the sources available to me, I believe I can trace Paul's borrowing to the *Risālat al-iksīr* of Avicenna, or pseudo-Avicenna, called *De re tecta* in Latin.<sup>46</sup> This remarkable little treatise begins with the author's claim that he has found alchemical books to be "vacuous and devoid of rationality," a motif echoed at length in the *Summa*. But the author then says that he has discovered the opponents of alchemy to be equally fatuous. In order to solve the problem, therefore, he found it necessary, as he says, to "turn to myself. I cogitated and began to meditate [in order to discover] if this [discipline] is, how it is, and if it is not, how it is not." Step by step, in almost Cartesian fashion, the author proceeds to determine from known facts whether alchemy exists, and if so, how. At numerous points we can find passages that the *Summa* has expanded or paraphrased.<sup>47</sup> Thus it comes as no surprise when we find the author of the *De re tecta* to say: "we therefore looked into natural principles. The subject of liquefaction is a running humidity mixed with dry, earthy parts...." from which he deduces that alchemists should search for such a subject.<sup>48</sup> Although the Arabic expression

for *principia naturalia* is the unremarkable "Usûl tabî'îya," the self-absorbed method of Avicenna, with its exclusive reliance upon axioms drawn from observation, was to have a remarkable effect on the history of Latin alchemy.

I believe that we can trace part of the *Summa's* indifference to Aristotelian hylomorphism and cosmology - not to mention its abandonment of organic reagents - to the adoption of the Avicennian method and its focus on "natural principles." The alchemist is no longer obliged to reason from the corpus of Aristotelian natural philosophy to the particulars of alchemy. Although he is still conditioned by the outlook of Aristotle's *Meteors*, "Geber's" method is now ostensibly self-sufficient. (Observation of nature's works and meditation upon her principles will lead the alchemist to a perfect mimicry of her products. Conformity of his processes to "natural reason" will ensure their success. Hence there is no longer any need to subordinate alchemy explicitly to the more formal disciplines of physics and mathematics, as is done in the *TP*.)

### III.5. The Problem of "Ceration"

The degree to which "Geber" has committed himself to the "self-sufficient" method of Avicenna is further illustrated by the fact that in the *Summa*, old alchemical procedures and recipes are entirely re-written to make them conform to "natural reason." An excellent example of such technological reworking may be seen in the evolution of Paul's thought concerning the old technique called "ceration." This term is derived from the Latin "cera," or wax, and refers to the softening of a hard subject so that it can be made to penetrate a metal or stone. The process is already described in the genuine works of Râzî, where it receives considerable prominence.<sup>49</sup> This "tashmî" or "ceration" of the Islamic alchemists involved the wax-like mollification of minerals and

metals by means of oils, caustic, deliquescent salts, and various solutions.<sup>50</sup> The *TP* reproduces the Arabic view of ceration while adding a *caveat* -

[39v,8-16] Ceration is a certain "fecundation" and impingative softening of a hard or dry substance, in order to give easy fusion and good ingress and mixture or union with the bodies of the metals. For ceration is not - as some impute - the imbibition and grinding itself of imbibed powders upon a stone in the manner of colors; instead, ceration is an acquired effect in the substance of a dried and heated substance, or even in the substance of a hard metal, which effect has taken its name from "cera," due to its easy fusion and tractability.

Here Paul has used at least two sources - the *De aluminibus et salibus* of pseudo-Râzî, from whence he got the etymology of *ceratio*,<sup>51</sup> and the *Liber secretorum de voce Bubacaris*, which appears to have supplied him with some doubts as to the simplicity of the process. There is nothing in the *De aluminibus* to suggest that *ceratio* is not to be identified with "grinding" and "imbibition": to the contrary, that text recommends those very processes. The *L. secretorum*, on the other hand, does not forbid the use of imbibition and grinding, but it limits the cerating agents to sulfur and arsenic sulfide, saying

The very wise philosophers have taught to make the ceration of the metals with pure sulfurs and auripigments, because they mix with the bodies if they be conjoined to them and are left with them, for they spread out with them, dissolve <them>, and make them <run>. According to what many say, the bodies are cerated with salts and boraces, but they have not understood.<sup>52</sup>

It appears that Paul interpreted the above distinction between sulfurs and "auripigments" (i.e. arsenic sulfide) on the one hand, and salts and boraces on the other, as a dichotomy between volatile and non-volatile reagents. The Rhazean category of "eleven salts" and "six boraces," which we reproduced earlier in this chapter, contained no volatile reagents, while sulfur and

auripigment were of course included along with mercury and ammonium chloride in the category of volatile "spirits." Hence Paul considered the *L. secretorum's* exclusion of salts and boraces to be in reality an attack on all non-volatile reagents, and thus on their method of preparation (imbibition and grinding). Sulfur and mercury, on the other hand, belong to the category of spirits: hence Paul assumed that the members of this class, and thus their proper mode of preparation (sublimation), should be admitted. The correctness of my interpretation is confirmed by the statements that follow Paul's rejection of grinding and imbibition in the *TP* (39v,18-23): "the ceration of spirits is performed in two ways - in one mode principal and better [by sublimation]." The less desirable method employs imbibition and grinding.

In order to see the line of progression in Paul's thought, we must now examine the *De investigatione's* gloss to the above passage from the *L. secretorum*. At p. 144,10-14 of our edition, he says the following -

The effect of ceration, in which the right intention of the true artificer is based, is found in none better and nearer than in clean sulfur and arsenic, and in sal ammoniac, whose method of ceration is that they be sublimed so many times with the matter to be sublimed that they sit at the bottom <of the sublimatory> with it, and good fusion show forth in them.

Here we discover two things. First, "Geber" has now explicitly adopted the *L. secretorum's* reagents sulfur and "arsenic," to which he has added sal ammoniac. The addition of sal ammoniac is not surprising, given that the *L. secretorum* itself, in quite contradictory form, includes recipes for ceration with that substance directly after its precept to avoid all reagents save auripigment and sulfur.<sup>53</sup> Second, "Geber" has implicitly rejected imbibition and grinding in the above quotation, in favor of sublimation. This is precisely the tack that he took in the *TP*, where after announcing his distrust of these processes, he came out in favor of sublimation.

Thus we have seen a partial development between the time of the *TP's* composition and that of the *De investigatione*: first Paul rejected imbibition and grinding; then he took up the *L. secretorum's* explicit injunction against reagents other than sulfur and "arsenic," although he kept sal ammoniac. The *Summa* continues this line of development even further, and combines it with the doctrines of the Avicennian *De re tecta*. Let us therefore quote the *Summa's* description of ceration, which occurs at 73vb,8-38 -

Some impute that ceration should be performed with oils, liquids, and waters, but this is erroneous and entirely removed from the principles of this magistry, and disproved by manifest works of nature. For we do not see nature to have put a quickly consumable humidity in the metallic bodies for the need of their fusion and softening....Therefore, imitating nature in those works where we can, we must follow nature in her manner of cerating. Hence we must cerate with a similar humidity. But in nothing is this cerative humidity found better, more possibly, and nearer than in these - namely near in sulfur and arsenic - but nearer and better in quicksilver....The method of ceration is with those, so that their sublimation be repeated upon the matter to be sublimed until, remaining with their humidity in it, they show forth good fusion.

The *Summa*, therefore, rejects such substances as oils waters, and even sal ammoniac outright, saying that their use is "erroneous and entirely removed from the principles of this magistry." The alchemist, since he must imitate the works of nature inasmuch as he can, should use the same agents as does she. These, of course, must be homogeneous; otherwise their moisture will evaporate, leaving only a dry residue. At the same time, we know that "nature herself" uses the principles of the metals in their composition. He who wishes to alter the metals should therefore "follow nature" and use the same agents as she does. The alchemist who uses these minerals cannot therefore be chastised with the concluding phrase of Avicenna's *De congelatione*, where the sceptical philosopher attacked the addition of *res extranee* (cf. our Chapter I, App. I). We

can therefore see how Paul of Taranto, starting with the *L. secretorum's* warning against minerals other than sulfur and arsenic sulfide, first adopted this in the *TP* and *De investigatione* as a technological procedure, though at that point he still wished to keep such reagents as sal ammoniac, which the *L. secretorum*, despite its protestations, had also done. In the *Summa*, however, Paul then developed a rationale for the *L. secretorum's* wariness by coupling it to the methodology of the *De re tecta*, for here he wishes to follow the Avicennian *principia naturalia*, which can be deduced by observing the actions of nature at large.

It is therefore clear that here, and elsewhere in the *Summa*, we have a technology based on scientific first principles. A better term for such a discipline - which is manifestly different from a craft tradition *per se* - is "applied science." Paul of Taranto, in his mature work, refuses to accept recipes that contradict the *principia naturalia* which he has found by experience and reason to be true. His progress from the *Theorica et practica* to the *Summa* witnesses a parallel progression from the attempt to justify and explain alchemy by relating it to cosmology and physics toward an effort to base alchemy on its own internal methodology. Hence we find the passage from an alchemical text openly supported by Aristotelian natural philosophy, replete with references to *De anima*, *De caelo*, *De generatione et corruptione*, and the *Meteors*, to one that barely refers to the philosophy of matter and form, whose material theory is almost purely corpuscular. Although the outlook of the *Summa* is still an Aristotelian one, it is a tacit Aristotelianism that purports to find its justification in observation and the Avicennian reliance on aphoristic *principia naturalia*, rather than in citations of the written text.

#### IV. Conclusion

The mineralogical result of Paul's shift from an alchemy subordinate to and openly dependent on Aristotelian natural philosophy to one ostensibly resting on an observational basis alone, can be clearly seen. The *Summa's* incessant reference to *principia naturalia* which the alchemist must follow or imitate leads to the inevitable conclusion that alchemy should only employ those transmutative agents that nature herself exploits. But since these are known to be mercury, sulfur, and "arsenic," it follows that the principal interest of the alchemist should be focused on the same. Although salts, alums, and atraments or vitriols may have a certain role in purifying the metals, they do not figure in their make-up, and are consequently of little interest.

The *Summa's* greater focus on marchasita, magnesia, and tutia, is part of this same phenomenon. Although these minerals are not components of the metals, they are themselves either composites of mercury and sulfur, as in the case of marchasita and magnesia, or by-products of the metals, such as tutia. Salts, atraments, and alums, as well as "talc" and the boraces, are nowhere described as composites of sulfur and mercury. Therefore the alchemist who wishes to determine and then follow the "principles of nature" will wish to discover the *modus generandi* of marchasita, magnesia, and tutia: first he must determine why they have not evolved into proper metals, and second, since these minerals are particularly close to the metals, he will suspect an affinity between the two groups.

The *Summa* clarifies the second of these two themes by creating two further divisions of substances - "those adhering to the bodies [i.e. metals] without additional modification," and "those which without adherence cleanse the bodies" (67va,17-24). The first class includes marchasita, magnesia, and tutia, while "salts, alums, niters, and boraces" fall into the second. As we have already



stated, only the first class receives a comprehensive description in the *Summa*.

We may therefore say with some confidence that the *Summa's* relative indifference to salts, atraments, alums, and boraces, stems from the fact that these minerals are neither principles of the metals nor made up of those principles. The *Summa's* focus on the internal constituents of the metals is in turn linked to the *De investigatione's* explicit rejection of the manifold reagents described therein in favor of "fewer and better," which are "closer to natural reason." As the *Summa*, relying on Avicenna's *De re tecta*, makes clear, the metallic principles and their immediate progeny are "closer to natural reason" precisely because they are the very materials employed by nature herself in making and altering the metals. "Geber's" decision to limit his further investigation to such minerals, announced in the *De investigatione*, and brought to fruition in the *Summa perfectionis*, marked an entirely new phase in his thought, where the introduction of "extraneous matter" into an elixir would be consistently avoided. This of course became the basis of the "mercury alone" theory, which we shall describe in our treatment of the *Summa's* influence.

## Chapter Notes

<sup>1</sup> M. Berthelot, *La chimie au moyen âge* (Paris: 1893), I. Berthelot analyzes certain recipes for alcohol, gunpowder, Greek fire, etc., *sparsim*.

<sup>2</sup> Ernst Darmstaedter, *Die Alchemie des Geber* (Berlin: 1922). Darmstaedter's apparatus contains numerous attempts to translate the alchemy of the *Summa* into modern chemistry.

<sup>3</sup> Julius Ruska, *Ar-Rāzī's Buch Geheimnis der Geheimnisse*, in *Quellen und Studien zur Geschichte der Naturwissenschaften und der Technik* (Berlin: 1937), VI.

<sup>4</sup> H. E. Stapleton, *et al.*, "Chemistry in Iraq and Persia in the 10th Century A.D.," in *Memoirs of the Asiatic Society of Bengal* (Calcutta: 1927), VIII, No. 6, pp. 318-411.

<sup>5</sup> Ruska, 1937, p. 41.

<sup>6</sup> *Ibid.*

<sup>7</sup> *Ibid.*, p. 42.

<sup>8</sup> *Ibid.*, pp. 42-3.

<sup>9</sup> *Ibid.*, p. 43.

<sup>10</sup> *Ibid.*

<sup>11</sup> *Ibid.*, pp. 43-4.

<sup>12</sup> *Ibid.*, p. 44.

<sup>13</sup> *Ibid.*

<sup>14</sup> *Ibid.*

<sup>15</sup> Stapleton, 1927, p. 370.

<sup>16</sup> Ruska, 1937, p. 45.

<sup>17</sup> *Ibid.*

<sup>18</sup> Ruska, 1935, pp. 34-5.

<sup>19</sup> *Ibid.*, p. 35.

<sup>20</sup> Ruska, 1937, p. 46.

<sup>21</sup> *Ibid.*

<sup>22</sup> Dietlinde Goltz, *Studien zur Geschichte der Mineralnamen*, in *Sudhoffs Archiv: Beihefte* (Wiesbaden: 1972), pp. 282-3.

<sup>23</sup> *Ibid.*

<sup>24</sup> *Ibid.*, p. 282.

<sup>25</sup> Ruska, 1935, p. 35.

<sup>26</sup> *Ibid.*, p. 35.

<sup>27</sup> Goltz, *op. cit.*, pp. 248-9.

<sup>28</sup> *Ibid.*, p. 248.

<sup>29</sup> Ruska, 1935, p. 35.

<sup>30</sup> Stapleton, 1927, p. 347, n.2.

<sup>31</sup> *Ibid.*, p. 376.

<sup>32</sup> A. C. Crombie, *Robert Grosseteste and the Origins of Experimental Science* (Oxford: 1953), pp. 204-10.

<sup>33</sup> William A. Wallace, *The Scientific Methodology of Theodoric of Freiberg* (Fribourg: 1959), pp. 174-248.

<sup>34</sup> Boraces are given a comprehensive description in the *TP* (ff. 40v, 17-41r, 3) and *De investigatione* (pp. 222-4).

<sup>35</sup> *Ibid.*

<sup>36</sup> The *L. secretorum de voce Bubacaris* describes the production of *sal alkali* and *sal cineris* at f. 102rb,25-34 of Paris BN lat. 6514.

<sup>37</sup> TP, 20r,29-v, 2.

<sup>38</sup> CLM 25113, 136r.

<sup>39</sup> M. Berthelot, "Geber: le *Livre des soixante-dix*," in *Mémoires de l'Académie des Sciences* (Paris: 1906), XLIX, p. 360.

<sup>40</sup> Paul Kraus, *op. cit.*, II, pp. 187-303.

<sup>41</sup> Dorothy Wyckoff, *Albertus Magnus: Book of Minerals* (Oxford: 1967), pp. 174-7.

<sup>42</sup> Robert Halleux, *Les alchimistes Grecs* (Paris: 1981), I, pp. 47-8 describes the use of "mordants" taken over from dyeing technology for use in coloring stones. The influence of painting may be seen in the alchemical apparatus known as a "kērotakis," i.e. a painter's palette (*op. cit.*, p. 35).

<sup>43</sup> Arthur John Hopkins, *Alchemy, Child of Greek Philosophy* (New York: 1934).

<sup>44</sup> <Geber> *De investigatione perfectionis*, ed. Newman, in Newman, 1986, vol. III, p. 221, lines 14-17.

<sup>45</sup> <pseudo-Rāzī> *Liber de aluminibus et salibus*, ed. R. Steele, "Practical Chemistry in the Twelfth Century," *Isis XII* (1929), pp. 18-19.

<sup>46</sup> Georges C. Anawati, "Avicenne et l'alchimie," in *Oriente e Occidente nel Medioevo* (Rome: 1971), pp. 285-341. Stapleton has made an interesting argument that the text is really by Avicenna. Cf. H.E. Stapleton, R.F. Azo, M. Hidayat Husain, and G.F. Lewis, "Two Alchemical Treatises Attributed to Avicenna," *Ambix 10*:1962, pp. 41-82. But cf. also Julius Ruska, "Die Alchemie des Avicenna," *Isis 21*, 1934.

<sup>47</sup> Cf. our commentary to the *Summa*, where we give the Avicennian sources for these borrowings.

<sup>48</sup> Anawati, *op. cit.*, p. 332, no. 29.

<sup>49</sup> Halleux, 1981 b., p. 190, n. 2.

<sup>50</sup> Ruska, 1937, pp. 69-70.

<sup>51</sup> Steele, *op. cit.*, p. 28.

<sup>52</sup> Rhazes, *Liber secretorum de voce Bubacaris*, MS. Paris lat. 6514, f. 107vb, 1-8: "Inceratio corporum sapientissimi philosophi cum sulfuribus(!) et auripigmentis puris facere preceperunt quia commiscuntur cum corporibus si coniunguntur et si cum ipsis fuerint elargant enim ea et dissolvunt et faciunt currere [cod. leg. cinerem] et secundum quod multi dixerunt corpora incerantur cum salibus et boracibus et non intellexerunt."

<sup>53</sup> *Ibid.*, f. 107vb, 23-8, 35-40, 41-2, et passim.

## CHAPTER FOUR

### The Matter Theory of "Geber."

#### I. Terminological Analysis.

In the present chapter we shall discuss the matter theory of the *Summa perfectionis*, first on its own terms, and then within the context of other late medieval theories of matter. As we shall show, the *Summa* contains a thoroughly corpuscular theory of matter, though little related to the atomistic conceptions of antiquity. Unlike the authors of ancient atomism, the *Summa* has nothing to say about the shapes or motions of its constituent corpuscles, nor does it maintain them to be indivisible. Moreover, the *Summa's* corpuscular theory is expressed in a language that is not immediately comprehensible, since it depends on a highly technical use of such commonly occurring Latin terms as *pars*, *subtilis*, *grossus*, and others. Hence it will be necessary to justify our translation of these terms and of those that bear a related meaning, before proceeding to the exposition of the *Summa's* corpuscular theory *per se*.

The matter theory of the *Summa* relies on several key terms that are never defined by the author. The most basic of these, arguably, is the word *pars*, which we shall translate as "particle" or "corpuscle," when the context so demands. This decision is easily justified by reference to the text. At 71va, 9-29, for example, the *Summa* describes the conversion of metals into a powdery "calx" by means of intense heat. "Geber" views this process in terms of his theory that metals are composed of two components, mercury and sulfur. Because the sulfur is inflammable, it can be removed by burning. The intense heat of the calcinatory oven can reach the "smallest particle of the sulfur" (*minimam eius partem*), thus inflaming and removing it. As a result of the deletion of the "humidity glueing <the metal's> particles together" (*ex privatione*

*humiditatis partes consolidantis*), the resulting substance will be a powder rather than a coherent solid.

The above example obviously necessitates the translation of *pars* as "particle" or "corpuscle." Nor is it hard to find other passages supporting this choice of words. The *Summa* frequently employs the expression *per minima* when describing the mixture or uniting of *partes*. A very important example of this usage occurs at 65va,13-18, where the composition of sulfur and mercury is described -

In genere vero dicemus quod unumquodque ipsorum est fortissime compositionis et uniformis substantie, et illud ideo, quoniam in eis per minima partes terre taliter partibus aereis, aqueis, et igneis sunt unite, ut nulla ipsarum alteram in resolutione possit dimmittere.

The idea here is that the four elements are themselves of corpuscular structure: particles of fire, air, water, and earth unite "through the smallest," to form the principles mercury and sulfur. We shall describe the origin of the *Summa's* corpuscular theory elsewhere, but it is sufficiently clear from the above examples that *pars* does not have the generalized sense of the English "part," but denotes a minute corpuscle.

Further reason to translate *pars* in the fashion that we have chosen may be found by inspecting "Geber's" use of the term *subtilis*, since the *Summa* frequently associates *pars* with *subtilis* (or in its nominal form *subtilitas*). What does "Geber" mean when he refers to *subtiles partes* or *subtilis substantia*? Although one might be inclined *prima facie* to associate such "subtlety" with the fineness of the Stoic pneuma (continuous rather than corpuscular), the term does not mean primarily "fineness" or "thinness" in the *Summa*: rather it denotes the quality of smallness in a corpuscle in the case of *subtilis pars*, and an aggregation of such tiny particles in the case of *subtilis substantia*. This is not difficult to prove. Let us consider two examples where "Geber" explains the

cause of great weight in metals. At 75ra,4-13, describing the composition of gold, he says the following -

Subtilissima igitur argenti vivi substantia ad fixationem deducta et puritas eiusdem et subtilissima sulphuris materia fixa non adurens tota ipsius materia auri est essentialis.... Et quia subtiles habuit et fixas partes, ideo potuerunt partes eius multum densari; et hec fuit causa sui magni ponderis.

Here "Geber" tells us that gold is made of the smallest possible particles of mercury and sulfur (*subtilissima substantia, subtiles partes*). Because these particles are so tiny, they can be pushed together without leaving much interstitial space. Therefore the resulting metal, gold, will be heavy. If we were to translate *subtilissima substantia* here as "very thin substance" or "very subtle substance," the passage would become nonsensical, since the author would be saying that the high specific weight of gold is due to its "thinness." Obviously he is saying the very opposite, that a given volume of gold is heavier than that of tin, for example, because the former has more particles of metallic matter compressed into the same space. Several pages later, Geber informs us that silver has a lighter specific weight than gold, precisely because its particles are not as small (75rb,2-5) -

Diminutam tamen habet puritatem ab auri puritate, et spissitudinem grossiorem quam aurum, cuius signum est quod non densantur partes eius in tantum quod auro componderet....

The author's reasoning is absolutely clear. The particles making up silver are larger than those of gold. Therefore the interstitial spaces between such particles are also greater than those of gold: as a result silver will be lighter than gold. Finally, in discussing the nature of mercury, Geber generalizes his explanation of the relative weights of metals, in the following passage (79va,5-9) -

Est igitur causa ponderis magni subtilitas substantie corporum et uniformitas in essentia. Per hoc etenim illorum possunt densari partes cum nihil intercidat; et partium densatio ponderis adductio et illius perfectio.

Even more clearly here than in the former passages, the author explains that a higher specific weight is due to a smaller size of particles, since this allows them to be closely packed. As little empty space intercedes between such closely packed particles, the resulting metal will be heavy. It is clear from this passage as well as the preceding that *subtilis pars* must be translated consistently as "small particle" and "subtilis substantia" as "substance composed of small particles." What then is the antonym of *subtilis* in the *Summa's* terminology? The key is supplied in the second passage quoted above, where the relative lightness of silver is attributed to its *grossiorem spissitudinem*. As one might expect, the opposite of *subtilitas* is *grossities*, and so a *pars grossa* must be translated as a "large particle" or "large corpuscle." This can be further substantiated by reference to 67vb,25-26, where the *Summa* introduces the technique of sublimation -

Ignis enim, cum elevat, subtiliores partes semper elevat; ergo dimittit grossiores.

According to "Geber," the reason why sulfur, arsenic sulfide, and mercury can be purified by sublimation is that these "spirits" are composed of small particles, while their impurities are made up of larger ones. On the assumption that the heat used to carry out the process volatilizes small corpuscles easier than large ones, it follows that a small fire will carry up only the small, leaving the large behind. The idea is clarified at 68ra, 7-11 -

Si igitur sublimetur arsenicum vel sulphur, necesse est illa per remissum ignem sublimari, quoniam, cum habeant partes subtilissimas coniunctas uniformiter grossis, ascenderet utique tota illorum substantia sine purificatione aliqua....

The passage tells us that the alchemist must use a small fire when subliming arsenic sulfide or sulfur; if not, the impurities composed of large particles will be carried up with the small ones, since they are "uniformly conjoined." It is therefore indisputable that *pars grossa* and *substantia grossa* respectively denote a single large particle and a substance composed therefrom.

Several other related terms require explanation here. Let us consider the expression *uniformitas in essentia*, which we already quoted from the *Summa's* explanation of specific weight in metals. This uniformity of essence was used along with *subtilitas substantie* to explain why some particles can be closely packed. There can be no doubt that the *uniformitas in essentia* here is identical in meaning to the term *uniformitas in substantia* occurring at various points throughout the text. This is quickly substantiated by reference to 65va,14-18, already quoted, where the *Summa* describes the formation of mercury and sulfur within the earth. Here the four elements composing mercury and sulfur are described as corpuscles united *per minima* to one another in such strong mixture that they cannot be separated: therefore the two principles are of "uniform substance" (*uniformis substantie*). In other words, each particle of mercury (or sulfur, as the case may be) is itself composed of the four elements, and is identical to every other particle of mercury. Hence if a given quantity of mercury is sublimed, all of the substance will evaporate, leaving little if any residue. The roots of this idea are clarified in another passage, where "Geber" further describes the formation of the principles within the earth (62vb,30-35) -

Sed vera mixtio sicci et humidi, ut humidum contemperetur a sicco et siccum ab humido et fiat hec substantia una in suis partibus omniomera et temperata inter durum et molle et extensiva in confusione, non fit nisi per diuturnam mixtionem humidi viscosi et subtilis terrei per minima quousque humidum idem cum sicco et siccum cum humido fiat.

Here again the *Summa* speaks of a *mixtio per minima* which is now associated with "true mixture," in which the components really become "one substance." Obviously we are once again in the presence of a *uniformitas substantie*, since we have a single substance here, "homoeomerous in all its particles." In such a case, the "viscous humid" and the "subtle earthy" are so well mixed that "the humid becomes the same as the dry and the dry the same as the humid." In other words, the elemental particles spoken of on 65va are so thoroughly conjoined that the corpuscles resulting from their union are all identical. Uniformity of substance refers in part, then, to the elemental homogeneity of the corpuscles making up a substance. But there is more to it than that. In describing the sublimation of sulfur, mercury, and arsenic sulfide, the *Summa* stated that fire had the property of raising small particles while leaving larger ones behind. We may therefore argue that "uniformity of substance" refers to uniform particle size, as well as elemental composition. Indeed, this idea is clearly spelled out on 62vb-63ra, where the *Summa* describes the natural formation of metals from their principles (62vb,16-29) -

Dicimus utique quod principia super que actionem suam natura fundat sunt durissime compositionis atque fortissime, et sunt sulphur et argentum vivum, ut dicunt quidam philosophorum. Igitur quia durissime compositionis, difficillime sunt resolutionis. Sed inspissatio et induratio taliter quod fiat in eis contusio et extensio per mali compulsionem et non confractio non est nisi per hoc: quod humidum viscosum in eorum adinvicem commixtione salvatur per successivam et diuturnam inspissationem et temperatissimam in minera decoctionem. Sed

regulam tibi tradimus karissime fili generalem, quoniam non fit inspissatio alicuius humidi nisi prius fiat ex humido partium subtilissimarum exhalatio et conservatio ex humido partium magis grossarum, si sit humidum in mixtione superans siccum.

Initially, the metallic principles are volatile fumes. Before a *mixtio per minima* (62vb,34) of the particles can take place, the smallest corpuscles must be deleted by an exhalation, leaving the larger ones behind. This happens over the course of many years, and is effected by means of slow gentle heat within the earth. As in the case of sulfur's sublimation by an alchemist, the fire raises up the smallest, leaving the larger behind. As a result, the principles gradually lose their volatility and liquidity, becoming a solid metal. In order for a truly uniform substance to be produced, however, so that the particles become homoeomerous, it is necessary that the remaining corpuscles undergo a "mixture through the smallest of them" (*mixtio per minima*). This results in the temperation of moist by dry and dry by moist that we already quoted from 62vb, 30-35, leading to a state of homogeneity.

The word used by the *Summa* to describe the gradual solidification of the metals within the earth is *inspissatio* (62vb,20 and 24). In this context, "thickening" is a perfectly appropriate translation of *inspissatio*, since "Geber" is simply trying to convey the notion of a passage from volatile liquidity to solidity. *Inspissatio* and the related *spissitudo* remain troublesome terms in other contexts, however, and so require further explanation. We already quoted a sentence at 75rb,2-5 that explained the lighter specific gravity of silver as a result of its "greater thickness than gold" (*spissitudinem grossiorem quam aurum*). To translate *spissitudo* simply as "thickness" here would be highly misleading, since "thickness" to us could connote density, while to "Geber" it implies the opposite. We have already proposed a partial solution to this problem, by translating *grossus* as "big" and *grossities* as "large size," in reference to the constituent corpuscles. Following this

procedure, we see that the author means that silver has larger particles than gold, hence larger interstitial spaces, and therefore a lighter specific weight. But *spissitudo* could still refer either to the individual particles which are "thicker," that is, "bigger" than those of gold, or it could refer to the *packing* or *compaction* of a group of such particles, which is looser than a similar packing of gold's particles. On the balance the latter interpretation seems preferable here, in which case we are free to translate *spissitudinem grossiorem* here as "looser compaction," while bearing in mind that this "looser compaction" is brought about precisely because the particles of silver are bigger than those of gold.

*Spissitudo* and the related *inspissatio*, may be translated otherwise in other contexts. Let us consider "Geber's" account of the artificial preparation of mercury at 75va,2-13 -

Densam autem substantiam illud habere manifeste vidit monoculus per illius aspectum et preponderationem sui immensi ponderis. Auro enim preponderat cum in natura est, et est similiter fortissime compositionis, ut narratum est. His igitur relinquitur ipsum posse figi sine illius humiditatis consumptione et in terram conversione. Propter enim bonam partium adherentiam et fortitudinem sue mixtionis - si quoque modo partes illius inspissentur per ignem - ulterius non permittit se corrumpi nec per ingressum fumose flamme in illud se in fumum ulterius elevari permittit, quoniam rarefactionem sui non patitur propter sui densitatem et carentiam adustionis, quam per sulphureitatem perfici cognoscimus.

Here the *Summa* tells us that mercury has a *densam substantiam*, made obvious by its great weight. If we refer back to the *Summa's* explanation of great weight on 79va,5-9, we shall recall that "Geber" believes this to be a product of small closely packed particles, since only insignificant interstices occur between such corpuscles (*possunt densari partes cum nihil intercidat*). *Densari* must therefore be translated as "to be packed together," and *densatio* as "packing" or "close packing."

Thus the *densam substantiam* alluded to on 75va should be rendered as "a closely packed substance," or even "a substance of closely packed particles." "Geber" then tells us that mercury is of "very strong composition," which, as we know, connotes that the mercury is also of "uniform substance," having homoeomeric particles. As we also know, from our previous analysis of 62vb, 16-35 and 65va, 13-23, such "strong composition" results from "true mixture," that is, "mixture through the smallest particles" (*mixtio per minima*). Returning to 75va, however, Geber now tells us that mercury can be rendered non-volatile (*posse figi*) without the consumption of all its humidity and the consequent conversion of it into an infusible earth. This is due to the fact that mercury already has "good coherence of its particles" (*bonam partium adherentiam*) and "strong mixture" (*fortitudinem sue mixtionis*). The idea is that since mercury already has coherent particles, it is possible to "fix it" (make it non-volatile) without the deletion of all its minute corpuscles (clearly the homogeneity of natural mercury is only relative, since it still has particles of different size). This is an oblique allusion to the theory expressed at 62vb, 25-29, that liquids are converted to solids by the elimination of their smallest particles. At 75va, therefore, the *Summa* is telling us that such an "exhalation" must not be carried out to the degree that the alchemist's mercury be robbed of all its humidity. Instead, the particles of mercury must be "made larger" (*partes illius inspissentur*) so that the substance be fixed. Again, the idea is that very tiny particles are volatile, while larger ones are not. Thus if the particles of mercury can only be increased somewhat in size, with their uniformity, coherence, and strong mixture remaining, the substance will become impervious to fire. The "ingression of vaporous flame" will be prevented, and so the mercury will "not allow itself to be further elevated into vapor."

It may seem a flagrant contradiction that the *Summa* maintained the particles of silver to be too large at 75rb,3, while

those of quicksilver must be increased in size at 75va. Nor does "Geber" help this apparent confusion when he makes the following statement at 79va, 9-14 -

Patet igitur quod tam corporum administrationis preparatione quam ipsius perficientis medicine per operis artificia subtilitatem perquirere necesse contingit, quoniam quanto maioris sunt ponderis corpora transmutata, tanto et maioris sunt perfectionis inventa investigatione per artem.

As the author says, the perfection of transmuted metals is directly proportional to their weight. But we know that weight is the result of closely packed minute particles: therefore the artificer must seek to produce both "medicines" and artificial metals from such tiny corpuscles. As he says, "it is necessary to seek out minuteness" (*subtilitatem perquirere necesse contingit*). How do we reconcile this with the statement on 75va that the particles of mercury should be increased in size? In fact, such minuteness is not absolute, but relative, varying with the substance at hand and with the particular goal of the alchemist. This we can demonstrate by reference to the *Summa's* description of sublimation.

In describing the sublimation of mercury, arsenic, and sulfur, "Geber" tells us that the alchemist should seek to acquire their *mediocris substantia* (74ra,43, 74rb,37). In order to do this, he must "divide" their substance, which is difficult due to their "strong mixture." The object, in the case of sulfur and arsenic, is to remove the excessively small corpuscles that are responsible for its inflammability, and also to eliminate the overlarge corpuscles that account for its earthiness (*terreitas*), the cause of its ability to "infect" and "darken" metals, and also of its poor "ingression" into the smallest particles of metals. It is therefore necessary to sublime sulfur with the addition of "dregs" (*feces*) made up of iron or copper filings, which serve to combine with the large particles and hold them back in the sublimatory so that they cannot pass over (*commixtio cum fecibus partes comprehendit grossas et tenet illas in*

*aludel fundo depressas, nec eas scandere permittit*. 68ra, 14-17). After these dregs have been removed, the sulfur or arsenic is then sublimed again, but with a very weak fire. What will then pass off is a substance composed of very tiny particles (*res subtilissima*), which is the cause of native sulfur's combustibility. After the deletion of the sulfur's overly small and large particles, what will then remain is the *mediocris substantia*, a substance composed of particles between the two extremes.

In the case of mercury, the alchemist's object is to remove its excessive wateriness and also its earthiness. The wateriness is obviously the cause of its liquidity, while the earthiness causes it to produce blackness in the metals. Mercury should therefore be imbibed with dissolved dregs and sublimed by means of a gentle fire. Its excessive humidity will be carried off by the evaporating liquid: then it should be subjected to more heat, so that it be separated from its dregs (69va 27-41). As in the case of sulfur and arsenic, the aim is to separate the *mediocris substantia* of the mercury (74rb,37). Since this is composed of medium-sized particles, it is neither overly volatile nor overly earthy. Hence it is the "perfective cause" in mercury, which should form the primary ingredient of a medicine made from that substance.

From the above analysis of terms we have shown that *pars* should be translated more or less consistently as "particle" or "corpuscle," *subtilis* as "small," and *grossus* as "large." Similarly, *subtilis substantia* may be rendered as "substance made up of small particles," while *grossa substantia* becomes "substance made up of large particles." Since this is rather periphrastic, however, we shall sometimes translate the terms simply as "subtle substance" and "gross substance," keeping our interpretation in the footnotes. *Spissitudo*, on the other hand, is translatable either as "compaction" and "packing" if it refers to a mass of particles, or as "largeness" and "bulk" if it refers to individual particles. In other contexts it need not refer to the micro-structure of a substance at all, but rather to

its properties at the macro-level: then it can be translated simply as "thickness." *Inspissatio*, consequently, is the process by which such compaction, large particle size, or generalized thickness, is achieved. *Densatio* is a more specific term for "compaction" or "close-packing," and will be translated accordingly. *Mediocris substantia*, finally, will be translated either as "a substance of medium-sized particles," or, to avoid periphrasis, as "medial substance."

## II. The Corpuscular Theory of the *Summa*

The foregoing analysis of terms has allowed us to reach certain conclusions. The *Summa* contains a corpuscular theory according to which the principles of metals, mercury and sulfur, begin their subterranean existence as volatile fumes. They are gradually thickened within the earth by means of an exhalation of their smallest particles, followed by a true mixture of their components through the smallest remaining corpuscles (*per minima*) until all their particles become relatively homoeomerous. In this natural process "the dry" and "the wet" act on one another to produce the metals - substances of medial condition between dryness and humidity. This "contemperation" and "true mixture" gives them the condition of "strong mixture" and "uniformity of substance," which in turn account for the fact that natural mercury and sulfur can be sublimed without the deposition of much if any residue.

We have also discussed the *Summa's* theory of specific gravity, according to which metals vary in weight according to the packing of their tiny corpuscles. Lighter metals have larger corpuscles separated by larger interstices; hence they cannot be packed as tightly as heavier metals.

Purely as an aside, it is interesting to note how similar "Geber's" corpuscular theory is to that of the *Timaeus*. Plato also

argues that smaller, more uniform particles can be more tightly packed than large ones, and that this accounts for the great weight of gold, for example (59BC). Similarly, the *Timaeus* states that fusibility is a function of small particles, an idea also contained in the passages discussed above (58DE). It would thus be tempting to argue that the *Summa* has drawn directly on the *Timaeus*, except for two facts. First, the sections of the *Timaeus* containing these passages are not found in the translation of Chalcidius known to the medievals, and second, as we shall show, the *Summa* could have derived them from other, non-Platonic, sources.

The alchemical implication of "Geber's" theory is that since heavier metals are more perfect than their lighter counterparts, the alchemist should "seek out minuteness" of particles. In other words, for a base metal to be converted to a noble one, its constituent corpuscles must somehow be reduced in size and packed more tightly. This in fact is the *modus operandi* of the *Summa's* transmutational theory, as we shall presently show. First, however, we must say something about the constituents of the individual metals, since the rectification of their conditions provides the method by which "perfection" is attained.

### II.1. The Causes of Metallic Perfection

The *Summa* maintains that the six known metals, gold, silver, tin, lead, copper, and iron, are composed of the two metallic principles mercury and sulfur. As we have already seen, each of these two principles is homoeomerous, and partakes of "strong composition," due to the mixture within it of the four elements "through their smallest particles" (*per minima*). It is this sort of speculation that has led modern commentators of the *Summa*, such as Reijer Hooykaas, to argue that "Geber" possessed the notion of "chemical mixture."<sup>1</sup> As Hooykaas says - "While assuming the preservation of elements in compounds, we also regard the



compound as homogeneous and consisting of completely identical particles which we think of as molecules."<sup>2</sup> The *Summa's* assertion that tiny elemental particles combine to form larger corpuscles of mercury or sulfur does sound superficially like the modern distinction between atoms and molecules. But it is extremely dangerous to push this too far, since the *Summa* posits another level beyond the putative "molecular." According to the text, mercury and sulfur particles in turn combine to form metallic particles *per se*, which are themselves homogeneous. At 65rb,34. the *Summa* relates that the metals themselves are "of very strong composition" implying that mercury and sulfur can themselves undergo the sort of intimate mixture that leads to "uniformity of substance." This is carried a step further at 75ra,18-20, where "Geber" states the following -

Et uniformitas in substantia est causa perfectionis que per  
mixtionem fit in decoctione naturali, diversitas vero causa  
corruptionis.

Since uniformity of substance appears here as a cause of metallic perfection, it follows that the "more perfect," noble metals, gold and silver, must be more homoeomeric than tin, lead, copper, and iron. In addition to such homogeneity, however, the *Summa* lists several other causes of metallic perfection at 75ra,18-23. These may be recapitulated here: 1) "a great quantity of quicksilver," and a correspondingly small portion of sulfur; 2) the type of "durability and thickening" (*induratio et inspissatio*) that result from long, temperate cooking underground as opposed to the bad type that results from rapid, overly hot cooking; 3) the forementioned uniformity of substance. We may refer to these as "primary" causes of perfection. From them result a host of "secondary" causes, which appear throughout the text. The tendency of the *Summa* is to treat these secondary causes in terms of the interplay between mercury and sulfur of differing quantity

and quality. Yet it is not difficult to see how the qualities of these two principles derive from the three primary causes described above. Let us therefore list them along with their causes.

At 75ra,23-35, the *Summa* states that the sulfur making up a metal can be either fixed (non-volatile) and unburning, or volatile and burning, or partake of a medial state between the two extremes. It is clear from our earlier analysis of the term *mediocris substantia* that the *Summa* is referring obliquely to the fact that sulfur can be composed of particles varying in size. The smallest are intensely volatile and inflammable. The largest are neither volatile nor flammable, but the medium-sized particles occupy an intermediate position. As the reader will also recall, the *Summa* attributed particle size within the principles to the type of cooking occurring beneath the earth (62vb, 16-29). A rapid cooking led to the removal of all the tiniest particles responsible for moisture and liquidity, while a slow, temperate one led to proper mixture of the moist and the dry. Thus the differing conditions of sulfur described on 75ra may be attributed to a primary cause, namely heat and duration of subterranean cooking.

The second quality of sulfur described on 75ra is its relative "cleanliness." The sulfur can be either wholly clean, wholly unclean, or in-between the two. The cleanliness of sulfur is itself a product of its uniformity of substance. Appealing again to our earlier analysis of *mediocris substantia*, we will recall that native sulfur has an "earthiness" (*terreitas*), which is associated with its large corpuscles. Just as overly small corpuscles cause sulfur to be volatile and fiery, so too large corpuscles make it dark and dirty. Furthermore, they prevent the sulfur from being mixed properly with a metal's mercury, which results in internal porosity and a loss of structural integrity. This is nicely described in the *Summa's* explanation of the fact that iron and copper are easily calcined (oxidized) by fire (72ra,33-42) -

Propter enim eorum [i.e. copper and iron] multam terreitatis quantitatem et sulphureitatis adustive et fugientis mensuram, defacili hoc modo adducuntur in calcem. Et illud ideo, quoniam ex multa terreitate argenti vivi substantie intermixta turbatur argenti vivi continuatio, et ideo porositas in eis creatur, per quam et sulphureitas transiens evolare potest. Et ignis ex causa illa ad eam accedens comburere et elevare potest illam. Per hoc igitur derelinquitur et partes rariores fieri et in cinerem per discontinuitatem raritatis converti.

Iron and copper have a large quantity of "earthiness," along with volatile and burning sulfur. The presence of these earthy particles prevents the corpuscles of mercury from properly cohering, which leads to a state of porosity in the two metals. The fire of the calcinatory oven can easily penetrate these pores, and when it does so, it drives out whatever volatile sulfur was present in the metal. Earlier, however, the *Summa* equated this volatile sulfur, made up of very fine corpuscles, with the "humidity consolidating <the metal's> particles" (71va,10). The result is that the deletion of this sulfur will destroy the metal's coherence, leaving a powder behind. The presence of large, earthy sulfur particles is therefore a cause of "corruption" in that it accounts for the base metal's corrosion by fire. But such variation of size among sulfur particles is itself a violation of homogeneity, and hence a product of "diversity of substance" as opposed to "unity of substance."

In addition to listing such secondary causes of perfection as non-flammability and cleanliness, the *Summa* also iterates that the sulfur in a mixture can either exceed in quantity, be exceeded, or equal the quantity of mercury. Similarly, the sulfur can vary in color, being either "white, red, or in-between." The author makes no attempt to reduce these phenomena to more fundamental causes, accepting them simply as givens. The *Summa's* purpose at this stage of the text is no longer to relate secondary causes to their primary forbears, but rather to delve into ever more specific examples of metallic perfection and the lack thereof. Thus we

learn that unfixed sulfur is responsible for blackness upon burning, fusion, and softness with a loss of metallic integrity, while fixed sulfur impedes fusion and causes hardness (75vb,33-40, 77ra, 4-26). Similarly, both unfixed and fixed mercury can cause fusion, the former leading to low temperature melting, the latter to liquefaction with the application of great heat. Both unfixed and fixed mercury can also produce the quality of softness in a metal, and in either case the softness will not cause a lack of metallic integrity, so that the metal can be hammered thin. But unfixed mercury has the property of evaporating from a metal if kept in the heat too long, in which case the metal loses its proper fusion, and acquires "vitrification" in its stead. Let us now consider the *Summa's* treatment of individual metals, to see how these doctrines are applied.

Gold, "Geber" tells us, is composed of a great quantity of mercury, which is made up of small particles, fixed, and pure, combined with a small quantity of fixed, clean sulfur, capable of tinting the mercury yellow (74vb,28-30). The fact that gold is mostly made up of mercury is known primarily because of its easy amalgamation with native quicksilver, revealing an identity of substance. The fixity of the mercury and sulfur is known from the fact that gold is not volatile under normal conditions. We know that the mercury and sulfur are clean because the metal withstands the assaying tests of cupellation and cementation: if it had much *terreitas*, it would be infiltrated by pores that would allow fire to attack it. Finally, the fact that gold is made up of small particles rather than large is revealed by its great weight, since the minuteness of its particles allows it to be greatly compacted.

Silver, on the other hand, has a mercury and sulfur that are "clean, fixed, white, and shining," and the mercury predominates (75ra42-75rb2). But the purity and fixity of silver's principles are less than those of gold, since it weighs less, and is slightly combustible.

Iron, unlike silver and gold, is produced from a large amount of "fixed, earthy, sulfur," mixed with a small amount of an earthy quicksilver. The large amount of sulfur in iron, and its correspondingly small share of mercury, are known from the absence of affinity that it has with native quicksilver. The fixity of the sulfur is known from the fact that iron has a very high melting point (1535° C). Its earthiness, as we have already discussed, is made manifest by its easy calcination: the earthiness creates large pores allowing the easy penetration of fire into its substance.

Copper, like iron, has much dirty, fixed sulfur composed of large particles, but mixed with a smaller part of unfixed, dirty, red sulfur. To this is joined an equal quantity of dirty, large particles of mercury. The presence of unfixed sulfur in copper is substantiated by the "sulfurous" flame (i.e. blue) with which it burns. Its other, fixed sulfur, is known from the fact that it can be hardened in fire, and its fusion impeded. The fact that copper has more mercury than iron is known from its easier amalgamation therewith (66rb,17). No proof other than its appearance is offered for the dirtiness of its mercury.

Tin is composed of a large amount of "impurely white" quicksilver, part fixed and part unfixed, mixed with a smaller amount of mostly unfixed, dirty, white sulfur. The proof that tin contains both fixed and unfixed sulfur lies in the fact that its first calcination produces the stench of burning, volatile sulfur, but after this, its calx cannot be induced to stink. The presence of unfixed mercury is shown by the fact that tin calcined twice loses its "creak." Since this same creak can be induced in lead by "washing" it with mercury, it must have originally been caused in tin by the mercury that volatilized during its calcination. The great quantity of mercury in tin is proven by its ease of amalgamation with quicksilver.

Lead, finally, is composed of sulfur and mercury in the same proportion as tin, but the principles of lead are dirtier, and made of

larger particles, and lead's sulfur is more fixed. Lead's greater earthiness is proven from its ease of calcination, while the fact that it has more fixed sulfur is shown from the extreme yellowness of its calx.

The imperfections of the metals, then, can be explained in terms of diversity of substance (the opposite of homoeomerity), small quantity of mercury, and improper particle size. Diversity of substance appears in two basic ways - in the presence of diverse types of mercury and sulfur (e.g. fixed and unfixed), and in the presence of earthiness. While gold partakes of fixed mercury and sulfur alone, the principles of silver are fixed in relation to the base metals but not to gold. Iron, on the other hand, has fixed principles, but they are mixed with considerable earthiness, providing diversity. Copper, tin, and lead, finally, have both earthiness and the diversity supplied by a mixture of fixed and unfixed principles. Put simply, the make-up of the base metals is not as homoeomerous as that of the perfect, and this accounts for their corruptibility.

Quantity of mercury can also be seen in terms of uniformity of substance, since the *Summa* says that gold has the least sulfur of any metal, and "mutated from its own nature" (74vb,30). Hence gold is almost pure fixed mercury. The other metals will therefore partake of more sulfur in the order of their imperfection.

The question of particle size is perhaps the most subtle of the *Summa's* causes of "perfection." Gold we know to be of very small particles because of its great weight. Silver, on the other hand, must have larger particles precisely because its specific weight is less than gold's. We have already shown from various *loci* in the *Summa* that volatility is a function of minute particles. Iron must therefore be of larger particles than silver because its principles are fixed. The *Summa* consistently links *grossities* to *terreitas* as well, so the great earthiness of iron means also that it must have large particles. In the case of copper, tin, and lead, however, the metallic

principles are a mixture of the fixed and the unfixed. Does the author take the step of viewing these principles in terms of particle size? In the case of copper, he tells us that the fixed sulfur and mercury are made up of large particles (the term is *grossus*: 75va43-75vb1). Lead, he tells us, has principles that are made up of larger corpuscles than those of tin (*grossioribus*: 76va,37). We are not told, however, whether the principles of tin itself are grosser or subtler than those of the other base metals.

## II.2. Transmutational Theory in the *Summa*

It is time now to determine the import of the *Summa's* speculations about the nature of matter for the author's theory of transmutation. Folios 79va-82rb of the *Summa* are devoted to the theory of "three medicines." This theory, as I have explained elsewhere, is in part an attempt to rationalize certain cryptic remarks made by Jābir ibn Hayyān in the *Liber Septuaginta*. The *Summa* posits three different types of alchemical "medicine" which, when projected on base metals, lead to three corresponding "orders" of metallic perfection. Medicines of the first order produce only transient, apparent effects, medicines of the second order induce real change, but can only effect one quality, leaving all the others imperfect, while third order medicines perfect all qualities at once. But how do these medicines produce their effects, and why do they vary in intensity? At 77vb,19-78ra,38, the *Summa* describes two sorts of metallic imperfection, one that exists "in the depths" of the metal (*in profundo*), and another that is accidental (*in manifesto*). The profound sort of imperfection "cannot be removed by a medicine of the first order, no matter how hard one tries" (*impossibile est removeri per medicinam primi ordinis alicuius industrie*). The superficial sort can, however, be removed, apparently by the application of just such a medicine.

The *Summa* then proceeds to say that the imperfection in the *profundum* of the metals (i.e. their essential imperfection) is not really a positive quality, but merely the absence of perfection. Hence the metals need to be cleaned in their *manifestum* alone (i.e. their accidental impurity must be removed). After this preparation has taken place, one of the three degrees of medicines should be applied. But again, what allows one medicine to perfect more than another? In comparing the second degree medicine for gold with that of silver, the *Summa* says that nothing distinguishes one from the other, except "the greater subtilization of the particles" (*in maiori partium per modos proprios subtiliatione egestos*: 81rb,4-5) in the medicine for gold. This suggests that there is no essential difference between the medicines of different rank, but that they are differentiated only by their particle size, as also illustrated by the *Summa's* penultimate chapter (84va,34-84vb,15). Here a process of repeated sublimation of mercury is used to attain a state of continually increasing "subtlety." Sublimation of the first degree cleanses the substance from "corrupting impurity." But then the mercury must be further sublimed -

Et est scilicet sublimationis perfectio, et cum ea subtilietur lapis donec in ultimam subtilitatis puritatem deveniat, et ultimo volatilis fiat.

This passage tells us that "the stone," that is, mercury, must be sublimed repeatedly, until it is "brought into the final purity of subtlety." In other words, the particles of mercury must be purified from all their earthy *grossities*: this will result in a product of uniform tiny corpuscles. The author's reasoning is clear: in order for the perfecting mercury to penetrate into the *profundum* of a base metal, so that it can engage in a true *mixtio per minima*, the mercury particles must be extremely small. Only then will they be able to infiltrate the pores of the metal and unite with the metallic

microstructure at its most fundamental level. But here a problem arises. We know that the *Summa's* explanation for volatility is precisely the fact that small particles are easier elevated by heat than larger ones. Does it not follow, therefore, that mercury particles subtilized to the final degree will also be intensely volatile? The *Summa* deals with this problem by asserting that after each sublimation of the mercury, it must be fixed, "until it rests in the harshness of the fire," (*donec in ignis asperitate quiescat*: 84va,40-41), rather than passing off as vapor. But then the reader must wonder why the mercury was subtilized in the first place, if such reduction in particle size is to be followed by the inevitable increase necessary for fixation. Has anything at all been accomplished?

The answer to this perplexing problem may lie once again in "Geber's" concept of the *mediocris substantia* of the metallic principles. As we discussed earlier, the *Summa* states that native sulfur, though relatively homoeomeric, is nonetheless composed of tiny, overly volatile particles, large earthy particles, and a medial substance which is neither very volatile nor partaking of such *grossities* that it has difficulty entering into the intimate structure of metals. Mercury similarly has an overly watery component, an earthy constituent, and a medial substance lacking the imperfections of the former two. For this reason, when describing the production of third order medicines, "Geber" advises to "separate the purest part" (*purissimam partem divides*: 81vb,20) of the mercury, and to cast aside its "impurities." As he reiterates throughout the text, mercury in its "whole substance" is not the medicine, but only "part of it" (e.g. at 67va,28-29). This desired "part" of mercury is surely its *mediocris substantia*, as the following passage demonstrates (74rb,33-39) -

...necesse est ... mediocrem illius substantiam salvare, de cuius est proprietate et natura non aduri et ab adustione defendere, et que non fugit fixumque facit.

Not only does the medial substance of quicksilver resist burning and partake of fixation, it imparts these very qualities to other substances (*ab adustione defendere ... fixumque facit*). Hence it is the ideal material from which to make a metallic medicine. When "Geber" therefore advises that the alchemist subtilize mercury to the final degree, he means this in a relative sense. What is to be subtilized is not the smallest particles of mercury, but the medial substance, and this, surely, will not be divided to the point that it finally equal the smallest particles in minuteness. Once subjected to the "third degree" of treatment, the medial substance will partake of relatively small particles cleansed of all impurity by repeated sublimation and fixation. It will then be able to penetrate the depths of base metals, defending them from burning and resisting volatilization.

In addition to providing fixation and a defense against combustion, the perfecting medicine should impart certain qualities that vary with the two "types" of metal - the hard (iron and copper) and the soft (tin and lead). The former need a medicine that "softens" and "attenuates up to the *profundum*" (*mollificante et ad profundum attenuante*: 77ra,39-40), while the latter require a medicine that "hardens" and "thickens the *occultum*" of the metal (77ra,40-41). Hardening and softening are self-explanatory, but the attenuation and thickening referred to need some consideration. In the light of the comments made about silver at 75rb,2-5, it is not difficult to see why iron and copper would need attenuation. There it was said that silver was lighter than gold, which proved that it had a *grossiorem spissitudinem*, and hence larger metallic corpuscles. Since copper and iron have lower specific weights than silver (8.96 and 7.87 respectively), it would follow that they have yet larger metallic particles, inhibiting their close-packing even more than silver. Therefore iron and tin need to have their corpuscles "attenuated," i.e. reduced in size.

Why, however, do lead and tin need to have their corpuscles "thickened," i.e. increased in size? Lead has a specific weight of 11.35, while that of pure tin is 7.31. It is clear, however, that "Geber" is not speaking of pure tin, since he refers to a livid and a white type (64va,39-42), and says that purified tin equals lead in weight (76rb,37). Therefore his tin and lead have a specific weight greater than those of iron and copper. But the problem is not that tin and lead are heavier than iron and copper, rather it is that tin and lead are lighter than gold (specific weight 19.32). Since this is the case, it should follow that the corpuscles of tin and lead need to be reduced just as those of copper and iron, so that one arrive at the higher specific weight of gold. In order to solve this apparent inconsistency, we need to recall that tin and lead are far from being truly homoeomerous. Both consist of a mixture of fixed and unfixed principles. In particular, lead and tin contain an abundance of unfixed mercury, which accounts for their low melting point and volatility (76vb,38-40). But we know that unfixed mercury, by its very volatility, is composed of smaller corpuscles than fixed mercury. Therefore the mercury of lead and tin does need to be "thickened" to the degree that it be fixed. Nonetheless, if lead and tin are composed of a mercury more subtle than that of gold itself, why do the base metals not exceed gold in weight? Simply because lead and tin also partake of gross sulfur and earthiness, which make the mercury particles stand apart, thus reducing the specific weight of the soft metals. It is for this reason that the *Summa* can say that the alchemist must, in general, "seek out minuteness" (79va,9-14). In relation to the gross sulfur and earthiness in lead and tin, their unfixed quicksilver is composed of tiny particles. By removing the *grossities* supplied by their sulfur and *terreitas*, the alchemist will arrive at his goal, a more "subtle substance." In fact, however, this substance will then be too "subtle," giving "Geber" the further impetus to instruct us that the *tenuitas* of the soft metal must undergo an *inspissatio*.

The nature of the *Summa's* transmutational theory should be clear enough by now. The alchemist's object is to separate the medial substance of quicksilver, its "purest part," and by a process of repeated volatilization and fixation he should lead its corpuscles to a state that allows them both to penetrate the depths of the base metals and to inhere there upon their arrival. Such "artificial" mercury will not be impeded from ingress either by earthy impurities mixed in with it or by its own particles having too large a size. At the same time, its corpuscles will not be so small as to be volatile. In other words, the medial substance of mercury will itself have been tempered to the degree that it occupies a perfect mean between all extremes. Once installed in a base metal, this "medicine" will protect the former from burning and volatility, while imparting such qualities as brightness, proper malleability, proper weight, fusion with incandescence, and resistance to corrosion. For the sake of convenience, we shall deal with these topics in our commentary as they arise within the text. It is now time, however, to say something about the tradition into which the *Summa's* corpuscular theory fits.

### III. Corpuscular Theories in the Latin Middle Ages

#### III.1. The Views of Lasswitz

In the preceding part of this chapter, we have described the corpuscular theory of the *Summa* in some detail. It will now be useful to describe the nature of this theory and its sources. We are not the first to observe that "Geber" was influenced by corpuscular ideas. The well-known historian of atomism, Kurd Lasswitz, included the *Summa* in his *Geschichte der Atomistik* written in 1890. Lasswitz summarized the *Summa's* corpuscular doctrine in the following words--

Von all den Prinzipien der Chemiker, sowohl den älteren als neueren, sagt Dschabir ganz im allgemeinen, dass sie zusammengesetzte Körper sind und zwar von sehr gleichförmiger Substanz, weil in ihnen die Teile der Erde mit denen der Luft, des Wassers und des Feuers aufs innigste (durch Berührung der kleinsten Teile) vereint sind, so dass dieselben bei der Auflösung sich nicht voneinander trennen können. Wir haben es also bei den Grundbestandteilen der Metalle nicht etwa mit neuen Elementen, sondern mit eigentümlichen engen Verbindungen der vier alter zu thun, die nun als solche die Verbindungen zu Metallen eingehen.<sup>3</sup>

As Lasswitz realized, this teaching was not a pro-Democritean response to Aristotelian physics based on philosophical first principles, but an attempt to justify the multifarious operations of chemical combination and decomposition taking place in the laboratory. Lasswitz rightly distinguished between the theoretically rigorous atomism of the ancient philosophical schools and the tendency toward a "naive corpuscularism" exemplified in Antiquity by the Greek and Latin writers on technology, such as Hero of Alexandria and Philo of Byzantium on the one hand, and Vitruvius on the other.<sup>4</sup> Hence to Lasswitz, who followed Kopp in believing the *Summa* to be an Arabic production of the eighth century, "Geber" was an important transmitter of ancient corpuscularism - but not of atomism - to the Latin West.<sup>5</sup>

Despite his important observation that the *Summa* contained a corpuscular philosophy, Lasswitz's approach was misdirected in two important respects. First, his dating and origin of the *Summa* were completely wrong, for that work was written in late medieval Italy. Second, since the *Summa* cannot have "transmitted" Greek or Arabic ideas to the West, we must wonder whether these corpuscular notions were not already established in Europe before its composition. Before approaching this problem, however, we must confront one of the main tenets of the *Geschichte der Atomistik*, namely that the Aristotelian philosophy of the

scholastics was fundamentally opposed to corpuscularism of any sort.

Thanks largely to the groundbreaking work of Anneliese Maier, it is now common knowledge that the late medieval scholastics had a type of corpuscular theory based on Book I, chapter IV, of Aristotle's *Physics*.<sup>6</sup> The Stagyrte there says that animals and plants have both an upper and lower size limit, and that the same must be said of their parts. From this rather obscure reasoning the scholastics concluded that there are *minima naturalia* out of which living things - and by extension non-living things - are composed. One influential expositor of the theory, Roger Bacon, argued that although matter may be infinitely divisible, the smaller a particle is, the less it can exercise its natural power on others. Hence if a particle of fire, for example, became too small, it would lose its natural power of heating. As Maier says -

...dann ist die betreffende Substanzpartikel nicht mehr wahrnehmbar und kann nicht mehr ihre spezifischen operationes naturales ausüben. In diesem Sinn gibt es minima, an denen die Teilbarkeit der kontinuierlichen corpora sensibilia ihr Ende findet.<sup>7</sup>

Despite the familiarity of the *minima naturalia* tradition today, it is little appreciated that this particular theory, and the textual locus from whence it was drawn, formed but one strand of a complex collection of ideas about the corpuscular character of matter that were *au courant* in the late Middle Ages. These corpuscular concepts arose in almost every genre of medieval scientific writing - alchemical, medical, philosophical, and elsewhere. We shall here consider the relationship of these corpuscular notions to Aristotelianism *per se*, and try to present a brief overview of their scope.

The polemic that Aristotle directed against the ancient atomists is so well-known that we need only address a few remarks thereto. Lasswitz classes Aristotle's objections in two main

divisions - I) those attacking the possibility of atomism (*Gründe gegen die Zulässigkeit der Atomistik*), and II) those denying the usefulness of atomistic speculation in the framing of physical theory (*Gründe gegen die Brauchbarkeit der Atomistik zu physikalischen Erklärungen*). Only the first of these categories concerns our present discourse. Lasswitz divides Aristotle's attack on the possibility of atomism into two distinct arguments - 1) atoms are literally indivisible bodies, being *atomos*, i.e. uncuttable; this indivisibility is impossible, however, for multiple reasons which Aristotle proves at length; 2) the atomists posit the existence of an absolute void between atoms, but this is also impossible for many reasons.

Although the foregoing objections rule out the existence of absolutely indivisible bodies separated by absolute void, they do not bear at all on the existence of such particles as Empedocles described - elementary corpuscles which are not theoretically incapable of further division. It seems, however, that Aristotle opposed this sort of particle from an entirely different set of presuppositions, this time concerning the nature and mixture of the elements. In *De generatione et corruptione* (334a. 16-334 b. 7) Aristotle explicitly attacks the notion of Empedocles that substances such as flesh and blood, which are homogeneous in appearance, can be made up of heterogeneous elementary particles in the way that a wall is built up of bricks and stones. Such a heterogeneous grouping is impossible, first because it tacitly denies the intertransmutability of the elements, which Aristotle deems to be proved true by experience, and second, it fails to distinguish between "mere juxtaposition (*synthesis*) or mechanical mixture and the chemical combination (*krasis* or *meixis* proper)...."<sup>8</sup>

Given these explicit attacks, along with Aristotle's proclivity for explanations of matter based on hylomorphism rather than mechanism<sup>9</sup> and the "Idealismus des Aristoteles <der> hebt den

Materialismus der Atomisten auf...,"<sup>10</sup> Lasswitz concluded that corpuscularism was at worst inimical to Aristotle and Aristotelianism, and at best superfluous.<sup>11</sup> Despite the many merits of the *Geschichte der Atomistik*, this pitting of formalism against corpuscularism presents the reader with an untenable oversimplification. For example, although no historian of philosophy would, I think, be inclined to make Aristotle more of a realist than Plato, Lasswitz considers Plato to be one of the most influential protagonists of corpuscularism.<sup>12</sup> If idealism is opposed *a priori* to corpuscularism, how could Plato's *Timaeus* have fostered a corpuscular philosophy? More importantly, other parts of the Aristotelian *corpus* do in fact resort to corpuscular explanations, which we shall now discuss.

The fourth book of Aristotle's *Meteors* is a work of contested authorship. Although good arguments for both its genuineness and inauthenticity can be found, it is not necessary for us to decide the issue. The medievals had no doubt that it was genuine, and since our study concerns them alone, we may leave the problem unsolved. It will be useful to turn to Ingemar Duering's arguments in favor of its genuineness, however, in order to see how the corpuscular ideas of *Meteors* IV can be integrated with the other members of the Aristotelian *corpus*. As Duering points out, *Meteors* IV makes frequent reference to the micro-structure of matter, using *poroi* in particular to explain absorption (385b. 12-26), compressibility (386 b. 1-10), splitting (386b. 26-387a. 2), and combustibility (387a. 17-22). These *poroi* are not empty, like the interstitial void of the atomists; to the contrary, they are -

...a) cavities in a solid body as f. i. in a sponge, or b) ...[spaces in] bodies of a fibrous or crystalline structure. The cavities in porous substances are of course not void, they are filled with air.<sup>13</sup>



*Meteors* IV does not limit its description of the structure of matter to pores; the text attributes the properties of viscous substances to "an interlocking of their parts which keep together like rings in a chain" (387a. 11-14). It is therefore correct to say that the fourth book of the *Meteors* expresses a partly corpuscular theory of matter. But what of Aristotle's attack on the brick-like particles of Empedocles? The reader will recall that Aristotle rejected those elemental corpuscles first because their existence implied that the four elements could not be transmuted. There is no hint in *Meteors* IV that either pores or particles represent a final, intransmutable stage of matter or that more than one element cannot enter into combination in a particle. The same may be said if Aristotle's claim that Empedocles has made homogeneity an impossibility be directed against its author. The pores and particles of *Meteors* IV do not constitute the ultimate being of matter: they are only used to explain properties not easily deduced from the four qualities and elements. Consequently it is possible that a body can be elementally homogeneous - that all its parts contain precisely the same elemental mixture - although its micro-structure be divided into pores and particles.

Lasswitz has therefore considerably overstated the historical tension between formalism and naive corpuscularism as it existed before the Scientific Revolution. It was quite possible to view these two systems of thought as complementary rather than opposed. The problems only began to emerge a) if one tried to make his corpuscles the irreducible components of matter, or b) if he allowed corpuscles of different elemental make-up in a homoeomerous body. The former would violate the Aristotelian principle of elemental intertransmutability, while the latter would rule out true homogeneity. As we shall see, these two possibilities provided real pit-falls for the medievals, but they were often viewed as specific problems capable of solution, not as overriding reasons for the abandonment of corpuscularism.

We have now seen that the fourth book of Aristotle's *Meteors* contains distinct corpuscular notions, and that it is possible to reconcile these with the rest of the Stagyrice's *corpus* by assuming different stages in the interaction of matter. The correlation of particles and pores can account for *synthesis*, as in the case of absorption (385b. 12-26), and they can even contribute to a situation inducing *krasis* or *meixis*, as in the case of combustion (387a. 17-22). On the other hand, one could not allow his corpuscularism to block either the mutual transmutation of the elements or the uniformity of homogeneous bodies, if he wished to remain a proper Aristotelian. Let us now examine the works of Paul of Taranto in order to see how these considerations affect his physical theory. We shall begin with the *Summa*, working back to the *Theorica et practica*, because it is easiest to see the reasons for theoretical development in light of the finished product.

### III.2. Development Within the Corpus of Paulus de Tarento

The passage paraphrased by Lasswitz is in fact the only point at which the *Summa* discusses the relationship of the four elements and corpuscles. Let us here give the Latin passage so that we may examine it more minutely -

[65va,13-18] In genere vero dicemus quod unumquodque ipsorum [i.e. the two metallic principles, mercury and sulfur] est fortissime compositionis et uniformis substantie, et illud ideo, quoniam in eis per minima partes terre taliter partibus aereis, aqueis, et igneis sunt unite, ut nulla ipsarum alteram in resolutione possit dimittere.

Lasswitz interprets this passage to mean that individual particles of earth are "united" to those of air, water, and fire by a juxtaposition of elementary corpuscles ("durch Berührung der

kleinsten Teile"). The situation does not seem quite so simple to me. The problem hinges on the way one takes the expression *per minima* - "through the smallest." If one reads *per* in the sense of *usque* ("up to"), the interpretation of Lasswitz is valid. The *Summa* means in Empedoclean fashion that individual elementary particles are mixed even "up to the smallest" of them. But it is equally possible to read *per* in a literal sense as "through"; in this case the idea of interpenetration is implied: the elements are mixed "through the smallest" of their particles. In such a case, the base particle would now be composed of all four elements. Since the *Summa* nowhere suggests that its corpuscles are indivisible or impenetrable, this interpretation is equally valid.

The second interpretation is more acceptable from a purely logical point of view, since the *Summa* iterates that mercury and sulfur are "uniformis substantie," i.e. in some sense homoeomerous. In order for all their parts to be literally the same, they must all contain the same elements: this would also fulfill the Aristotelian criterion of homogeneity. Nonetheless, I believe that the vagueness of this passage makes it impossible to determine the precise position of the author. The *modus operandi* of the *Summa* is in other respects entirely corpuscular, as we shall see. It is therefore possible that the passage quoted above was kept intentionally vague, in order to avoid a flagrant conflict with the doctrines of *De generatione et corruptione*.

In the foregoing part of this chapter, we showed how the *Summa* uses its corpuscular philosophy to explain chemical and metallurgical phenomena. Let us here group some of the phenomena which the *Summa* explains by corpuscular means: 1) hardening and thickening of minerals in the mine [62vb,26-9]; 2) purification of the spirits (i.e. volatile substances) by sublimation [68ra,7-16 - 68rb,21. 74ra,30-44]; 3) escape of spirits from non-vitreous vessels [69ra,41 - 69rb,4]; 4) combustion of metals and spirits [71va,9-29. 72ra,35 - 72rb,3. 76vb,3-9]; 5) the putative

congealment of mercury by a "perfecting medicine" [73ra,44 - 73rb,6. 78ra,14-8]; 6) the fixity (i.e. non-volatility) and density of the metals, or the lack thereof [75ra,4-13. 75rb,3-5. 75va,4-25]; 7) weight in general [79va,5-9]; 8) increased effectiveness of "second and third order medicines" [81rb,4-7. 81vb,6-10. 84vb,37-39]; 9) effect of cupellation [82va,3 - 82vb,1]; 10) effect of cementation [83rb,23-32]. From these data the *Summa* attempts to frame a comprehensive corpuscular explanation of chemical and metallurgical phenomena. This system is by no means free of contradictions, nor is it always clear. Its basic flaw lies in its failure to describe the "minimal particles" themselves. Do they vary in density and shape? Do they participate in color, odor, and other sensibles, or are these by-products of different particle conglomeration? A further problem lies in the inadequate treatment of the particles' cohesion. One finds no explanation of the reason for their interaction except that they are mixed *per minima*.

In order to understand why these questions are not treated, the reader must recall that the tradition from whence the *Summa* comes is above all that of *Meteors* Book IV. Because the pores and particles of that text do not reflect the ultimate being of matter, no attempt was made in *Meteors* IV to derive all sensory phenomena from them, nor was it necessary to ask fundamental questions about their bonding and dissociation. But given that the *Summa* reflects this Aristotelian corpuscularism, we are still left with formidable problems.

Above all, we must bear in mind the two conditions imposed upon matter in *De generatione et corruptione*. First, the elements must be capable of mutual transmutation, and second, homogeneous substances must be alike in all their parts. The *Summa* does not flagrantly reject the first of these canons, but I see no way to avoid the fact that it has bypassed the second. The metals, as we have seen above, are composed of particles of sulfur

and mercury. These particles are distinct entities, and it is possible to remove one sort while leaving the others behind. Now since it is further clear that sulfur, being fiery, and mercury, being watery, must respectively contain more of the elements of fire and water, it follows that the elements in metals must not be uniform in their distribution, but grouped into clumps corresponding to the particles of sulfur and mercury. But *Meteors* IV explicitly calls the metals "homiomera" - alike in all their parts.<sup>14</sup> There can be no doubt then that the *Summa's* corpuscular theory has violated the Aristotelian principle of homogeneity, at least as it applies to metals. If we now follow the progression of ideas from the *Theorica et practica* to the *Summa*, it will be possible to show that the author was aware of this difficulty, and that he avoided open contradiction only by adapting his terminology to the particular context of his discourse.

In many cases where we would find the *Summa* using the expression *per minima*, the *TP* employs *per intima* (at 21v,2; 24r,9; 29r,34; 37v,13). Other variants of *intimum* also occur where we might expect corresponding forms of *minimum* (16v,17; 19v,11; 23v,5; 26r,17; 26v,27; 40v,20; 52r,2; 52r,4). We need only inspect several of these passages in order to see that a real difference of meaning is implied, though the philosophy remains corpuscular. At 13v,26 - 14r,3, the *TP* describes the intermixture of the four elements -

Neque enim ex sola aqua fit corpus solidum, nec fit ex sola terra continuum, neque etiam fit digestio et glutinatio sine igne ac aere, licet sales videantur solum generari ex aqua et lapides solum ex terra, commiscentur enim intime partes ex aere et igne formales partibus materialibus ex aqua et terra.

I have extracted this quotation from a passage in which the *TP* openly refers to the doctrine of homogeneity laid forth in *De generatione et corruptione*. It would have been quite impossible in this context for the author to suggest that the elements consist of independent particles joined by their contiguity alone, in the way

that Lasswitz interpreted the *Summa*. Although *partes* above can still be interpreted as particles, the particles of air and fire are "inwardly mixed" to those of water and earth. Hence their interpenetration is no longer conjectural, but actively spelled out. Such interpenetration is not restricted by the *TP* to the elements alone, but applies to the action of the volatile spirits on metals as well -

[37v,12-4] ... <spiritus> possunt per intima penetrare ac eis intimari profunde....

This passage may at first seem ambiguous, since *per* can be taken to mean either "through" or "among." In the former case, the spirits would be penetrating through each particle taken independently; in the latter they would be penetrating through the interstices in the mass of particles. There is no ambiguity in the following passage, however-

[51v,30 - 52r,5] Mars autem et venus facilius calcinantur, propter multam siccitatem eorum, ut est dictum ibidem <supra>, et etiam propter terreitatem que prohibet partem in partem intimari et continuari sibi invicem. Et ideo sulphureitas exurens et vis ignea per intima particularum subintrans, dividit et calcinat.

Here the *TP* actually says the particles to be "intimari," to be "pressed into" one another. Thus, when the author proceeds to say that fire calcines, *per intima particularum subintrans*, there is every reason to believe that he means the fire to be "penetrating into the deepest of them."

The term *per minima*, where it does occur in the *TP* (at 23v,14-5 and 29r,33) also appears in the context of interpenetration, as the following example will illustrate:

[29r,32 - 29v,1] Et quoniam in sua substantia [i.e. of gold] per minima se occupant eius partes, et per intima sibi invicem profundantur....

It is difficult to translate "se occupant," of course, since this could mean that the particles either "occupy one another" (interpenetrate) or that they "grip one another" (and are contiguous). The proximity of this expression to the unequivocal *per intima sibi invicem profundantur* ("they flow together through the deepest"), however, suggests that both terms are meant to suggest interpenetration.

Hence the terminology of the *TP* is carefully chosen to give the impression that the particles are less explicitly differentiated, more capable of melding into one another, than the sort of particles later to be described in the *Summa*. As I stated above, the reason for this difference is obvious. The *TP* openly paraphrases Aristotle's discussion of homogeneity in *De generatione et corruptione*, and the text - whether we believe its author to have been a "lecturer" or not - is clearly intended for a scholastic audience. The context of the *TP*, with its open reliance on *De generatione*, *De anima*, and *De sensu*, would have put any conflict between corpuscularism and metallic homogeneity into high relief. The author was therefore forced to modify his corpuscular ideas to the degree that they conform with the material philosophy of Aristotle. His subsequent exclusion of the Aristotelian lecture course from the *Summa* allowed him to develop his corpuscular philosophy further, and to "fudge" on the issue of homogeneity. Thus we encounter the equivocal passage quoted by Lasswitz, and the more explicit references to distinct mercury and sulfur particles in the *Summa*.

### III.3. The Sources of Paul's Corpuscularism

We may now enquire into the sources of Paulus de Tarento's corpuscular philosophy. It is expedient - though somewhat artificial

- to divide these sources into four classes: alchemical, philosophical, medical, and "questions" literature. The artificiality of this division stems from the fact that alchemy, medicine, and "natural questions" all belonged to natural philosophy in the Middle Ages. At the same time, these four classes represent real textual genres, if not absolute distinctions in content. We shall begin with the genre of alchemical texts, since it is most obvious to search for an author's sources in material kindred to the subject he is pursuing.

1) Alchemical Sources. We know from the works of Kraus and Holmyard that the Arabic *corpus* of Jābir ibn Hayyān betrays certain atomistic tendencies.<sup>15</sup> No inclination toward a corpuscular philosophy appears in any of the Jābirian works known to have been translated into Latin, however, nor is such apparent in the alchemical treatises attributed to Avicenna. There are, however, passages of seemingly corpuscular intent in the *Liber secretorum de voce Bubacaris*, and these were transferred to the *Liber de investigatione perfectionis* when Paul reworked the former text. Let us therefore examine the following passage, which occurs at pp. 54-5 of our edition (= *Liber secretorum* 105ra, in BN 6514) -

Multi vero philosophi propter nimiam festinantiam non desiccaverunt ea <corpora>, volentes dividere partes suas propter eorum mollietatem et venire ad finem ut non essent dura. Scias ergo quod dura corpora morantur ad dissolutionem quia naturalis eorum humiditas coniungit partes et impedit humiditatem quam habitura sunt veniendi ad optatum finem partium, quia naturalis humiditas coniungit partes et facit eas esse duras. Unde te oportet per ignem dividere partes corporis ut deperdatur eius humiditas que tenet eas inviscatas et constrictas.

Here we find the concept of an interparticular glue enunciated rather clearly. The "natural humidity" of the metals keeps their particles "glued together and constricted" (*inviscatas et constrictas*). This "natural humidity" is opposed to the "humidity

which they should have" (*humiditatem quam habitura sunt*), however, presumably because it occupies the pores where the induced humidity would have to inhere. For reasons which are not clear, the "natural humidity" causes the metals to be overly hard; the induction of an artificial humidity is therefore necessary for their mollification. Furthermore, this "natural humidity" is associated on p. 56 with sulfur, in the same way that the *Summa*, in its chapter on calcination, considered sulfur to be a "glue" removed by intense heat.

Additional similarities of language and thought can be found in the *Liber secretorum's* description of solution, taken up by the *De investigatione* at pp. 66-7 (= *LS*, BN 6514 105vb) -

Omnia enim que impastantur ex toto dissolvuntur, tamen que non dissolvuntur habent partes que non sunt mollificate et sunt subtiles et non dividuntur, propter subtilitatem quam habent.

The above passage clearly conveys the notion of small particles which cannot be physically divided further, precisely because of their minuteness (*partes ... sunt subtiles at non dividuntur, propter subtilitatem*). This is conveyed in language which is quite similar to Paul's, since the term *subtilitas* is used for corpuscular minuteness. The same terminological similarity resurfaces at pp. 90-1, where the *De investigatione* describes sublimation (= *LS*, BN 6514, 107rb) -

...corpora debent subtiliari, ut spiritus coniungantur subtilitati eorum....Nota quod si ipsa corpora habent partes subtiles, universaliter coniunguntur. Si vero grossas, non coniunguntur, unde spiritus dividuntur ab eis, in igne fugiunt, et dimittunt corpora sua in vase.

Here the terms *subtilitas* and *grossities* are used in apparent reference to the size of particles. Furthermore, the idea that a subtiliation of the metals must be enacted before they may be joined to the spirits - wholly cognate to the passages from the *TP*

and *Summa* quoted above - is expressed in clear language. We have every reason, therefore, to suspect that the *Liber secretorum* has influenced Paul's corpuscularism to some degree.

There are, however, important differences between the corpuscular language of the *Liber secretorum* and that of the *TP* and *Summa*. First of all, neither the expression *per minima* nor *per intima* occurs in the former. We may therefore suspect that these terms come from another tradition. Secondly, the *Liber secretorum* contains some peculiar terminology of its own, which is incorporated into the *De investigatione*, but not developed either in Paul's additions to that text or in his other writings. The most important example of this occurs in the *L. secretorum's* employment of the terms *finis partium* and *fundamentum partium*, the first of which already appeared in the earliest passage cited above from the *De investigatione* (pp. 54-5 of our edition). On p. 55 of the *De investigatione*, in addition, we find the following passage lifted from the *LS* (105ra) -

Quare si contritio et dissolutio possunt pervenire ad finem partium, pars eius recipit humiditatem et fiet humidum.

Similarly, on p. 67 (= *LS* 105vb), we find the assertion that in order for something to be dissolved, it must receive moisture in all its particles, *maxime in finibus earum*. Several lines later, we learn that this humidity must come *ad fundamentum suarum partium*. It is difficult to determine precisely what is meant by this *finis* and *fundamentum*, but the two terms undeniably play an important role in the *Liber secretorum's* description of matter. It is therefore peculiar that Paul has made no attempt to rationalize these terms, and others which might puzzle the reader of the *De investigatione*. Since these borrowed passages from the *Liber secretorum* on the one hand contain apparently corpuscular terms not appearing in the *TP* or *Summa*, and are lacking the important expressions *per minima* and *per intima* on the other, we must suspect that Paul has

received further corpuscular influence from different sources. At the same time, the *Liber secretorum's* use of the important words *grossities* and *subtilitas* in a corpuscular sense, and its description of constricted particles glued together by sulfur, make it rather likely that this work served as an immediate inspiration for Paul's corpuscular treatment of alchemy.

Before passing to the three other genres of sources employed by Paul, we must mention the *Liber alchimie Hermes* used by Albertus Magnus. Wyckoff and Halleux have both drawn attention to this work as a source of Albert, and of the early XIIIth century encyclopedist Arnoldus of Saxo.<sup>16</sup> This work bears a close relationship to the *Liber sacerdotum* printed by Berthelot in the first volume of *La chimie au moyen âge*, as both Halleux and Wyckoff point out. If we inspect the passages which Albert borrowed from this *Liber alchimie*, one at least betrays a certain corpuscular inclination -

Sulphur ipsum quadam subtili affinitate ad quam vicinatur omnia metalla, omnia eorum perurit corpora et incinerat, aurum vero non: pori namque ejus arcti sunt et indissolubiles.<sup>17</sup>

The *Liber alchimie* maintains that sulfur burns the metals due to its "subtle affinity" with them. It cannot attack gold, however, since that metal's pores are "narrow and indissoluble." This concept is very close, of course, to the *Summa's* description of calcination. It may be significant, however, that the *Summa* and *TP* rarely use the term *pori* (variants of *porus* occur only four times in the *Summa* - at 69ra,42-3; 70rb,11; and 72ra,37). Although we find *porositas* in the *Summa's* description of calcination (cf. #4 above), that term and other forms derived from *porus* are distinctly overshadowed by the *partes* or *particulae* which the *Summa* and *TP* describe at length. In this respect, the two texts are closer to the *Liber secretorum de voce Bubacaris* than they are to the *Liber alchimie Hermes*.

2) Philosophical sources. It is manifest that the *TP* and *Summa* have both made use of the fourth book of Aristotle's *Meteors* and probably of commentaries thereto. This use is reflected, for example, in the *Summa's* employment of the expression *omniomera* (cf. n. 10) for the metallic principles, where *Meteors* IV said that the metals themselves are homoeomerous. The *TP*, on the other hand, refers to the *De congelatione et conglutinatione* of Avicenna as being *in fine sui <Aristotelis> libri ... in metheauris* (4r,13), which suggests that Paul was using Henricus Aristippus's translation of *Meteors* IV, to which the Avicennian fragment had been attached.<sup>18</sup> Since the first part of this chapter was devoted to a description of *Meteors* IV's corpuscular theory, there is little need to reiterate the influence that this text no doubt had on the development of Paul of Taranto.

We must stress here, however, that the tradition of medieval commentaries on *Meteors* IV has received almost no study. According to Lohr's list of medieval Aristotle commentaries, approximately fifty different authors' *Meteors* comments dating from the beginning of the thirteenth to the early fifteenth century still exist. Only a handful of the texts belonging to this vast tradition have been printed, and not all of those in critical editions.<sup>19</sup> We are not, therefore, in a position to estimate the influence that such *Meteors* commentaries may have exercised on Paul of Taranto, although an inspection of those attributed to Thomas Aquinas and Albertus Magnus reveals no obvious influence.<sup>20</sup> For the moment we must content ourselves with the knowledge that Paul certainly used *Meteors* IV, and possibly commentaries devoted thereto.

3. Medical sources. There can be no doubt that a type of naive corpuscularism was widespread among medieval writers on medicine. We cannot gauge the breadth of this tradition in the present work, but it is possible to point to at least one strand of it.

The famed school of Salerno and those writers associated with it, such as Constantine the African and Alphanus of Salerno, seem to have particularly favored corpuscular theories of matter. Both Conastantine and Alphanus, writing in the late eleventh century, define "element" as "the smallest particle of a body's composition."<sup>21</sup> This tradition is later represented in the *Aphorismi* of Urso de Calabria and his commentary thereto, which present evidence of a corpuscular medicine *cum* natural philosophy existing in the Salernitan school during the late twelfth or early thirteenth century.<sup>22</sup> As early as the seventh aphorism, we encounter Urso speaking of "pores" -

Subtilis substantia mollificativa per angustos poros facile penetrat ad profundum, contentamque in poris essentiam incidendo discindit et debilitat separando.<sup>23</sup>

Here Urso attributes the dissolution of a body by a "softening substance" to the former's ability to enter the pores of the latter and destroy its integrity. Importantly, Urso does not speak of the "softening substance's" corpuscles, but only of the pores it enters. One finds the same emphasis on pores in the commentary. In "Glossula 5.," for example, Urso explains that porosity is the cause of lightness in pumice, because "spiritus" can inhere in the "vacuitas" of its pores. The cause of weight, conversely, is the lack of such "spiritus" brought on by few or narrow pores.<sup>24</sup> It is interesting to see how a basically corpuscular explanation can differ so strikingly from that of the *TP* and *Summa* simply by focusing its concern on the pores rather than the particles between them.

One finds the same emphasis on pores rather than particles when Urso discusses mineralogical subjects. In "Glosula 7," for example, he attributes the ability of a he-goats's blood and vinegar to "break" a diamond to the following cause -

...angustos ipsius poros subintrans facile penetrat ad profundum et poros replendo solidas partes adamantis inter poros contentas utraque sua humiditate scilicet remollit et subtilitate acrius dividendo discindit.<sup>25</sup>

This is a concrete application of the general rule enunciated in the seventh aphorism. The "subtle substance" of the goat's blood enters the pores of the diamond, thereby separating its substance. Similarly, Urso attributes the breaking of bell-tower walls to the force of air driven into the pores of the wall by the bells. Such air *abrupit substantiam contentam inter poros et sic findit*. We are told nothing about this "substance between the pores"; the explanation focuses exclusively on the destructive power of the external agent, air.

Another work by Urso, the *De effectibus qualitatum*, puts somewhat more emphasis on corpuscles *per se* than does his *Aphorismi* and *Glosulae*.<sup>26</sup> Here Urso speaks of a humidity that causes leather to soften by "entering into its pores and separating particle from particle."<sup>27</sup> The same humidity can act in another way, however: "filling the pores and vacuities of a body, the humidity becomes glue-like, <and so> consolidates and conjoins the particles of the same, whence it renders them thicker."<sup>28</sup> Urso proceeds to list a wide variety of processes induced by the action of this humidity on the pores and particles of bodies, such as heating, subtilizing, moving, or accidentally impeding motion.

Nonetheless, Urso does not specify that the material entering the pores of a body must also be corpuscular. This, however, was certainly the intention of the *Summa*, when it spoke of the ever smaller particles of mercury produced by repeated sublimation (#8 above), or of the constantly invoked *mixtio per minima*. Despite this difference, it is nonetheless possible that Paul may have known the particular medical tradition that produced Urso's *Aphorismi*. In the following section we shall encounter the Salernitan material under different guise.

4) Sources in the "Questions" literature. If we now turn to the genre of "natural questions," further affinities with the thought of Paulus de Taranto will emerge. Such are especially apparent in the *Questiones Alani*, a group of questions composed in Salerno probably before 1225.<sup>29</sup> As Lawn has remarked, the earliest medieval collections on natural questions, such as that of Adelard of Bath, contain no material of metallurgical import. The *Questiones Alani* represent a stage in the evolution of this genre when metallurgical considerations were only beginning to be discussed. If we turn to the sixty-fifth question of Alanus, we find a corpuscular explanation for the floating of steel in liquid mercury, and the sinking of iron.<sup>30</sup> This presented a particular problem, since the author had observed iron to be lighter than steel. He therefore explains the phenomenon by assuming first that steel is drier than iron, having *defectu <m> humiditatis partes conviscantis*. Iron, on the other hand, is moister, and *poros habet constrictiores*. Because the pores of iron are small, the mercury, when it encounters them, *subintrando, infigitur, elabatur, collaterabitur, et cedit, et ferrum mergitur*. Hence it is the very minuteness of the iron's pores that causes the mercury to be trapped in them, thus making the metal sink. Steel, on the other hand, has larger pores, which do not trap the mercury: thus the steel floats. Here, as in Urso's *Aphorismi*, we find a greater emphasis on the pores of metals than on their constituent particles. If we now turn to a slightly later source in the same tradition, we shall find ourselves almost in the thought world of Paulus de Tarento.

The *Questiones Nicolai Peripatetici* attributed by Albertus Magnus to Michael Scot,<sup>31</sup> and by others to Averroes,<sup>32</sup> have made use of explicitly alchemical literature, unlike the Salernitan questions proper. Although it is possible that Paul of Tarento actually used this source, it is more economical to suppose that he knew it through the *De mineralibus* of Albertus Magnus. At any

rate, the terminology of the *Summa* is often similar to that of the *Questiones Nicolai*. In explaining the rise of ground water above the earth's surface, for example, "Nicholas" speaks of a "humidum, quod admiscetur illi terrae per minimas particulas."<sup>33</sup> Similarly, in explaining why the flame of a candle always remains the same size, "Nicholas" says that *particulae terrae* floating in the air always *dividunt flammam in eius superiori parte secundum particulas minutissimas*.<sup>34</sup> "Nicholas" invokes these *minimae particulae* throughout his text to explain such diverse phenomena as the quenching of an "inextinguishable flame" by vinegar,<sup>35</sup> the extinction of "heat" in wine,<sup>36</sup> and the preservation of fat in cooked geese.<sup>37</sup>

While "Nicholas" distinguishes himself from Urso's *Aphorismi* and the *Questiones Alani* by his frequent reference to corpuscles themselves, his explanations also make considerable use of pores, for example in his explanation of a process for hardening steel with lead.<sup>38</sup> At the same time, his terminology is manifestly closer to that of Paulus de Tarento than that of the two former authors. The fact that the *Questiones Nicolai Peripatetici* are probably somewhat later than the *Questiones Alani* makes it tempting to suggest that the "questions" genre was gradually evolving toward the fully developed corpuscular philosophy of the *Summa*. At the same time, the use of Arabo-Latin alchemical sources by both "Nicholas" and Paul, coupled with the more explicit corpuscularism of the *Questiones Nicolai Peripatetici* and the *TP* and *Summa*, suggest that the Arabic texts may have played a decisive role in this development. This can only remain speculation, however, until the other Salernitan texts have been examined, and the role of the *Meteors* commentaries determined. But we would not be far wrong if we saw the *Summa* as the culmination of an attempt to link the fourth book of Aristotle's *Meteors*, the genre of "natural questions," and the Arabo-Latin alchemy of such texts as the *Liber secretorum de voce Bubacaris*. Such an attempt had already been initiated by



Albertus Magnus, but the *Summa* represents a far more sustained attempt to explain material change in corpuscular terms than does the *De mineralibus*.

Having mentioned Albert, we must now say a few words about the universal doctor. As we show in our general analysis of the *Summa's* sources, there is good reason to believe that Paul of Taranto knew Albert's *De mineralibus*. There is no need here to duplicate our efforts by quoting both texts in parallel columns, nor can we provide a detailed exposé of Albert's matter theory. It is not difficult to show, however, that Albert is willing to entertain corpuscular ideas when framing his explanations of phenomena. Consider, for example, his explanation of the "compaction" of stones<sup>39</sup> -

Compactio autem praecipue facta partium est ab humido undique penetrante lapidis materiam: propter quod quamlibet partem ejus fluere facit ad quamlibet partem: et ideo compactus factus est lapis: hoc autem humidum est corporale et aqueum, aut spirituale, aut aereum.... De causa autem gravitatis aut levitatis lapidum superfluum est hic intendere, cum de hoc in libro de *Coelo et Mundo* sufficienter sit pertractatum, ubi ostensum est quare lapides leviores sub aqua merguntur, cum ligna graviora supernant aquis.

Here Albert gives a theory of compaction that is not unlike the explanation of resistance to solution already met with in the *Liber secretorum de voce Bubacaris*. The *humidum* naturally contained within a substance glues its particles together, making them coherent. As in his explanation of specific gravity (cf. our Chapter IV), Albert then directs us to Tract II, Chapter V, of his commentary on *De caelo* for further information.

Albert seems to have put great stock in his explanation of "the cause of gravity and levity in compounds" as proffered in the *De caelo* commentary. His explanation there attempts to derive the

weight of mixed bodies from the relative quantity of their elemental constituents. Hence gold is heavier than silver because the former has more "earthy particles" than the latter. A piece of wood weighing three pounds will sink in air in rise in water, while a piece of lead weighing but two pounds will sink in both. This is because the wood and lead have an equal quantity of earthy and watery particles, while the wood has more aerial ones. The excess aerial particles in the wood have gravity in a medium of air, but in water they possess levity. Thus the wood floats and the lead sinks.<sup>40</sup>

However naive Albert's explanation may seem to the reader, it had one great advantage in its day: it could explain differences of weight without the assumption of void space. Hence Albert did not have to argue that an equal volume of silver was less dense than that of gold due to the former's having less matter absolutely. That argument would have been an invitation to the conclusion that silver contains empty, vacuous pores. Instead, Albert could maintain that the gold had more terrestrial particles than the silver, with the implication that the silver had additional fiery, aerial, or watery particles to make up for its deficiency of earthy ones. Albert's explanation of weight in compounds is therefore entirely within the medieval corpuscular tradition initiated by Aristotle's *Meteors IV*.

#### Conclusion

In a sense, this chapter has been an attempt to answer Lasswitz's assertion that the Latin Middle Ages, dominated by the "rule of substantial forms," were incapable of fostering a corpuscular philosophy. Although Lasswitz carefully distinguished the "corpuscularism" of the ancient technical writers from the philosophical atomism of the Democritean school, he was curiously unable to see that the same distinction applied in the Middle Ages.

In the above analysis we have found sufficient evidence to demonstrate that such corpuscularism existed in the writings of physicians, philosophers, and alchemists in the late Middle Ages. Whenever concrete, specific descriptions of matter were required, the late medieval writers tended to invoke this corpuscularism. Such was especially the case in physiology, metallurgy, and the myriad physical topics treated by the writers on natural questions. As Lasswitz himself said, when describing the beliefs of Asclepiades of Prusa, the founder of the ancient "methodist school" of medicine -

Wenn auch in dieser Theorie des Asklepiades die Konsequenz des atomistischen Systems durchbrochen ist, so haben wir dafür in ihr das ausgeprägte Vorbild der Korpuskulartheorie des 17. Jahrhunderts, eine Atomistik, welche nicht mehr an ein bestimmtes philosophisches System gebunden ist, aber wohlgeeignet, als Grundlage physikalischer Erklärung gebraucht zu werden.<sup>41</sup>

If it is true that we must turn to the empirical corpuscularism of such writers as Asclepiades, Hero of Alexandria, and Vitruvius for the "model" of early modern atomism, then we should not overlook their medieval heirs. Yet as Roger Bacon stressed, it was alchemy above all to which the medieval "science of matter" most properly pertained.<sup>42</sup> The attempt to put this science of matter into corpuscular terms may well have reached its medieval climax in the *Summa perfectionis*. Whether this in turn affected the corpuscular philosophers of the Scientific Revolution - especially those who worked in chemistry and alchemy - remains to be seen.

## Chapter Notes

<sup>1</sup> Reijer Hooykaas, *The concept of Element: Its Historical-Philosophical Development* (= authorized translation of *Het Begrip Element*), H. H. Kubbinga, trans., (privately printed, s.d., s.l.), pp. 36-40.

<sup>2</sup> *Ibid.*, pp. 37-38.

<sup>3</sup> Kurd Lasswitz, *Geschichte der Atomistik vom Mittelalter bis Newton* (Hamburg: 1890), I, pp. 226-7.

<sup>4</sup> *Ibid.*, pp. 211-21.

<sup>5</sup> *Ibid.*, p. 224.

<sup>6</sup> Anneliese Maier, *Die Vorläufer Galileis Im 14. Jahrhundert* (Roma: Edizioni di "Storia e Letteratura," 1949), p. 180. A more superficial treatment of this subject is found in Andrew G. van Melsen, *From Atomos to Atom*, Henry J. Koren, trans. (Pittsburgh: Duquesne University Press, 1952).

<sup>7</sup> Maier, *op. cit.*, p. 183.

<sup>8</sup> Ingemar Duering, "Aristotle's Chemical Treatise," in *Göteborgs Högskolas Årsskrift L* (1944: 2), p. 11.

<sup>9</sup> Lasswitz, *op. cit.*, p. 92.

<sup>10</sup> *Ibid.*, p. 102.

<sup>11</sup> *Ibid.*, p. 219, p. 209.

<sup>12</sup> *Ibid.*, pp. 60-67.

<sup>13</sup> Duering, *op. cit.*, p. 19.

<sup>14</sup> The expression "omniomera," a transliteration of *homoiomera*, occurs in some manuscripts of Henricus Aristippus's translation of the *Meteors*, Bk. IV. The metals are called "homiomera" in the version printed with the commentary of Thomas (*Sancti Thomae Aquinatis...opera omnia* (New York: 1949), XIX, p. 427A) but the term has been replaced in the well-known Venice edition with "similarium partium [corpora]" (*Aristotelis opera cum Averrois commentariis* (Venice: 1562), V, 479va).

<sup>15</sup> Kraus, *op. cit.*, II, p. 10, n. 3; p. 154, n. 6. Holmyard, "The Identity of Geber," *Nature*, Feb. 10, 1923, No. 2780, III, p. 192B.

<sup>16</sup> Wyckoff, *op. cit.*, p. 283. Halleux, "Albert le Grand et l'alchimie," *Revue des sciences philosophiques et théologiques* LXVI (Jan., 1982), p. 67.

<sup>17</sup> Albertus, *ed. cit.*, V, p. 93A.

<sup>18</sup> Holmyard and Mandeville, *op. cit.*, p. 3.

<sup>19</sup> Charles Lohr, "Medieval Latin Aristotle Commentaries," *Traditio* XXIII (1967), pp. 313-414; XXIV (1968), pp. 149-245; XXVI (1970), pp. 135-216; XXVII (1971), pp. 251-351; XXVIII (1972), pp. 280-396; XXIX (1973), pp. 93-197; and XXX (1974), pp. 119-144.

<sup>20</sup> Thomas Aquinas, *Sancti Thomae Aquinatis...opera omnia*, ed. Petrus Fiaccadori (New York: 1949), XIX. Albertus Magnus, *Opera omnia*, ed. Auguste Borgnet (Paris: 18--), IV.

<sup>21</sup> <Constantine> *Summi in omni philosophia viri Constantini Africani Medici operum reliqua... Basileae: Henricum Petrum, 1539, Cap. III, p. 4.*

<Alphanus>, *Nemesii Premnon Physicon*, C. Burkhard, ed. Lipsiae, 1917, p. 62.

<sup>22</sup> Brian Lawn, *The Salernitan Questions* (Oxford: 1963), pp. 32-3.

<sup>23</sup> Rudolf Creutz, "Aphorismen und Kommentare des Urso Salernitanus," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin*, V (1936), p. 11.

<sup>24</sup> *Ibid.*, p. 27.

<sup>25</sup> *Ibid.*, p. 29.

<sup>26</sup> C. Matthaes, *Der Salernitaner Arzt Urso aus der 2. Hälfte des 12. Jahrhunderts und seine beiden Schriften "De effectibus qualitatum" und "De effectibus medicinarum,"* diss., Borna-Leipzig, 1918.

<sup>27</sup> *Ibid.*, p. 34: "...sui poros subintrans, partem a parte separat."

<sup>28</sup> *Ibid.*, "...poros corporis et vacuitates replens ipsa in eisdem glutinosa effecta, eiusdem partes magis solidat et coniungit, unde eas spissiores reddit...."

<sup>29</sup> Lawn, *op. cit.*, p. 37.

<sup>30</sup> Brian Lawn, ed., *The Prose Salernitan Questions* (London: 1979), p. 322.

<sup>31</sup> Lawn, 1963, p. 76.

<sup>32</sup> Stanislaw Wielgus, ed., "Quaestiones Nicolai Peripatetici," *Mediaevalia Philosophica Polonorum* (Wroclaw: 1973) XVII, pp. 58-63.

<sup>33</sup> Wielgus, p. 87.

<sup>34</sup> *Ibid.*, p. 94.

<sup>35</sup> *Ibid.*, p. 110.

<sup>36</sup> *Ibid.*, p. 112.

<sup>37</sup> *Ibid.*, p. 115.

<sup>38</sup> *Ibid.*, p. 101.

<sup>39</sup> Albertus Magnus, *Libri quinque mineralium*, Auguste Borgnet, ed., *Opera omnia*, Paris, 1890, vol. V, p. 20.

<sup>40</sup> Albertus Magnus, *De coelo et mundo*. Auguste Borgnet, ed., *Opera omnia*, Paris, 1890, vol. IV, pp. 307-308.

<sup>41</sup> Lasswitz, *op. cit.*, pp. 213-4.

<sup>42</sup> Roger Bacon, *Opus tertium*, ed. J. S. Brewer, *Opera quaedam hactenus inedita*, London, 1859, I, pp. 39-40.

## CHAPTER FIVE

### *The Influence of the Summa perfectionis*

There is no satisfactory way to trace the influence of the *Summa perfectionis* within the scope of a single study. The text was too influential, and the current historiography of alchemy too undeveloped, to allow for comprehensive analysis. Nonetheless, it is possible to arrive at an idea of the *Summa's* importance by considering representatives of the major alchemical corpora. It has been remarked that there are six major alchemical corpora of the late Middle Ages. These are the texts going under the names of Michael Scot, Roger Bacon, Thomas Aquinas, Albertus Magnus, Arnald of Villanova, and Ramon Lull<sup>1</sup>. Of these, we shall consider only the final three.

The corpora ascribed to Michael Scot and Thomas Aquinas are very small in relation to the others (3 for Scot, 6 for Aquinas), and the most important members of the Scot corpus seem to be earlier than the *Summa*. Hence we will not suffer from their loss. As for the Roger Bacon corpus, I have found no influence from the *Summa* in two of its early representatives, the *Breve breviarium* (TK 180) and the *Tres epistolae* (TK 290, 296, 332). Other less central members of the Roger Bacon group may betray Geberian influence, but the matter cannot be settled here. We may therefore restrict ourselves to the texts bearing attributions to Albertus Magnus, Arnald of Villanova, and Ramon Lull.

The alchemical corpus ascribed to Albert the Great consists of about thirty titles<sup>2</sup>. Among these, the *Semita recta*, or *Libellus de alchemia*, seems to occupy a central position.<sup>3</sup> This little work, already in existence around the end of the thirteenth century, is also very possibly the oldest alchemical text ascribed to Albert. Now we have shown elsewhere that the *Summa* lies at the very foundation of the *Semita recta*.<sup>4</sup> Indeed, the author of the *Semita recta* has borrowed entire columns verbatim from the *Summa*,

without the slightest acknowledgement. Given the fundamental nature of the *Semita recta* to the rest of the corpus, the established fact of its dependency on the *Summa* will make it unnecessary for us to explore the Albertine corpus further. Instead, we shall restrict ourselves to influential texts belonging to the corpora attributed to Arnald of Villanova, and Ramon Lull. After having established that their authors owe a debt to the *Summa*, we shall say something about the precise nature of that debt.

No satisfactory study has been made of the alchemical corpus going under the name of Arnald of Villanova, which consists of some fifty-seven titles.<sup>5</sup> The leading scholars of his medical works agree that the alchemical texts are spurious.<sup>6</sup> The alchemical works were widely read, however, and at least one of them may date back to the first third of the fourteenth century, as we shall show. The most sustained look at the Arnaldian alchemical corpus is still Lynn Thorndike's work of 1934, and this can hardly be considered definitive. Nonetheless, we shall have to use it as a guide. Thorndike's brief study contains an analysis of alchemical *Rosaria* attributed to Arnald. For reasons that are not entirely clear, he states that "The *Rosarius* which there seems the most reason for accepting as Arnald's is also the longest of his alchemical treatises."<sup>7</sup> This *Rosarius* or *Rosarium* begins with the incipit "Iste namque liber nominatur (vocatur) Rosarius," (TK 793), and was printed in Arnald's *Opera* of 1504. Considerable confusion seems to surround the relationship of this text with John Dastin's *Speculum philosophie*,<sup>8</sup> but we cannot attempt to solve that problem here. The *Rosarium* bearing the above incipit is also found in Manget's *Bibliotheca chemica curiosa*, in what Dorothea Singer calls "a variant version."<sup>9</sup> The following analysis will be based largely on this "variant version." We have also consulted the Lyons editions of 1504 and 1532, however, and found only minor variants in the passages quoted below.<sup>10</sup>

The Manget printing of the *Rosarium* makes no overt reference to Geber, but it is clear that its author has used the *Summa perfectionis*. Indeed, the unacknowledged quotations from the *Summa* are so long, frequent, and exact, that one could call this *Rosarium* a virtual commentary on the former text. Since the present work is not a study of the *Rosarium*, but of the *Summa*, we shall have to keep our comments short: the reader may easily find many other borrowings from the *Summa* that we have been forced to omit. Let us begin by comparing the *Rosarium's* comments about mercury with those of the *Summa* -

*Rosarium* (Cap. IV, 663B)

Hoc autem in argento vivo minime contingit: quoniam figitur absque eo quod in terram vertatur: & similiter figitur conversione ejus in terram. Nam per festinantiam ad ejus fixationem, quae fit per praecipitationem, figitur, & in terram vertitur, & per successivam iterata vice illius sublimationem figitur similiter, & non vertitur in terram, imo dat fusionem metallicam.

*Summa* (75rb,33-39)

Hoc autem minime in argento vivo contingit, quoniam figi potest absque hoc - quod in terram vertatur - et figi similiter cum conversione illius ad terram. Nam per festinationem ad eius fixationem quae per praecipitationem perficitur, figitur et in terram mutatur. Per successivam vero illius iterata vice sublimationem figitur similiter et non in terram vertitur, immo fusionem dat metallicam.

The *Rosarium* has manifestly borrowed here either from the *Summa* or from the *Summa's* source. But as we have repeatedly stated, the *Summa* is not a text that recapitulates its sources verbatim. Hence it is extremely unlikely that the *Rosarium* has here chanced upon a source used by the *Summa*. This close copying continues throughout Chapter IV of the *Rosarium*, but we shall here pass to Chapter VI of that text, where the author describes the steadiness of mind necessary to the successful alchemist -

*Rosarium*, (664B)

Oportet igitur inquisitorem hujus scientiae constantis voluntatis esse in opere. Nemo hoc modo illud praesumat attendere: quoniam in rerum multitudine ars nostra non perficitur: una enim est. Est enim lapis unus, una medicina, cui nil extranei additur, nec diminuitur, nisi quod superflua remouentur.

*Summa* (61vb,22-28)

Et ipsum similiter necessarium est constantis voluntatis in opere fore, ut non modo hoc modo illud attemptare presumat, quia in rerum multitudine ars nostra non perficitur. Est enim lapis unus medicina una in quo magisterium consistit cui non addimus rem aliquam extraneam nec minuius nisi quia in preparatione superflua remouemus.

Once again, the *Rosarium's* language closely mirrors that of the *Summa*. Here, moreover, we have a transition from the subject of the alchemist's mental attributes to a statement that the alchemical medicine is unique and uncompounded. The fact that this transition appears in both texts argues for a direct dependence rather than the use of a mutual source, where one might expect to find a description of either the alchemist's traits or those of the "medicine," but hardly both, in virtually the same wording.

Another argument for the *Rosarium's* borrowing from the *Summa* might be found if we could find a theory that was definitely original with the *Summa*, but recapitulated in the Arnaldian text. Such a theory may in fact be found in the form of the *Summa's* (and *Rosarium's*) comments about the *mediocris substantia* of mercury. Since we have already explained the *Summa's* theory of *mediocris substantia* in our treatment of Geber's corpuscular theory, it will be helpful to show how the *Rosarium* has made use of the same idea -

*Rosarium* (665A)

Relinquitur ergo, medicinam nostram esse purissimam & subtilissimam substantiam, quae ex argenti vivi materia originem suam ducit, & ex illa creata est. Non est autem

*Summa* (67va,26-30)

Consideratio vero rei que perficit est consideratio electionis pure substantie argenti vivi. Et est medicina que ex materia illius sumpsit originem, et ex illa creata est. Non est autem

materia argenti vivi in sua natura, nec in sua substantia tota, sed fuit pars illius.

illa materia argentum vivum in natura sua, nec in tota sui substantia, sed fuit pars illius.

It is not difficult to see the resemblance between these two passages. After the *Rosarium's* introductory phrase beginning "Relinquitur..." and ending "...substantiam," the passages are virtually identical. We are now in a position to make a quite strong claim for the *Rosarium's* use of the *Summa*, since the theory of *mediocris substantia*, though partly a rationalization of prior alchemical practice, seems to receive its first clear expression in the *Summa*.

There seems to be no way to escape the conclusion that the author of the *Rosarium* has here closely paraphrased the *Summa*. As in the preceding passage, he has derived critical information about the nature of mercury from the *Summa's* treatment thereof. This information, moreover, is of direct benefit to the *Rosarium's* alchemical practice, since the import of it is that the source of the alchemist's elixir should be an extract of mercury. As we know from our earlier analysis of the *Summa's* transmutational theory, this was precisely the mode by which Geber hoped to arrive at a perfective medicine. The alchemist must first acquire the "medial substance" of mercury, which is already relatively fixed, then repeatedly volatilize and fix that substance until it is both able to mix *per minima* with the base metals and to remain with them in the fire. Depending upon the length and assiduity of the alchemist's procedure, he will arrive at a medicine belonging to one of three degrees. The *Summa* informs us that this may lead to a medicine capable of transmuting ten times as much base metal as it weighs itself. Or, if the alchemist has been industrious enough, the medicine can transmute one hundred times, one thousand times, or even an infinitely large number of times its own weight. This information is found in Chapter XXIX of the *Rosarium* -

*Rosarium* (675B)

Proice ergo supra quodvis corpus, & ex eo tantum quantum vis: quoniam in duplo multiplicabitur tinctura ejus. Et si una pars sui primo convertit cum suis corporibus centum partes: secundo convertit mille: tertio decem millia: quarto centum millia: quinto mille millia in solificum & lunificum verum.

*Summa* (84vb,9-14)

...resultat multiplicationis bonitatis alterationis diversitas, ut ex medicina quedam sui duplum, quedam vero decuplum, quedam vero centuplum, quedam vero millesimum, et quedam in infinitum solificum et verum perfectionis lunificum transmutet corpus.

The intent of these passages, if not the wording, is the same. The alchemist may increase the power of his medicine proceeding by factors of ten until he arrive at an incredibly powerful agent of transmutation. Although the *Rosarium* does not here follow the *Summa* in arguing for an infinite increase of transmutational power, that information does appear on the following page of the *Rosarium* (...in infinitum perficiendum, in solificum & lunificum verum...: 676A). There can be no doubt that the direct source of this theory is the *Summa perfectionis*.

The reader may object that this comparison of the *Rosarium* and the *Summa* has put too much faith in an uncontrolled eighteenth century edition of the former. Perhaps the manuscripts of the *Rosarium*, if consulted, would not contain these artifacts of the *Summa perfectionis*. Our reply to this is twofold: first, the *Rosarium* contains many more unacknowledged quotations from the *Summa* than those cited above. The text is virtually replete with *Summa* borrowings, so much so that it is difficult to imagine that all of them could have been imported by a reworker. To this informal objection may be added a second, and more weighty one: there is quite good evidence from another source that the *Rosarium* already contained *Summa* passages by the early 1330's. Hence if the *Rosarium* in its most primal state did not contain these sections,

they were at least present by a very early date. Since the additional source to which we allude is in its own right a tremendously influential one, its introduction will serve the additional purpose of further substantiating the *Summa's* importance in the development of Latin alchemy. This additional text is the *Testamentum* attributed to Ramon Lull.

We are fortunate to possess a recent and thorough study of the alchemical corpus attributed to Ramon Lull. Its author, Michela Pereira, maintains that all of the over one hundred alchemical works attributed to Lull are spurious, and it is hard to find fault with her conclusion.<sup>11</sup> Her research has also revealed that the oldest text within the *corpus* and probably the most fundamental, is the *Testamentum*, possibly written in the 1330's in Catalan, and later translated into Latin.<sup>12</sup>

The *Testamentum* is a vast and rambling work, made all the less intelligible by its use of Lullian *figurae*. Moreover, as Pereira has shown, the printed versions of the *Testamentum* disturb the order of the work, confusing the progression of the author's ideas. Nonetheless, it is possible to show that the *Testamentum* has utilized ideas and expressions that find their original enunciation in the *Summa perfectionis*. As we shall also show, the ultimate source of some of these borrowings - possibly all of them - is not the *Summa* itself, but the very *Rosarium* of Arnald that we examined above. The most obvious trace of pseudo-Lull's debt to Arnald appears in the following passage from Chapter XXXVIII of the *Testamentum* (731B-732A) -

Et istud temperamentum debet eligi, sicut dicit Arnaldus de Villa Nova in suo Rosario in cap. 14 quod incipit: Omnia sub termino definito, &c. in fine, &c.

The text to which the *Testamentum* here refers is surely the *Rosarium philosophorum* beginning "Iste namque Liber nominatur

(vocatur) Rosarius" (TK 793) and attributed to Arnald of Villanova. This can be verified by the fact that Chapter XXIV of this *Rosarium* bears the incipit "Omnia sub termino definito..." in the version printed by Manget<sup>13</sup>. Although pseudo-Lull attributes this incipit to Chapter XIV, this is probably due either to a misprint of the printed text, or to a scribal misreading. In order to forestall the objection that this reference might be an interpolation, let us compare several characteristic passages from the *Testamentum* with their counterparts in the *Rosarium*. In Chapter XVII, the *Testamentum* argues the "album Sulphur" can become "sulphur rubeum ad aurum" by means of "digestion" - slow heating - alone, without the addition of further ingredients. Pseudo-Lull explains how this can happen by reference to the gradual production of urine within the body -

*Testamentum* (719A)

Quando enim de mane surgo & video urinam meam albam & indigestam, signum est paucae dormitionis. Et ideo requiesco, & dormio, & reperio urinam, quasi citrinam, & percipio, quod somnus est perfectus. Sed quando urina matutina citrina est, tunc calor ignis naturae diffusus est per omnes partes urinales, per quem natura manifeste docet & ostendit, quod citrinatio per completam digestionem completa est. Et ideo intelligere potes, quod sulphur album & rubeum venit de una materia metallorum solummodo, scilicet argenti fini cum igne auri fini.

*Rosarium* (671A)

Sic ergo de mane quando video quod urina mea est alba, indigesta, statim cognosco, quod parum dormivi, & repono me in lecto: somno vero recepto urina citrinatur: quia citrinatio non est nisi completa digestio. Haec vero est verissima compositio albi & rubei sulphuris non urentis, quo per regimen quartum completur Elixir perfectum ad omne diminutum perficiendum in solificum & lunificum verum.

This vivid rationale for the digestion of "white sulfur" can hardly have arisen spontaneously in two different texts. It exists in yet a third work, the *Correctio fatuorum* attributed to Richardus Anglicus, but the fact that that author openly refers to an

alchemical Arnald of Villanova strongly suggests that he was drawing from the *Rosarium*.<sup>14</sup> Therefore the appearance of this passage in the *Testamentum* supports the genuineness of pseudo-Lull's citation of the *Rosarium*. As we shall now show, he has also used the *Rosarium* as a source for his knowledge of the *Summa*. We have already quoted the passage from Chapter VI of the *Rosarium* where that text paraphrased 61vb,22-28 of the *Summa*. Both the *Rosarium* and the *Summa* started by stating that the alchemist must be of steady mind, lest he be dissuaded from his quest. He must focus on one thing alone, since there is but "*lapis unus, una medicina*," to which nothing extraneous is added. The *Summa*, after relating this information, then returns to its previous subject, the mental and moral qualities necessary for a successful alchemist. The alchemical artificer must be assiduous and patient, and he must know the principles of art and nature. The *Summa* continues in this vein for about forty lines more, then launches into a refutation of anti-alchemical arguments. The *Rosarium*, on the other hand, omits this material entirely: after relating that the alchemical medicine is unique, the *Rosarium* goes on to expound this uniqueness further, defining exactly what constitutes a *res extranea*. Here it will be useful to compare the *Rosarium* to Chapter XVIII of the *Testamentum* -

*Testamentum* (Manget, 719B)

...non est nisi unus solus Lapis, scilicet sulphur, & una sola medicina, scilicet compositio sulphuris, cui nihil addere debes, nisi superflua demere terrestria & phlegmatica.... Quia omne sulphur in quantum combustibile, nostro argento vivo est extraneum, quia sibi ipsi incombustibile est, & corruptibile, & a nostro argento vivo alienum.... Ergo a contrario sensu. Res non est argento vivo extranea, in quam per magisterium

*Rosarium* (664B)

Est enim lapis unus, una medicina, cui nil extranei additur, nec diminuitur, nisi quod superflua remouentur. Omne enim sulphur, linternum: id est vulgare, vel butyrum argenti vivi, est extraneum: eo quod sui ipsius est destructivum, vel corruptivum. Econtra vero illud non est extraneum, in quo habet ipsum converti per magisterium nostrum,

habet converti, scilicet in aurum & argentum. Nota, quod nulla res convenit lapidi, nisi quae est de materia propinqua naturae suae, quia de homine non generatur nisi unus homo, & alia animalia nisi sibi similia.

Et sic omnis res, quae concipit, generare potest sibi simile.

scilicet in aurum & argentum. Nihil ergo convenit rei, nisi quod est ei propinquius, ex sui natura. Non enim generatur ex homine nisi homo, neque ex aliis animalibus nisi similia sibi. Quoniam quodcumque, quod generatur, sibi simile consequitur.

The *Testamentum*, after stating that there is but one stone and medicine, to which nothing is added or taken away, maintains that all sulfur, by virtue of combustibility, is extraneous to "our mercury." This is the gist of the *Rosarium's* statement as well, though without explicit reference to combustibility. Then both authors proceed to define "non-extraneity," saying that whatever can be converted to gold or silver by means of skill is not extraneous. The similarity of language here is striking, and argues for a textual dependency. This is true for the remainder of the passage as well, where the argument that only what is closely related to the medicine can act as an ingredient is supported by the phenomenon of human generation. As we stated before, the *Summa* diverges sharply from both the *Rosarium* and the *Testamentum* after the statement that there is but one medicine and stone. This supplies further evidence for our view that the *Testamentum* is relying here on the *Rosarium* rather than the *Summa*.

Several other passages occur in the *Testamentum* that support a borrowing either from the *Rosarium* or from the *Summa* itself. In some cases it is not possible to say which is the case, as in the following unacknowledged quotation -

*Testamentum* (731A)  
...non est argentum vivum  
in tota sui substantia,

*Rosarium* (665A)  
Non est autem materia argenti  
vivi in sua natura,

nec in tota sui natura,  
respectu argenti vivi communis  
sed in parte de ipso est....

nec in sua substantia tota,  
sed fuit pars illius.

The *Rosarium's* language is so close to that of the *Summa* here that one cannot determine whether it or the *Summa* served as pseudo-Lull's source. A further point at which the *Testamentum* has borrowed information about mercury can be found in its Chapter LXIV. Here we shall not quote the parallel passage from the *Summa*: the reader may find it at 75va, 7-13 -

*Testamentum* (746B)  
Et hoc per bonam adhaerentiam  
omnium partium suarum, et  
per fortitudinem suae nobilis  
mixtionis. Ideo fili, si  
aliquo modo inspissare possis  
ipsum argentum vivum  
per ignem sub conservatione  
suae humiditatis  
nullo tempore se corrumpi  
permittit, neque per flammam  
furiosam unquam in fumum  
recedet  
  
per gravitatem ponderosam,  
quam in se habet,  
& per carentiam adustionis  
omnis quam habet....

*Rosarium* (663B)  
Propter enim bonam partium adherentiam,  
fortitudinem suae  
mixtionis, si  
alioquo modo partes illius inspissentur  
per ignem  
  
ulteris non permittit se corrumpi  
nec per ingressionem furiosae flammae  
illud se in fumum  
patitur evolare: quoniam  
rarefactionem sui non suffert  
propter sui densitatem  
  
et adustionis carentiam....

Clearly the *Testamentum* has used either the *Rosarium* or the *Summa* itself here. The only clue that the case may have been the former rather than the latter lies in the *lectio facilior* "flammam furiosam" and "furiosae flammae" occurring in both texts: the *Summa* has "fumose flamme." Without the aid of manuscripts, however, this provides too little evidence for us to determine the *Testamentum's* direct source for this passage.

We may conclude from the above passages that the author of the *Testamentum* had access to the *Rosarium* attributed to Arnald of Villanova, beginning with the incipit "Iste namque liber...."



From this work he clearly drew alchemical information - especially concerning mercury - whose ultimate source was the *Summa perfectionis*. If the manuscript colophons of the *Testamentum* are correct in giving its date of composition as 1332, it therefore follows that the *Rosarium* was in existence before that date. The terminus ante quem of the *Rosarium* cannot be determined here, except to say that it was obviously written after the *Summa's* composition around the end of the 13th century. We cannot enter into the question of the *Rosarium's* authenticity here: the problem is being reappraised even now and must await the fruits of further research.<sup>15</sup>

In addition to the *Rosarium* the author of the *Testamentum* may perhaps have had a copy of the *Summa* itself or another work glossing the *Summa*, though we have found no direct evidence supporting either of these possibilities. At any rate, we have shown that these two major works from the first third of the fourteenth century have a distinct Geberian component, even if one of their authors did not know that text directly.

#### *The "Mercury Alone" Theory*

It is now established that the fundamental treatises of the Albertine, Arnaldian, and Lullian corpora all owe a debt to the *Summa perfectionis*. I have shown elsewhere that the *Semita recta* of pseudo-Albert mainly borrows technical descriptions of processes from the *Summa*, while augmenting these with detailed recipes.<sup>16</sup> The *Rosarium* and the *Testamentum*, however, are interested above all in the *Summa's* statements about mercury. Now Thorndike, in his study of the *Rosarium*, noted that the author of that text played down the traditional role of sulfur as a component of metals, while aggrandizing the position of mercury. Thorndike summarizes the position of the *Rosarius* thus -

Quicksilver is the medicine of the metals, extraneous or common sulfur is the cause of their imperfection. Quicksilver alone is the perfection of metals, and it contains its sulfur inherent in itself. This was to be a favorite and prevailing theory of transmutation in the fourteenth and fifteenth centuries, that gold and silver could be made artificially from mercury alone - using perhaps a little gold or silver to initiate the process - and that they could be produced in no other way. This seems to be the work's chief positive and forward-looking teaching.<sup>17</sup>

Thorndike reiterates these perceptive remarks throughout his monumental work, calling the belief that only mercury is necessary for alchemical success the "mercury alone" theory. An impressive list of fourteenth century adherents to this theory emerges from Thorndike's text, including John Dastin, Petrus Bonus, Nicolaus de Comitibus, and Bernardus Trevirensis.<sup>18</sup> It was Thorndike's view that all these figures ultimately owed their faith in mercury to the *Rosarium* analyzed above.

The reader who has followed us to this point will be in a better position than Thorndike to determine the origin of the "mercury alone" theory, for he will know that the *Rosarium* itself is above all a commentary on the *Summa perfectionis*. He may therefore suspect, and rightly, that the "mercury alone" theory comes from the *Summa* itself. Since we have already quoted some of the most pertinent passages of the *Rosarium* that express this theory, we need only refer the reader back to our previous pages. We already found "Arnald" borrowing the *Summa's* view that there is but "*una medicina*,"<sup>19</sup> and that that is made from the "purest and subtlest substance"<sup>20</sup> of mercury. We later found him regurgitating the *Summa* again, saying that mercury can be fixed to the degree that it become non-volatile.<sup>21</sup>

The "mercury alone" theory is not original to the *Rosarium*: rather the *Rosarium* has gotten it from the *Summa*. The *Summa* makes it quite clear that mercury is the material of the metals *par*

excellence, stating openly that it is (75va,33) "the necessary cause of perfection," and that (76ra,5-7)-

...manifestum est corpora maioris esse perfectionis que plus argenti vivi sunt continentia, et que minus, minoris sunt perfectionis.

Sulfur does play a part in the metals' composition, but mainly as an impurity. Indeed, it is even found as an impurity in mercury itself, "sealed up in the beginning of its mixture" (76ra,18-19). Only in the case of gold does sulfur act in a positive way: a tiny bit of fixed, very subtle sulfur "mutated from its own nature" (74vb,30) gives gold its yellow color. As for the production of the alchemical elixir, the alchemist should strive to produce it from mercury alone (76ra,9-11) -

Et si per solum argentum vivum perficere poteris, preciosissime perfectionis indagator eris, et eius que vincit opus.

Hence mercury is the "*lapis unus*" from which the "purest part," the *mediocris substantia*, must be extracted. Thorndike was right in stressing the influence of the mercury alone theory, but fell astray in making its progenitor the author of the *Rosarium*. We have shown, then, that the *Rosarium* took the "mercury alone" theory from the *Summa*. But where did the *Summa* get it? As I shall show in the final pages of this chapter, the theory was largely original to the *Summa*, though based on hints taken from earlier sources.

None of the identifiable sources of the *Summa* state clearly that the alchemist should attempt to make his medicine from mercury alone. Indeed, the alchemical sources of the *Summa* itself, such as the *Liber secretorum de voce Bubacaris*, the *Liber de septuaginta*, the *De aluminibus et salibus*, the *De re tecta*, and the *De perfecto magisterio*, all make use of abundant animal and plant products, along with a plethora of "prepared salts." There are only

vague hints in the early Latin literature that an alchemist could proceed by way of "mercury alone," and these hints are descriptive rather than prescriptive. One of these can be found in the *Liber de septuaginta*, which we know to be a source of the *Summa*. The *Liber de septuaginta* describes the *modi operandi* of varying alchemical schools at various points within the text. One of these relates that some alchemists employ mercury and sulfur, others use sulfur alone, still other sal ammoniac alone, and finally there are those who make use of mercury alone.<sup>22</sup> The *Liber de septuaginta* does not recommend this procedure over the other three; rather the alchemist should know them all.<sup>23</sup> Let us here relate the method of mercury alone -

Et hoc est ut sumas de argento vivo sublimato fixo et de argento vivo soluto partes equales. Fixum vero tere et inbibe ipsum ex soluto, et tere ipsum bene, et assa leviter. Et hoc fac donec illud solutum totum. Deinde tere ipsum et imbibe ex soluto terendo, donec fiat sicut medulla. Et tam diu inbibas ipsum, donec tantum bibat quantum. Et assa inter duo vasa cum igni forte. Et si emiserit fumum, redi ad terendum ipsum. Et reduc ipsum ad opus, donec fundatur in vase inferiore. Fiet enim rectum et non emittet fumum. Ex ipso prohice, quoniam colorem ipsum bonum efficiet. Postea inbibe ipsum ex aqua sua et tere bene et solve. Solvetur enim tempore parvo. Et postea congela ipsum et prohice ex ipso, sit quodcumque corpus volueris. Faciet enim mirabilia et precipue super *Ferrum*.<sup>24</sup>

Jābir's process may be summarized thus - the alchemist takes equal parts of sublimed fixed mercury and "dissolved" mercury, and triturates them until the fixed is dissolved. Then the mixture is cooked in a sealed vessel: if anything sublimes, the trituration must be repeated. After this fixation, the compound is apparently reduced in a descensory. It seems that it can either be used ("projected") at this point or again dissolved and solidified. Jābir's instructions, however, are far from clear.

Similar instructions are found in the *De perfecto magisterio* of "Aristotle," a work much influenced by the *Septuaginta*.<sup>25</sup> The *De perfecto magisterio* describes a school that first fixes quicksilver by subliming it, and then dissolves it with sal ammoniac. Then the dissolved mercury is distilled and coagulated, upon which it becomes "the true medicine of this art" (*vera hujus artis medicina*). But like the *Liber de septuaginta*, the *De perfecto magisterio* refuses to limit itself to this process alone, instructing the reader to "work according to whichever of the foresaid processes you wish" (*operare secundum quem volueris praedictorum ... modorum*).

It is likely that the *Summa* has used either or both of these sources for its own process on mercury, as we shall point out in our commentary to the text. But the important point for our present purpose is that neither Jābir nor "Aristotle" advises the use of mercury alone, despite the fact that each considers this a possible *modus operandi*. The *Summa* has therefore done something radically different from its sources in *restricting* itself to quicksilver. We have considered the motivation for the *Summa's* approach in chapter III: here it is only important to establish the fact itself. The *Summa* is the first work by a Latin author to explicitly reject other materials in favor of "mercury alone," though there are already hints in this direction to be found in the *Theorica et practica*. The importance of this fact does not end with an analysis of the *Summa*. It presents the historian of Latin alchemy with an important tool. We are now in a position to argue that any Latin text asserting the "mercury alone" theory is posterior to the *Summa*. Although the date of the *Summa's* composition is not entirely clear, we know with certainty that it was written either in the final third of the thirteenth century or at the very beginning of the fourteenth. This provides us with the *terminus post quem* of the "mercury alone" theory and its proponents.

## Chapter Notes

<sup>1</sup> Robert Halleux, *Les textes alchimiques*. In *Typologie des sources du moyen âge occidental*. Fasc. 33. Turnhout: Brepols, 1979. pp. 100-109.

<sup>2</sup> *Ibid.*, p. 102.

<sup>3</sup> *Ibid.*, p. 103.

<sup>4</sup> William Newman, "The Genesis of the *Summa perfectionis*," *Archives internationales d'histoire des sciences*, 1985, 35, pp. 246-259.

<sup>5</sup> Halleux, *Textes* (cited, n. 1), p. 105.

<sup>6</sup> Juan A. Paniagua, *El maestro Amau de Vilanova medico*. *Cuadernos Valencianos de Historia de la Medicina y de la Ciencia*, VIII, Valencia, 1969, pp. 74-77. Also J. Payen, "Flos Florum et Semita Semite. Deux traités d'alchimie attribués à Arnaud de Villeneuve," *Revue d'histoire des sciences et de leurs applications*, 1959, 12:289-300.

<sup>7</sup> Lynn Thorndike, *HMES*, III, p. 57.

<sup>8</sup> *Ibid.*, p. 669.

<sup>9</sup> Manget, *BCC*, I, pp. 662-676. *DWS*, I, p. 216.

<sup>10</sup> <Arnald of Villanova> *Opus preclarum magistri Arnaldi de villa Nova impendio nobilis viri Balthasaris de Gabiano civis Astensis summa cum diligentia Lugduni impressum Anno salutis dominice quarto supra millenarium et quinquagenerium decimo quarto....*, and <Arnald of Villanova> *Opera ... nuperime recognita ac emendata. Lugduni impressa in calchographia honesti viri Jacobi myt. Anno domini M ccccxxxii. die vero X. mensis Junii.*

<sup>11</sup> Michela Pereira, *The Alchemical Corpus Attributed to Raymond Lull, Warburg Institute Surveys and Texts*, XVIII, (London, 1989), p. 1.

<sup>12</sup> *Ibid.*, pp. 1-7. Dr. Pereira has very kindly checked most of the following quotations from Manget's edition of the *Testamentum* against the important manuscript Oxford University, Corpus Christi College 244. There are no variants of significance as far as our analysis goes.

<sup>13</sup> Manget, *BCC*, I, 673B.

<sup>14</sup> Manget, *BCC*, II, pp. 169-170; 271-2.

<sup>15</sup> M. Antoine Calvet is currently making a survey of the genuine Arnaldian writings in order to determine the definite position of Arnald with regard to alchemy. For a useful survey of the scientific pursuits in the *curia* of Boniface VIII, to whom another alchemical work of Arnald is dedicated (*Questiones tam essentielles quam accidentales ad Bonifacium VIII*), see Agostino Paravicini Bagliani, "Medicina e scienze della natura alla corte di Bonifacio VIII: uomini e libri," *Roma anno 1300: Atti del Congresso Internazionale di Storia dell'Arte Medievale Roma, 19-24 Maggio 1980* (Rome, 1983), pp. 773-789.

<sup>16</sup> Newman, "Genesis," (cited n. 4), pp. 246-259.

<sup>17</sup> Thorndike, *HMES*, III, p. 58.

<sup>18</sup> Thorndike, *HMES*, III, pp. 89-90 (for Dastin), p. 160 (for Dastin), p. 168 (for Nicolaus de Comitibus), and p. 624 (for Bernardus Treverensis).

<sup>19</sup> Manget, *BCC*, I, p. 664B.

<sup>20</sup> *Ibid.*, p. 665A.

<sup>21</sup> *Ibid.*, p. 663B.

<sup>22</sup> Jabir ibn Hayyān, *Liber de septuaginta*, Marcelin Berthelot, ed., "Geber. le livre des soixante-dix," *Mémoires de l'académie des sciences*, XLIX, 1906, p. 333: "qui cum argento vivo operantur."

<sup>23</sup> *Ibid.*: "tu omnes istos modos perfecte scire debes."

<sup>24</sup> *Ibid.*

<sup>25</sup> Manget, *BCC*, I, p. 640B.

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## CHAPTER SIX

*The Alchemical Sources of Paul of Taranto*

It is a difficult matter to locate an author's sources when he neglects to cite the works upon which he has drawn. This problem becomes more acute when the sources are not exactly quoted, but paraphrased. When such paraphrasing is the product of a conscious attempt to achieve stylistic homogeneity and verbal polish, we are confronted with a difficult problem indeed. Unfortunately, the last of these three options frequently obtains in the *corpus* of Paulus de Tarento. In such a situation, we cannot hope to achieve complete accuracy in our identification of sources. It is therefore expedient to divide them into two categories: I) definitely identified sources and II) possible sources. The second of these categories does not necessarily include *all* the possible sources of the author; it merely contains works which - because of some apparent verbal or ideological affiliation - he may possibly have used.

*I. Definite Sources*

1) Râzî, *Liber secretorum de voce Bubacaris*. Cf. Chapter II for a description of this text, and our notes to the *Summa* for documentation of its use. The *De investigatione* has also made extensive use of this text, being in part a reworking of it.

2) Jâbir ibn Ḥayyân, *Liber de septuaginta*. Cf. Chapter II, as well as our notes. All three of Paul's works - the *Summa*, *TP*, and *De investigatione* use this text, the *Summa* and *De investigatione* for stylistic purposes above all.

3) pseudo-Râzî, *De aluminibus et salibus*. All three works make extensive use of this source. The chapters on salts, atraments, and boraces shared by the *TP* and *De investigatione* are particularly rich in borrowings, while the *Summa*, especially in its chapters on the individual metals, also draws heavily on this work (cf. notes to *Summa* translation).

4) pseudo-Aristotle, *De perfecto magisterio*. This work, unlike the foregoing three, is a Latin forgery, not an Arabo-Latin translation (cf. Julius Ruska, "Pseudepigraphie Rasis-Schriften," *Osiris* VII (1939), pp. 33-94), probably written in the early 13th century. All three of Paul's works use it extensively, for which see our notes.

5) Avicenna, *De congelatione et conglutinatione lapidum*. We have described this fragment of Avicenna's *Kitâb ash-Shifa'* in Chapter I. Although the *Summa* makes the most use of this source, the *TP* quotes its famous broadside "Sciant artifices...." which it attributes to Aristotle.

6) pseudo(?)-Avicenna, *De re tecta*, sometimes also called *Epistola ad Hasen*. A description of this text is found in our Chapter III: it is possible that it could be a genuine work of Avicenna's. It appears that only the *De investigatione* and *Summa* used this work.

7) The most difficult problem to be met with in the analysis of the *Summa's* sources is that text's relationship to the *De mineralibus* of Albertus Magnus. It is clear that the *Summa* incorporates either borrowings from that work or from its sources, in particular the *Liber alchimie Hermes* and the *Quaestiones Nicolai Peripatetici*. The *Liber alchimie Hermes*, of which I have not succeeded in finding an intact manuscript, was excerpted by the

encyclopedist Arnoldus Saxo in the first half of the XIIIth century, as Wyckoff points out (*op. cit.*, p. 283). Halleux has shown (1982, pp. 66-9) that Albertus definitely used the *De finibus rerum* of Arnoldus, and it is not certain that he ever saw the Hermes text independent of the quotations withdrawn therefrom by the encyclopedist. A further difficulty lies in the fact that many - but not all - of the *Liber alchimie's* maxims exist in a fourth text, the *Liber sacerdotum* printed by Berthelot in the first volume of *La chimie au moyen âge*. Hence, although we have shown that Paul apparently used one of these four works (cf. *Summa* n. 103; *TP*, n. 14), the twin facts that these *loci* are all shared by the *De finibus rerum*, *De mineralibus*, and *Liber sacerdotum*, and that the *Liber alchimie Hermes* itself is unavailable for inspection, make it impossible to determine which text is the immediate source of the derived *loci*. Similar problems exist with the *Quaestiones Nicolai Peripatetici*, which we shall discuss in a moment.

There are, however, other factors which make a use of Albert's *De mineralibus* virtually certain, both in the *Summa* and in the *Theorica et practica*. We shall here give a parallel quotation from the *Summa* and *De mineralibus*, where the two texts describe the "intrinsic" and "extrinsic" moistures of the metals. Unfortunately, the texts of Borgnet and Jammy are slightly - but obviously - defective at this point. Hence we have added several lines to Albert's text which occur in identical form in the following manuscripts - Vat. pal. lat. 978, 8r (XIIIth-XIVth c.), and Marburg B-20, 140v (late XIVth-early XVth c.). The added lines are contained in brackets.

*Summa*  
76ra,16-25

Ex precedentibus itaque  
sermonibus, relinquitur  
duplicem fore in corporibus  
sulphureitatem, unam

*De mineralibus*  
Borgnet V,61B

Nos autem ad omnia  
hujusmodi objecta excusamur  
per hoc quod diximus in  
quarto meteororum nostrorum

quidem in profunditate  
argenti vivi conclusam in  
principio sue mixtionis,  
alteram vero supervenientem,  
quarum alteram cum labore  
tolli, alteram vero nullo  
artificiorum ingenio est  
possibile, quod igne  
perficitur, ad quod possit  
nostra operatio congrue ac  
utiliter pervenire, cum iam  
secum ab eiusdem creatione  
factum est. Et  
hoc experimento probatur  
sulphureitatem  
adustibilem videmus per  
ignem deleri, sulphureitatem  
vero fixam minime.

quoniam videlicet duplex  
est unctuositas in multis  
rebus: quarum una est quasi  
extrinseca, < immixto  
terrestri adusto feculento,  
et hec est multum  
combustibilis et  
inflammabilis. Altera autem  
est intrinseca, > subtilis  
valde, nihil factulentum  
habens admixtum; et haec  
non est inflammabilis, et unitum  
intrinseca rei retenta in  
radicibus rei, ne per ignem quod  
possit evelli et epotari:  
et nos dedimus de hoc  
exemplum in liquore, qui  
elixatur a vino, in quo una  
est unctuositas supernatans  
inflammabilis, et facile  
astringibilis et quasi  
accidentalis. Altera  
commixta toti substantiae  
liquoris ipsius, non  
separabilis ex ipsa  
substantia liquoris, nisi  
per defectionem  
substantiae: et haec non  
est cremabilis.

Both the *Summa* and *De mineralibus* here describe two sorts of "unctuosity" (recalling that sulfur is a *pinguedo terre* to the *Summa* - cf. 65vb), one "supervenient" or "extraneous," the other "profound" or "intrinsic." The exterior sort can be removed by burning, but the interior is not flammable, and cannot be separated from the matter to be purified without a loss of the *depurandum's* substance. The two passages are therefore remarkably similar from an ideological point of view. But, since their terminology is entirely different, and since the *Summa's* description is limited to the sulfureity of metals, while the *De mineralibus* extends to the unctuosity of such substances as wine (clearly meaning our ethyl alcohol), the similarity ends

there. Furthermore, it is manifest that the *De mineralibus* has gotten its concept of a two-fold unctuousity from the *Questiones Nicolai Peripatetici*. As Halleux has shown (1982, pp. 64-5), Albert drew extensively on the *Questiones*, and if we consult several *loci* in Nicholas himself, this particular case of borrowing becomes quite clear. At p. 96 (*ed.* Wielgus), The *Questiones* say the following:

Sed attende primo, quoniam in vino duo sunt, scilicet humorositas grossa et humiditas oleaginosa, quae humiditas oleagina nutrit calorem naturalem in vino, et ideo evaporat in duo: prius in aquam inspidam, cuius principium est sua humorositas, et postea in oleum, cuius principium fuit subtilis.

Here we have a clear description of two "humidities" in wine, but not of two "unctuosities" *per se*, as we found in Albert. A further difference between Nicholas and Albert lies in the fact that the former does not here say that his two moistures are found "in many things," but only in wine. If we inspect p. 98, however, Nicholas extends the range of his theory -

Et attende, quoniam duplex evaporatio est in re aliqua habente terrestritatem, ut contingit in vino, eius evaporatio prima est aquaea, secunda est oleagina....

Here Nicholas says that any matter containing earthiness must be party to this two-fold exhalation, but the exhalation is still different from that of Albert in that it contains both *aqueitas* and *oleaginositas*. Hence we find Albert agreeing with Nicholas on the pervasiveness of this double moisture, but not on its exact character. In order to find an agreement on this final point, we must inspect one more passage from the *Questiones* (pp. 85-6) -

... partes terrestres existentes in cavernis habent ex se unctuositatem subtilem, quae veniens ad bitumen praedictum admiscetur illi; et tunc est duplex unctuositas .... Et inde est, quod dicimus auripigmentum duplicem unctuositatem habere et sulphur similiter. Et inde est, quod quando intendimus sublimare auripigmentum aut sulphur, auferimus unam unctuositatem per abluionem eius in urina, et lexivia, et aceto, et lacte caprino, quae quidem sunt abluiones acutae et auferunt unam unctuositatem ex eo in abluendo, quae quidem, si remaneret, non posset auripigmentum sublimari, eo quod statim incenderetur, quia fieret flamma ex eo, quod illa unctuositas habilis fuit ad suscipiendum calorem. Nec possunt sublimari talia corpora, quia bene potest esse duplex unctuositas in aliquo, sicut in carne leonis est duplex calor: unus quem semper retinet, alter quem abluendo admittit.

If this quotation is long, its length is matched by its importance. Here we find Nicholas explicitly saying that sulfur and auripigment have two unctuosities, one of which is flammable and capable of being removed by washing or burning, the other of which is apparently not. Furthermore, this two-fold unctuosity can probably be found in other things, though Nicholas gives no examples. If we now return to Albert, the process by which he joined this description of two unctuosities to Nicholas's description of wine becomes rather clear. In attempting to generalize this theory, Albert subsumed both the *Questiones'* descriptions of sulfur/auripigment and of wine, thereby providing further cases of *duplex unctuositas* where Nicholas gave none.

But how does this bear on the *Summa*? Since it is possible that Paul of Taranto used the *Questiones Nicolai Peripatetici* himself, the above examples do not prove a dependency on Albert. But the manner in which Albert then expands the theory of the *Questiones* does suggest such a dependence. In Book IV, Chap. IV of the *De mineralibus*, Albert says that these humidities as they exist in sulfur and mercury are not really two, but three. The first is fatty and flammable, the second phlegmatic and glutinative, the third "radicalis essentialibus partibus rei



imbibitus." Albert proves the presence of sulfur in silver by the following test -

(89B) Cum autem conflatur argentum, odor sentitur sulphuratus: oportet igitur de substantia et qualitate habere sulphuris...."

Albert's proof of the sulphureity in silver, relying on the sulfurous odor given off during its calcination, is found nowhere in the *Questiones Nicolai Peripatetici*; nor have I found it in any other alchemical text written before the late XIIIth century. Yet the attentive reader will find this test described in numerous places of the *TP* and *Summa* (e.g. *TP* 25r,26-30; 26r,10-5; *Summa* 76rb,4-6; 76vb,18-20). Furthermore, Albert frequently says that the humid, or mercury, in a metal *defendit* (75, 80) or *protegit* (76) the dry, or sulfur, by insulating it from the heat of fire. This vocabulary, which I have not been able to find in the *Questiones Nicolai*, does appear in the *TP* and *Summa* (e.g. *Summa* 71va,25; 28; 74rb,39; *TP* 20r,12; 25v,28; 26v,29; 28r,30; 29r,29). Again, the presence of this theory - clothed in the said terminology - has not been detected by me in other early texts.

Our suspicion that the *Summa* has derived its theory of profound (fixed) and supervenient (unfixed) principles from Albert is strengthened indirectly by evidence of further borrowing. There is good evidence that the *Summa* has derived its influential theory of specific weight from Albert -

*Summa* (79va,5-9)  
Est igitur causa  
ponderis magni subtilitas  
substantie corporum et  
uniformitas in essentia.  
Per hoc etenim illorum  
possunt densari partes cum  
nihil intercidat; et partium  
densatio ponderis est

*De mineralibus* (92A)  
...cum spissentur plurimae partes  
materiae, simul constabunt: hoc enim  
est de proprietate subtilis  
substantiae, quod constans  
per coagulationem plurimas partes  
habebit in parvissimo loco....  
et subtilitas facit consolidationem  
maximam: et constantia multarum

adductio et illius  
perfectio.

partium simul in parvo loco et situ  
facit pondus, sicut probatur ex his  
quae in *Caelo et mundo*  
rationabiliter demonstrata sunt.

As in the *Summa*, "subtilitas" means "small size" to Albert, at least in the context of particles (*partes*). When many small particles are brought together in a small space, the resulting substance will be heavy, just as Albert claims to have proven in his commentary on *De caelo*. In fact, Albert does make this argument in his *De caelo* commentary, claiming there that gold is heavier than silver, for example, because the former has "more earthy particles" in the same space (IV, 307A). The fact that Albert supports his claim with extensive argument while the *Summa* does not adds further evidence to our view that the *Summa* has borrowed here from Albert, rather than developing the concept independently.

Even the concept of *mixtio per minima*, the association of minute particles that the *Summa* equates with true mixture, may be derived from Albert -

*Summa* (65va,15-18)  
...per minima partes terree  
taliter partibus aereis,  
aqueis, et igneis sunt unite,  
ut nulla ipsarum in  
resolutione possit dimittere.

*De mineralibus* (64B)  
...est...commixtio quae est  
commiscibilium alteratorum unio,  
ita quod minimum terrei est cum  
minimo aquei, et e converso....

In this passage Albert begins by quoting the famous definition of mixture from *De generatione*, then saying that the elements, in order to be mixed, must be juxtaposed as *minima*. He does not mean that this juxtaposition alone is equivalent to mixture, since it involves no real *alteratio commiscibilium*: rather it is the first step to mixture. The *Summa*, however, does not make this clear. This could be the origin of the *Summa's* terminology of *mixtio per minima*, but one would not wish to push such a claim too far.

Further evidence that Albert has influenced Paul of Taranto may be found by examining the *Theorica et practica*. In addition to most of the above borrowings, the *TP* contains an elaborate theory that mercury and sulfur, because they are not well compacted, digested, or glued together, are very close in nature to the simple subterranean elements (15r). In fact, they retain the "excellencies" (the *hyperochai* of *De generatione*, Book II) of the elements, meaning that mercury and sulfur, unlike normal reagents, have not lost the undiluted virtues of heat, cold, wetness, and dryness that otherwise would be diluted by mixture (3v). Therefore alchemists, unlike apothecaries, work directly with "the hands of nature," by whose help they can immediately produce whatever metal they like (3r). This concept that mercury and sulfur are useful precisely because of their poor digestion is not a commonplace in alchemy: indeed I cannot recall having seen it in any other source but one - Albert's *De mineralibus*. Let us therefore quote Albert and Paul in parallel columns -

*TP* (18v,24-19r,4)

Fetor autem eius <mercurii>  
quidam velut insipidus notat  
indigestionem commixtorum  
in eo per modicitatem caloris,  
aqueitatem eius glutinantis et  
inspissantis ad modicum neque  
figentis ad plenum; ex quo  
restat clarum ipsum per  
moderationem caloris digerentis  
et exhaurientis ex eo  
superfluum humidum atque eius  
humidum substantiale  
comprimentis et inspissantis  
ad plenum subtiliter et  
paulatine, ipsum in medicinam  
metallorum imperfectorum  
posse parari ac etiam  
feri perfectum metallum.

*De mineralibus* (84A)

...foetor ejus <sulphuris> indicat  
ipsam esse valde indigestam  
et non terminatum, sed potius  
calore corrumpente esse potius  
quam per digestionem completam:  
et haec incomplexio sui facit  
quod potest esse materia  
universalis omnium elementorum:  
si enim esset completum ad  
complexionem unam determinantem,  
tunc procul dubio non esset  
convertibile ad alia, nisi prius  
illa tolleretur: sed nunc propter  
sui incomplexionem convertibile est  
in omnia....

In both texts, the principles are said to be poorly digested, an extension of the theory found in Aristotle's *Meteors IV*. But to detect this fact from the principles' stench is highly unusual. Equally surprising is the two texts' assertion that precisely because of their poor digestion, the metallic principles are closer to the four elements than other mixtures are, and that this accounts for their ability to be transmuted into various different metals. I have encountered these claims in no other alchemical text. It is therefore very probable that this passage from the *De mineralibus* formed the immediate inspiration for the *Theorica et practica's* attempt to analyze the principles in terms of their elemental constituents. Other borrowings from the *De mineralibus* may also be found in the *TP*, such as the peculiar notion that sulfur is a "foam" produced by "boiling" within the viscera of the earth (*TP* 18r,21; *De mineralibus* 84B), or the unusual *Deckname* "pervigil insidiator," used by both texts for sulfur (*TP* 5v,25; *De mineralibus* 94B).

There is, in fine, strong evidence that both the *Summa* and *Theorica et practica* have borrowed extensively from the *De mineralibus* of Albert. As usual the *Summa* and *TP* have disguised their debt by rewriting, but a sharp eye can still detect the countenance of Albert beneath his new garb. It is also possible that the *Summa* and *TP* have drawn on sources used by Albert himself which are no longer available for our inspection - in particular the *Liber alchimie Hermes* - but there is no need to assume that this is the case. On the basis of the evidence, we can argue that whatever Paul of Taranto took from these sources he could have received from the *De mineralibus* of Albert.

## II. Possible Sources

1) *Liber luminis luminum*, attributed to Michael Scot. This text is early, possibly from the first third of the XIIIth century. Two different forms of the text were edited by J. Wood Brown, *The Life*

and *Legend of Michael Scot* (Edinburgh: 1897), pp. 240-268. It contains numerous mineral-names shared by the *TP* and *De investigatione*, such as *sal alembrot* (pp. 250-3), *alumen de pluma* (pp. 254-5), *alumen scaiole* (p. 255), *alumen de rocha* (p. 255), *alumen de maroc* (p. 256), and *alumen zucharinum* (p. 256). Occasionally Paul's recipes for these substances coincide with those of the *Lumen luminum*, as in n. 66 of the *TP*. In addition, the terminology of the *Summa* and *De investigatione* shows marked affinities thereto. The *Summa*, for example, makes very heavy use of the formulaic expressions "Intentio est..." and "Causa inventionis est..." in varying forms, especially in its description of apparatus (e.g. 68rb,29; 70vb,42;71ra,1; 4; 9; 71rb,17; 71va,11; 19; 33; 39; 71vb,10; *et sparsim*). "Scotus," on the other hand, begins with the division of his book into "talía ... Invenio (?Intencio) causa intentionis et utilitas" (p. 240). I have found another manuscript of the *Lumen luminis* to give the text in somewhat more complete form than that from which Brown made his transcription. Codex 1477 of the Biblioteca Casanatensis in Rome contains the *Lumen luminum* between ff. 84-96. On 84r,9-10, we find the book divided into "tria...scilicet intentio causa intentionis et utilitas." The *intentio* of the text is "tractare de transformatione metallorum..." The *utilitas*, similarly, is defined on 85r as the ability the *artifex* will receive to convert base metals into noble ones. Instead of *causa intentionis*, however, we find in the place of the second category the following - "[85r,13-4] Causa invencionis est ut ex tali mutatione in melius convertantur." It is therefore possible that the second category should read *causa invencionis* where it first appears, which does seem to have a certain logic missing in the expression *causa intencionis*.

It is not impossible, given the *Summa's* tendency to rewrite and expand passages from previous texts - as we showed in the case of the *Liber de septuaginta* (cf. Chapter II) - that these elliptical passages form the basis of its *inventio/intentio* vocabulary. A further hint in this direction lies in a passage from the *De investigatione*,

where it is stated that "alumina illuminant " (p. 222). Although Ruska has pointed out that the ultimate source for this word-play lies with Isidore of Seville (Ruska, "Übersetzung und Bearbeitungen...", p. 66, n.5), it is not common in XIIIth century alchemical texts. In the *Liber luminum*, however, we find extensive use made of this pun: (p. 254) "Sicut <alumen> illuminat pannos ita illuminat martem ut recipiat formam lune ut enim lana illuminatur ita et metalla illuminantur .... <Ita> mars ... est optime illuminatus." The occurrence of this pun in both the *Liber luminum* and *De investigatione*, along with the numerous mineral-names shared by those two texts and by the *TP*, and finally the other similarities of terminology between the *Summa* and *Lumen luminum*, may, however, represent a shared cultural milieu rather than a direct textual dependency.

2) The *Summa* and *TP* at various points employ the curious expression *impietas ignis*, *impius ignis* or *ignis impiissimus* (*Summa*, 64va,14; 79rb,48; *TP* 52r,8; 52r,20-1; 52v,25), which seems to be related to the expression *ignis sine pietate* that I have found in only one other source, the *Clavis sapientiae maioris* attributed to one Artepheus. This *Clavis* is a translation - apparently fragmentary - of a still extant Arabic work (cf. Kraus, *op. cit.*, II, 298-9). We cannot rule out the possibility that Paul knew this text, but since there is little other evidence in that direction beyond the similarity of the expression cited above, it seems equally possible that he derived this turn of phrase from another Arabo/Latin source unknown to us.

3) The *Questiones Nicolai Peripatetici*. We have already considered Paul's possible use of this text in our treatment of Albert the Great. It is virtually sure that the *Summa* has been influenced by this work, but such borrowings could have been made indirectly, through Albert's *De mineralibus*, as we have shown.

4) The *Liber de spiritibus et corporibus* or *Summa* of Archelaus. This is a manifestly early work, possibly even dating from the XIIth century, since it mentions the Byzantine Emperor Manuel Comnenus (1143-80) and the Holy Roman Emperor Frederick I (1152-90) as contemporaries of the author (cf. Wood Brown, *op. cit.*, p. 83, n.5). Our notes to the *TP* mention several possible borrowings from this work. Several manuscripts of this work inspected by me (cf. our edition of the *TP*, diss. n.35) contain large portions extracted from several other texts, including the *De compositione alchemiae* of Morienus (*vide infra*), *Liber Hermetis de blchknkb*, and *De aluminibus et salibus* of pseudo-Rāzī; CLM 610, ff. 2-85, seems to contain these three texts in their entirety - as part of the *Summa Archelai*. It is therefore possible that Paul may have had a copy of the *Liber de corporibus et spiritibus* which incorporated four different works.

5) Regardless of whether Paul knew the work of "Archelaus," it is quite likely that he had read the *De compositione alchemiae* of Morienus, which we mentioned in Chapter I as one of the earliest works on alchemy to have entered the Latin West. I have found no traces of the *De compositione* in any of Paul's *opera*, however; if he knew the text, it was not therefore important to his development.

6) There is a noticeable similiarity between the alchemical debate proffered by the *Liber Hermetis* edited in our first chapter and those occurring in the *Summa*. The verbal similarity is not exact enough to argue for a definite dependency of the *Summa* on this text, but the possibility cannot be excluded.

## CHAPTER SEVEN

### *The Manuscript Tradition of the Summa perfectionis*

#### *I. List of Complete and Fragmentary Summa Manuscripts*

(The following list makes no claim of completeness: rather the nature of things is such that it cannot be so.)

- Berlin  
Preussische Staatsbibliothek, Quarto 231 (Acc. 264), 5r-40r. XVIth c.  
P.S., Octavo 38 (= Rose 966), ff. 8r-106r, a. 1467.
- Bern  
Bib. Bongarsiana, B54, ff. 24r-105v, XVth c.
- Bologna  
Bib. Universitaria, 168(180), ff. 73r-130v, a. 1471.  
B.U. 448(756), ff. 1r-135v, XVth c.
- Bruxelles  
Bib. Regia Belgica, IV,1143, ff. 26v-37r, XIIIth-XIVth c., frg.
- Cambridge (England)  
Corpus Christi College, 99, pp. 36-92, XVth c.  
Gonville and Caius College, 181, pp. 35-115, XIVth and XVth c.  
Trinity College, 1122, ff. 55r-79r, XIVth c.
- Cortona  
Biblioteca Communale, 98. XIVth c.
- Firenze  
Bib. Nazionale Centrale, Palat. 981, ff. 203r-264r, XVth c., frg.  
B.N.C., fondo nazionale, II,1,364, ff. 1r-27r, XIVth c.  
Bib. Laurentiana, App. Ashburnham, 1869, ff. 1r-40v, XVth c.  
B.L., App. Ashburnham, 1873, XVIIth c.  
Bib. Riccardiana, 119, ff. 78r-96v, XVth c.  
B.R., 933, ff. 27r-46r, XIIIth-XIVth c.  
B.R. 1165, ff. 11r-39v, XVth c.
- Foligno  
Biblioteca Jacobilli, 346,C.I.12, 13r-40v, a. 1420.
- Glasgow  
University, Hunter 253, ff.130r-154v, XIIIth -XIVth c.  
University, Ferguson 39, ff. 57r-58v (frg.), XIIIth-XIVth c.  
University, Ferguson 80, ff. 1r-66v, XVth c., frg.
- Kobenhavn  
Bib. Regia Hafniensis, Gl. Kgl. 236, ff. 1r-28v, a. 1463.
- Kues  
Bib. Hospitals, 299, ff. 50r-74v, XIVth c.
- Leningrad  
Library of the Academy of Sciences, Q242, ff. 86v-155v, XVth c.
- London  
British Library, Arundel 164, ff. 124r-126v, 131v-155r, XVth c.

- B.L., Harley, 3528, ff. 43r-55v, XVth c., frg.  
 B.L., Sloane, 1091, ff. 2r-51r, XVth c.  
 Royal College of Physicians, 354, ff. 1r-66v, XIVth c.
- Madrid  
 Bib. nacional, 10031, ff. 1r-49v, XIVth-XVth c.
- Marburg  
 Universitätsbib., B20, ff. 41r-41v, XIVth- XVth c., frg.
- Montpellier  
 Bib. de l'Ecole de Médecine, 260, ff. 1r-48r, XIVth c.
- München  
 Bayerische Staatsbib., cod. lat. 276, ff. 117r-125r, XIVth c.  
 B.S., cod. lat. 353, ff. 85r-118r, XIIIth-XIVth c.  
 B.S., cod. lat. 455, ff. 26v-90v, XVth c.  
 B.S., cod. lat. 2848, ff. 2r-97r, a. 1531.  
 B.S., cod. lat. 12026 (537), ff. 15v-31v, XVth c., frg.  
 B.S., cod. lat. 26059 (1807), ff. 214r-216r, a. 1507-8, frg.  
 B.S., cod. lat. 27436, ff. 58r-65v, XVIIth-XVIIIth c., frg.
- Napoli  
 Bib. nazionale, XV/F/54, ff. 13r-76r, a. 1467.
- Oxford  
 Bodleian Lib., Ashmole, 1384, ff. 1r-64r, XIVth c.  
 Bodleian Library, Ashmole, 1408, I (frg.).  
 B.L., Ashmole, 1416, ff. 131r-142v, XVth c.
- New Haven  
 Yale University, Mellon 2, ff. 37r-64r, XIIIth-XIVth c.
- Palermo  
 Bib. comunale, 4QqA10, ff. 110r-136v, XIVth c.
- Paris  
 Bib. nationale, lat. 6514, ff. 61r-83v, XIIIth-XIVth c.  
 B.N., lat. 6514, ff. 174r-186v, XIIIth-XIVth c.  
 B.N., lat. 6679, ff. 106r-136r, XVth c.  
 B.N., lat. 7156, ff. 66v-83v, XIIIth-XIVth c.  
 B.N., lat. 7161, fragments distributed throughout codex, XVth c.
- Parma  
 Bib. Palatina, 147, XVth c.  
 (This MS. was brought to my attention by Mlle. Pascale Barthélémy. I have not been able to consult either the catalogue or the MS. itself.)
- Philadelphia  
 University of Pennsylvania, Smith 3, ff. 13v-42v, XVth c.
- Poppi  
 Bib. comunale, 90, ff. 8r-60v, XVth-XVith c.
- Prague  
 University Library, 1984, ff. 79r-117r, XVth c.
- Reims  
 Bib. de la ville, 986, ff. 1r-52v, XIVth c.
- Roma  
 Vaticanus, lat. 6896, pp. 1r-53r, XVth c.  
 Vat., palatinus 1339, ff. 25v-68r, XIVth c.

- Vat., Barberini lat. 334, ff. 31r-64v, XVIth c.
- St. Gallen  
 Bib. Vadiana, 300, ff. 37r-56v, XIVth c.
- Wien  
 Österreichische Nationalbib., 2449, ff. 1r-58r, XIVth c.  
 Ö.N.B., 5509, ff. 149r-200v, XVth c.  
 Ö.N.B., 5286, ff. 3r-49v, XVth c.  
 Ö.N.B., 5477, ff. 62v-63v, XVth c., frg.
- Wolfenbüttel  
 Landesbib., 4504, ff. 195r-231r, XVth c (inserted in XIVth c. codex).

### II.1. Editorial Techniques Used in The Present Edition

The reader who is familiar with alchemical texts will at once note that the manuscript tradition of the *Summa* is unusually fixed for a work of that genre. The reason for this regularity lies partly in the care with which its scribes passed the text down. The *Summa* seems to have been recognized as a classic of the genre very early, as the many manuscripts of the text written in the hands of professional scribes testify.

Unfortunately their very assiduity led the copyists of the *Summa* to undertake their own medieval form of text editing. Even the earliest manuscripts betray the unmistakable signs of this, be it the marginal addition of alternate word forms linked to the text by *alias* or *aliter*, or the occurrence of such forms in the text itself, linked in the same way or by *ve* or *vel*. Such attempts to supply variant readings are sometimes in a different hand than that which wrote the text (e.g. A and A<sub>2</sub>), at other times in the same hand (e.g. T). In many cases we are right to suspect that this text editing occurred in different stages, the variants which may have originally been easily distinguishable from the base text gradually

achieving a false homogeneity due to their incorporation into the text itself by a single scribe.

All such attempts on the part of medieval copyists make it more difficult for us to distinguish the different families of *Summa* manuscripts. It is possible to place them in groups, but the difficulties associated with their exact affiliation are immense, precisely because the scribes did their best to erase such heterogeneity. For this reason, it appears better to attempt only a grouping by families rather than the development of a *stemma codicum*.

Eighteen manuscripts of the late thirteenth and fourteenth centuries have been consulted for this edition. Two of these, Vaticanus Palatinus 1339 and Paris, bibliothèque nationale 7156, have been disqualified from serious consideration, the former because of its excessive corruption (ff. 57r-57r bis, for example, contain recipes for the production of basilisks), the latter because of its extreme illegibility. Eight more manuscripts have proven to be redundant as far as inclusion within the apparatus goes, since they are as well or better represented by other members of their respective families. This leaves us with eight manuscripts whose variant readings have been included within the apparatus.

The method of editing and the abbreviations used here are a somewhat simplified form of those described in the *Règles et recommandations pour les éditions critiques* (Paris: 1972) of *Les belles lettres*. The reader will note at once, however, that we have for the sake of simplicity provided a negative apparatus rather than a positive one.

As far as orthography and the incorporation of marginalia go, this edition follows a *via media*. Spellings have been regularized to the degree that they will be recognizable to anyone who knows Latin: no attempt has been made to retain such medieval forms as *condempacio* for *condensatio* or *fusilis* for *fusibilis*, for example. If such forms were retained in the text, consistency would rule that

they must also be kept where they occur among the variants. In the case of a work whose manuscript tradition is as extensive as that of the *Summa*, this would lead to a gargantuan apparatus that would dwarf the text. At the same time it would be mere pedantry to convert every occurrence of *hec* and *que* into *haec* and *quae*. We trust that the reader's common sense and our translation will aid him where the Latin lexicons fail. Marginalia have been retained in the apparatus only to the degree that they represent modifications of the text. Obvious marginal glosses that are not signalled for incorporation *in textu* by means of a carat or some other scribal device are not recapitulated in this edition. Again the object has been the avoidance of a bloated apparatus.

## II.2. The Families

Adopting the foresaid editorial techniques, we arrive at three clearly distinguishable groups of manuscripts - PAFKMZ, RTN, and BWHEGDC. As we shall show, however, T frequently reads with BWHEGDC, and WEG with RTN, due to contamination by an alternate tradition. D and C also have their own peculiarities that make them rather loose relatives of BWHEG.

**Family PAFKMZ.** This is the most distinct of the three families: the texts themselves are relatively uncontaminated, though variants are recorded in the margins and occasionally in the body of the work. Readings distinguishing this tradition include the following -

1. PAFKMZ lack a major seven line gloss at 63va,3. Although RN also lack this, this is part of an eighteen line lacuna unique to RN. If RN did not have this lacuna, it is likely that they would read with T, in adding the gloss. D also lacks this gloss, but as we shall presently see, D is much closer to BWHEG than to PAFKMZ for other reasons.

2. 64vb,42. PAFKMZ and D lack the transposition of *differentiis* after *aliis* of BWHEGDC, of *differentiis* after *non* of RT, or after *similiter* of N.

3. 67vb,20. PAFKMZ omit the subject *causa sola*.

4. 68va,28-30. Here we find a complicated lacuna shared wholly or partly by BH, WE, RTN, but not by PAFKMZ and CDG (the corresponding text is transposed three lines down by Z).

5. 69va,11. PAFKMZ and N lack a one line gloss which occurs in differing forms in the other manuscripts.

6. 69vb,26-7. PAFKMZ and N offer the reading *argentum vivum mortificatum* rather than BWHEGD's *substantiam argenti vivi mortificatam* or RT's *argenti vivi mortificati*. C has the unique reading *substantiam argenti vivi mortificati*.

7. 71va,11-12. PAFKMZ and D share a two line lacuna between *Causa - deletur*.

8. 81vb,5-6. PAFKMZ retain the necessary phrase *quam - medicina*, which BRTWH omit.

9. 81vb, 34. PAFKMZ and C lack a two line gloss following *preparationis*.

It would be possible to lengthen the list of unique PAFKMZ concordances considerably, but there seems little cause to do so. We shall therefore pass to the family composed of R,T, and N.

**Family RTN.** The group made up of R, T, and N, is somewhat more equivocal than PAFKMZ, because T sometimes reads with BWHEGDC or BH rather than R, and N occasionally reads against both R and T. In addition, R and N contain large lacunae unshared by T. It is likely, however, that the scribe of T or of his model has used a manuscript closely related to RN for his base text, correcting it against one of type BWHEGDC. First we shall show the agreement of R, N, and T, then passing to the instances where T (and occasionally N) reads with BWHEGDC, or BH.

1. 64vb,42. RT transpose *differentiis* after *non*, while N transposes it after *similiter*, unlike PAFKMZ and BWHEGDC.

2. 66ra,39. RT add *defacili* after *tinctura*, though N does not.

3. 66rb,32. RT read *malleabile fusibile*, while N simply has *malleabile*, against PAFKM's *minerale fusibile* (Z has *minerale facile*), or BWHEGDC's *miscibile fluxibile*.

4. 66va,41-2. RTN uniquely replace the long introductory expression *Solis - argento* with *Sermonem continuens in luna* (R), *sermonem conficientes in luna* (T), or *Sermonem constituentes in luna* (N).

5. 66vb,15-6. RTN alone omit the introductory phrase *De plumbo - quoniam*.

6. 68rb,13. RTN read *alicuius rei fixe*, against the others' *de aliqua re fixa*.

7. 68vb,28. RTN add the gloss *radii involuti cotone sive*.

8. 69vb,26-7. RT read *argenti vivi mortificati*, against PAFKMZ and BWHEGD (C reads *substantiam argenti vivi mortificati* uniquely), while N reads with PAFKMZ.

9. 70vb,36-7. RTN replace the longer introductory phrase *Equum - suis* with *Consequenter de distillatione dicendum est*.

10. 71va,8-9. RTN omit the introductory phrase *Post - calcinatione*.

In the above ten examples, we see four cases where RTN have shortened or omitted introductory phrases. This desire to reduce the *Summa's* verbosity appears to be a characteristic of the RTN family. Let us now analyze the divergences of N and T from R.

1. 72va,32 provides a good example of such divergence. Here BWHEGDC and NT add a three line gloss in almost identical wording.

2. A similar gloss is proffered by BWHEGDC and NT at 75rb,41.

3. At 67ra,10 BWHGC and T read together in adding *corporum* before *auferre*.

4. At 67rb,37 BHC and T agree in reading *perfectionis*.

5. At 67vb,20 BWHEGDC and NT agree in omitting *corpus*.

6. At 69va,18 BWHEGC and T read together in adding the gloss *ut sunt sol et luna*.

7. At 82va,6 BWHEGD and T add the gloss *ut mars et venus*.

8. If we turn to 68rb,18, T seems to combine the reading of PAFKMZ and RN, *secum*, on the one hand, with BWHEGDC, *feces*, on the other - giving *feces secum*.

9. Similarly, at 68vb,4-5, R's rubric *Rectificatio artificis in quibus illum errare contingeret in sublimando sulfur et arsenicum* is combined by T with that of BHG, *De errore a fecibus*, to give *Rectificatio artificis in his in quibus contingit errare in sublimatione sulphuris et arsenici et primo de errore a fecibus*; N, to the contrary, has *De errore contingente in sublimatione duorum spirituum scilicet sulphuris et arsenici*.

10. Again, at 71vb,36 T combines BWHEGC's *temperatum ignem* with R's *minorem ignem*, to get *temperatum et minorem ignem*; N has *maiorem ignem*. Other examples of this type of agreement also lead to the conclusion that the scribe of T or his model has combined the traditions of RN and BWHEGDC. But since RTN shares the abbreviated introductory phrases, it looks as though the base manuscript from which T or its exemplar was copied belonged to the RN tradition.

The divergences of N from RT are minor indeed compared to that manuscript's agreements therewith. In two of the three cases of such divergence listed above (69vb,26-7, 66rb,32), N is manifestly closer in its readings to RT than to the other groups. The third divergence (66ra,39) is shared by the rest of the manuscripts, and probably represents a point at which N is contaminated by the other families.

**Family BWHEGDC.** This family, like RTN, is not always distinct. In most cases where BH diverge from PAFKMZ and RTN, WEG follow BH. On some occasions, however, WEG go off uniquely, on others they follow RTN to the exclusion of PAFKMZ, and on still others, the manuscripts break down into the two groups BH and PAFKMZRTNWEG. D and C must also be considered apart from BWHEG in many cases, but as we shall presently show, they nonetheless belong to the same family.

First let us examine the most common grouping - BWHEG - while also showing where D and C agree and dissent.

1. 64vb,42. Here BWHEGC transpose *differentiis* after *aliis*, unlike the others.

2. 67ra,38-9. BWHEG omit the phrase *Sed si preparetur, coniungitur et non separetur*; D omits even more - *ab eis per examen separationis sine magna industria. Sed si preparetur, coniungitur et non separetur*.

3. 67rb,27-8. BWHEG omit two lines between *et secundum - laboris*.

4. 69vb,26-7. BWHDEG agree in the otherwise unique reading *substantiam argenti vivi mortificatam*.

5. 70rb,31-3. BWHEGDC omit the sentence *Descriptio vero vasis aludel de sublimatione marchasite ultime et cum fornace et baculo sue experientie habebitur*.

6. 70rb,40-1. BWHEG omit the phrase between *debent - sublimari*.

7. 70vb,37. BWHEGDC replace *Equum* with the *lectio faciliior Conveniens*.

8. 71rb,11-2. BWHEG omit the phrase between *ne - alembic*.

9. 72rb, 18-9. BWHE omit *Descriptio vero omnium que narrata sunt novissime est hec*, while DG have *Descriptio omnium que narrata sunt novissime hic deest*.



Let us now pass to the division formed by BH and WEG.

1. At 64vb,9-10, BH and DC add a short gloss unshared by WEG (or by the other manuscripts).

2. At 69ra,3, BH omit the phrase *cuius presens monstratur descriptio*, while WEG read *cuius descriptio ad presens deest*.

3. At 71vb,25, BH proffer the variant *fusum* for *ipsum*. WEGN and DC follow RT in giving *ipsum fusum*.

4. At 70vb,33-4, WG have *Descensorii vero descriptio hic deest*. E, however, betrays the unmistakable signs of contamination in the reading *Descensorii vero descriptio hic deest. alius. nunc vero descensorii descriptionem ponamus*. BH, finally, read here with the other manuscripts.

Before we consider the final grouping let us summarize the way in which the various manuscripts have treated the illustrations considered up to now.

a. At 70vb,33, manuscripts PAFKMZ, RTN, and BHDC gave the reading *Nunc vero descensorii descriptionem ponamus*. WG pointed out that the illustrations were lacking, while E gave a conflation of both readings.

b. BWHEGDC shared a lacuna in which illustrations of apparatus were promised by the other Mss. (at 70rb,31).

c. BWHE shared another omission (at 72rb,18) in which GD did not omit but pointed out that the illustration was missing.

d. BH, on the other hand, differed from WEG at 69ra,3 above, where BH neglected to mention a further figure, while WEG stated that the illustration was absent. In all these *loci*, the other manuscripts describe such illustrations as though they were present. Only A, however, has definitely retained the original pictures: they occur at intervals in the margin, and in the case of A - and possibly F - are contemporary with the manuscripts (although C and W are illustrated, the labelling to the pictures indicates that they are of later date than their manuscripts).

It will be useful here to determine how the manuscripts treat the remaining illustrations as well.

e. At 69rb,20, where an illustration of the aludel is supposed to occur, PAFKMZ, RTN, and DC read *ut in hac presenti conscriptione monstratur*. WE have *ut hic descriptione demonstratur que ad presens hic deficit*. G proffers *ut in descriptione demonstratur que ad presens hic deest*. BH, finally, omit the entire phrase.

f. At 71va,5, PAFKMZ and D agree in *Descriptio vero omnium vasorum distillationis cuiuslibet a nobis nunc tradatur*, while RT give *Descriptio vero omnium vasorum distillationis hec est*, and N has *descriptio vero omnium vasorum distillationis cuiuslibet ista est*, WEG read *Descriptiones enim omnium vasorum cuiuslibet distillatione hic deficiunt*, and C shows manifest signs of contamination in the reading "descriptio enim omnium vasorum distillationis cuiuslibet a nobis ista est." BH, finally, omit the entire phrase.

g. At 72va,33, where an illustration of dissolatory apparatus is called for, PAFKMZ, DC, and N give us *Descriptio vero eius que nunc diximus est hec*, while G has *descriptio eius que nunc dictum est hic deest*, and BWHE and RT omit the phrase entirely.

h. Finally, at 73rb,34 PAFKMZ, RTN, and BWHEDC provide the reading *Descriptio vero longorum vasorum et eorum in quibus fit omnis coagulatio est hec*; only G dissents, with *descriptio longorum vasorum hic deest et eorum in quibus fit omnis coagulatio*.

From all this, several things become distinct. First, the *Summa* in its most primitive form surely contained the picture of the descensory, and probably the others, since all the Mss. refer to at least that one figure, and most refer to the others as well.

Second, if we disregard the minor variants, and simply observe which of the manuscripts include references to the illustrations, which refer to the absence of the illustrations, and which omit any reference at all, a sudden homogeneity appears.

PAFKMZ and N agree in all eight cases, RT agree with PAFKMZ and N in seven of eight cases (exception - g.), C agrees in all cases but one (b.) with PAFKMZ and N, and D reads with PAFKMZ and N in all but two (b., c.). WEG, on the other hand, never treat the illustrations as though they were present: in seven of the eight cases, G refers to the absent illustrations (exception - b.), while WE do so in four (in three of the other cases - b., c., and g., WE omit any reference at all). BH, finally, fail to refer to the illustrations in all cases but two (a., h.).

This confirms our view that PAFKMZ and RTN should be considered apart from BWHEG, while also suggesting that BH form a distinct sub-family within BWHEG. It is clear, since WEG mention the pictures where they do not appear in their exemplars, that they must represent a somewhat more primitive tradition than BH, since the latter usually make no reference at all.

Further evidence that BH form a sub-group within BWHEG may be found in the following examples.

1. 67va,15. Here BH read *perfectionis transmutationem pervenire* uniquely, while the other manuscripts agree with A.
2. 67vb,22. Here all the manuscripts save BH share a gloss.
3. 73va,22-3. BHD here omit *quoniam scinderetur in partes*.
4. 82rb,11-2. BH here omit *quoniam vobis est inimica et adversaria et vos in miseria constituet*. Despite these disagreements, the numerous points of consensus between BH and WEGDC that we listed above clearly point to the fact that BWHEG form a unified family, though perhaps containing a sub-family BH.

But what of manuscripts D and C?

Manuscript D, as we mentioned in our treatment of PAFKMZ, lacks the long gloss at 63va,3, characteristic of BWHEG. In many other important areas, however, D reads with BWHEG and often T against PAFKMZ. We shall consider these here.

1. At 62vb,11, D has the following gloss shared in almost identical wording by BWHEG and T: *ave hoc est prius ponentibus usque ad versiculum restat columpna sequenti nobis*.

2. At 68vb,34, D shares the gloss in *paragrapho si igitur credimus te invenire* with BWHEG.

3. At 74rb,30, D reads closely with BHG in the following gloss: *s.i.e.s. secundus et ita in capitulo de mercurii lavacro et diximus supra in capitulo de sublimacione mercurii s. modus ergo* (WE read with the other manuscripts here).

4. At 74rb,32, D shares the following gloss in similar wording with BHG: *Sunt enim due mundaciones mercurii necessarie una per sublimacionem ad medicinam et hoc hic innuitur alia per lavacrum ad coagulationem et illa innuitur in s. secundus vero*. It is worth noting that WE have a more primitive form of this gloss: *Sunt enim due mundaciones necessarie una per sublimationem ad medicinam alia per lavacrum ad coagulationem*.

5. At 81vb,25, D has a gloss shared by BWHEG and T: *calcinationis et solucionis vel totum si possibile coagulabile*.

6. Finally, at 81vb,34, D reads closely with BWHEG and T in a further gloss: *calcinacionis solucionis coagulacionis et in temperamento ignis leniter assando conservacionis*.

That D shares some or all of the above glosses with BWHEG and T, but not with the other manuscripts, clearly necessitates that D be grouped with BWHEG and the contaminated T. The absence of the long gloss at 63va,3 can be explained on the assumption that D belongs to a more primitive branch of the BWHEG family than do its kin. Its exact affiliation is hard to determine, however, as D too betrays signs of contamination (e.g. variant readings linked by *alius* at 83rb,34, 83vb,5, and 84ra,8). At any rate, the possibility that D is more primitive than BWHEG *per se* makes it necessary to include its readings in the apparatus.

Manuscript C, unlike D, contains the long gloss at 63va,3, characteristic of the BWHEG family. But C has already demonstrated some evidence of contamination in the example at f. above, where it combined readings from PAFKMZ with RTN. Numerous examples are also found in the margin, in the same hand as the text.

1. At 70va,29 the scribe gives the meaningless *kimsi* in the text (probably for *kimia*, *chimia*, or *chimea*, as PF, RN, and BWHEG - T has *kimna*) with *seu chimina* in the margin (*chimina* or *kimina* is the reading of AKMZ and D).

2. At 71vb,12 he has *preparari* in his text (as BWHE and M - G and KZ have *preparati*), with *vel non preparari* in the margin (probably for the *preparati vel non preparati* of PAF, RTN, and D).

3. At 73rb,39 he gives *alterando* in the text (as BWHEG and D), with *vel alterato* in the margin (following the reading of PAFK and RN - MZ have *alteratione* while T combines both readings to get *alterato vel alterando*).

4. At 78vb,20 he gives *mundacionem* in the text (similar to the *mundificationem* of WE), with *alius mundificatur* in the margin (as the text of PAFKM, RTN, and BHD - G and Z give *mundificatur*).

It is therefore clear that C is a conflation of at least two traditions though based on the BWHEG (and now D) family. Hence there is no need to include C's variants in the apparatus.

From the foregoing analysis the reader will see that it is possible to produce a quite satisfactory critical edition of the *Summa perfectionis* by including representatives of the three families PAFKMZ, RTN, and BWHEGDC rather than reproducing the readings of all sixteen manuscripts. The absence of conjectural emendations in our edition will testify to the integral state of the text. We have taken our base manuscript, A, from group PAFKMZ, in part because it and possibly F are the only manuscripts to retain the author's original illustrations (albeit F has

converted these into quasi-perspective drawings). In order to verify the readings of A it is useful to have a second manuscript from the same family; hence we have chosen P, from the important Palermo *codex* 4Qqa10. On the same principle two manuscripts have been selected from the second family, giving us RT. The highly variant nature of the third group, BWHEGDC, made it necessary to include more than two of its manuscripts in our apparatus. BH alone make a good pair on the principle enunciated above, but the deviations of W and D made it necessary to include them as well. EG are well represented by BWH, finally, and C, being largely a product of contamination between BWHEGD and the other families, finds its representation in the apparatus at large.

### III. Manuscript Sigla

A. Paris, B.N. 6514, 61r-83v.

B. Oxford, Oxford University, Bodleian Library, Ashmole 1384, 1r-64r.

C. Reims 986, 1r-53r.

D. London, Royal College of Physicians 354, 1r-66v.

E. Montpellier, Bibliothèque universitaire, section médecine 260, 1r-48r.

F. Firenze, B.N.II, I, 364, 1r-27r.

G. St. Gallen, Vadiana 300, 37r-56

H. Glasgow, Glasgow University, Hunter 253, 130r-154r.

K. Cues 299, 50r-74v.

L. Paris, B.N. 7156, 89r-113v.

M. C.L.M. 353, 85r-116v.

N. New Haven, Yale University, Mellon 2, pp. 73-126.

P. Palermo, Biblioteca comunale 4QqA10, 110r-136v.

R. Firenze, Biblioteca Riccardiana 933, 28r-45v.

T. Cambridge, Cambridge University, Trinity College 1122,  
55r-79r.

V. Roma, Vaticanus Palatinus Latinus 1339, 25r-68v.

W. Wien, O.N.B. 2449, 1r-58r.

Z. Paris, B.N. 6514, 174r-186v.

#### IV. Description of the Eight Mss. Used in our Edition

Our intention here is to provide brief codicological descriptions of the eight manuscripts employed in making our edition of the *Summa perfectionis*. We shall not here list the other works contained in these *codices*, since some of them (e.g. Palermo 4QqA10) are of extreme length. Furthermore, none of these *codices* show signs of direct affiliation, so such a listing would add little to our knowledge of the *Summa's* transmission. Some of the following descriptions are dependent in part on manuscript

catalogues. The degree of dependency is proportional to the comprehensiveness and accuracy of the printed description. I have inspected all eight of the manuscripts *in situ*, with the exception of R.C.P. 354.

#### A. Paris, Bibliothèque nationale 6514, ff. 61-83v.

Our base manuscript has already been thoroughly described by James Corbett, *Catalogue des manuscrits alchimiques latins* (Bruxelles: 1939), I, pp. 18-36. We shall first translate Corbett's description of the codex, then adding some notes from other sources. "Bibl. nat. lat. 6514. - XIIIth-XIVth c.; parchment; ff. A-D, 193 - 66bis and 149bis; 360 x 252 mm.; 2 col.; several Italian hands; MS. composed of two different parts (ff. 1-85, ff. 86-191) combined in the XIVth c.; f. 38: "Liber M. Ja. de Meyse(?), 4 quaterni et sex carte"; f. 84v: very faint note of owner, which ends thus: "februarii 1329," and another around a sign manual: "Meioti(?) notarii quondam Bonacursii de Sancto Andrea de Verona est liber iste"; f. 191: "Iste liber est domini(?) Nicole Guasoyi(?) Canonici(?) Pad..."; old numbers: 203, CCXXXVI, 236 (Catalogue of Rigault, 1622), 4571 (Catalogue of Clement, 1682); modern half-leather. Cf. *Cat. Mss. Bibl. Reg.*, IV, 251-2."

Corbett's description should be supplemented by the following comments from the card-files of the *Institut de Recherche et d'Histoire des Textes*: "1) fol. 32v and 58 - name of one of the copyists - "Homodeus." 2) Fol. 84v - "Meiori notarii quondam Bonacursii de sancto Andrea de Verona est liber iste. 3) Folio 85v - Lib<er> m.i. ad hrd. (= Jacobus ab hereditatibus). The MS. passed in turn to the library of the dukes of Milan in Pavia and appears in the inventory of 1426. Cf. G. Billanovich, *Italia medioevale e umanistica*, 2 (1969), p. 168, and E. Pellegrin, *La bibliothèque des Visconti-Sforza*, p. 104, No. 144. 4) Fol. 191 - Iste

liber est domini Nicole Guaschi ca<noni>ci Paduani. 5)Fol. 38 - Liber M. Ja. de Meyse(?) 4 quaterni *et sex / carte*."

Further literature: Marcelin Berthelot, *La chimie au moyen âge*, Osnabrück: Otto Zeller: 1967 (reimpression of Paris: 1893) I; Lynn Thorndike, *A History of Magic and Experimental Science*, New York: Columbia University Press, 1934, III (App. III). Miss Maria Herrera has also sent me a very competent study of this *codex* made by herself, as part of her study of Marbode of Rennes (thesis presented to the *Ecole pratique des hautes études* for 1988 diploma).

*P. Palermo Biblioteca Comunale, 4QqA10.*

Description: XIVth c.; vellum; 138 x 99mm; ff. 442; either one Italian hand employing pens of varying width, or several different hands; 40 lines; red and blue initials; red paragraph signs; red rubrics; illuminated initials done in gold, light and dark blue, light and dark green, red, brown, white; binding of XVIIth c. white vellum; ends of pages dyed indigo.

Collation: due to the extremely fine vellum, tight sewing, and great length of this *codex*, I cannot offer an accurate collation, though the primary fasciculation is in tens.

Further literature: Luigi Boglino, *I manoscritti della Biblioteca Comunale di Palermo*, Palermo: Virzi, 1884, I; I. Carini, "Sulle scienze occulte nel medio evo, e supra un codice della famiglia Speciale," *Rivista Sicula di scienze, Letteratura ed Arti*, VII (1872), pp. 30-63, 138-182, 465-490; Giacchino di Marzo, *I manoscritti della Biblioteca Comunale de Palermo*, Palermo: Virzi, 1878, III.

*B. Bodleian Library, Ashmole 1384, ff. 1-64.*

Description: XIVth c.; vellum; 190 x 127 mm.; ff. 165; in at least three hands (a = ff. 1-64, b = ff. 65-97, c = ff. 98-137); 28

lines, 45 lines, and 45 lines; with catchwords; blue and red paragraph signs, initials; red rubrics; prickings intact; Early Modern binding of brown leather over boards, two functional bronze clasps, with newer spine.

Collation: Ten paper fly-leaves, 1<sup>8</sup>-3<sup>8</sup>, 4<sup>7</sup>, 5<sup>8</sup>-8<sup>8</sup>, 9<sup>2</sup>, 10<sup>8</sup>, 11<sup>8</sup>+1, 12<sup>8</sup>-18<sup>8</sup>, eighteen paper fly-leaves.

Further literature: William Henry Black, *A Descriptive, Analytical, and Critical Catalogue of the Manuscripts ... of ... Elias Ashmole*, Oxford: Oxford University Press, 1845.

*R. Biblioteca Riccardiana 933, ff. 28r-45v.*

Description: XIIIth-XIVth c.; vellum; 195 x 135 mm.; ff. 79; in one minute Italian hand, excepting table of contents; 59 lines; red rubrics, paragraph signs, emphasis of initials; prickings intact; wood, quarter leather cover.

Collation: 2 paper fly-leaves, 2 vellum fly-leaves, 1<sup>26</sup>, 2<sup>20</sup>, 3<sup>18</sup>, 4<sup>9</sup>, 2 vellum fly-leaves.

Further literature: Lami, Jo., *Catalogus codicum mancriptorum qui in Bibliotheca Riccardiana Florentiae adservantur*, Liburni: *Ex typographio Antonii Sanctinii et Sociorum*, MDCCLVI; Julius Ruska, "Übersetzung und Bearbeitungen von al-Rāzi's Buch Geheimnis der Geheimnisse," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin*, IV, III, (1935), pp. 153 [= 1] - 239 [= 87].

*T. Cambridge, Trinity 1122, ff. 55-79.*

Description: XIVth c., XVth c.; vellum; 218 x 143 mm.; ff. 193; written in at least five hands (ff. 15r-160r = one XIVth c.

hand, 160v-194v in at least 4 other hands); 44 lines; Gold used for first rubric, initial of first text; later initials in blue, red, or gold; red or blue paragraph signs; red, brown, blue, and green underlining; yellow, red emphasis; modern gray cardboard cover.

Collation: three paper fly-sheets, followed by four paper fly-sheets, 1<sup>5</sup>, 2<sup>8</sup>-6<sup>8</sup>, 7<sup>10</sup>, 8<sup>8</sup>-21<sup>8</sup>, 22<sup>12</sup>, 23<sup>7</sup>, three paper fly-sheets.

Further literature: Montague Rhodes James, *The Western Manuscripts in the Trinity College, Cambridge, Collection* Cambridge: Cambridge University Press, 1902, III.

*W. Wien, Ö.N.B. 2449, ff. 1-58*

Description: XIVth c.; vellum; 227 x 163mm.; 67 ff.; one Italian hand; 29 lines; first initial is red with internal yellow, violet, and red; XVth c. illustrations of apparatus at 18v, 20v, 21v, 23, 23v, 24v, 25v, 26v, 27v, 28v, 29v, 31v; defaced owner's signature under newer one on f. 1, saying - "Hic liber est Magnifici ac clarissimi Domini francisci Capelli Equiti(!) Dignissimi ac Ariminii Provisori(!)"; signature at 29 - "H.v. Hohenkann(?) A. 1545"; old library number at 1r - "XVI.F.81.MED.CX."; prickings intact.

Collation: three paper fly-sheets, one vellum fly-sheet, 1<sup>8</sup>-2<sup>8</sup>, 3<sup>4</sup>, 5<sup>10</sup>-7<sup>10</sup>, 8<sup>9</sup>, one folded, glued vellum fly-sheet, three paper fly-sheets.

Further literature: Hermann Julius Hermann, *Die Italienischen Handschriften Des Dugento Und Trecento*, in *Beschreibendes Verzeichnis Der Illuminierten Handschriften In Österreich, Neue Folge*, Leipzig: K.W. Hiersemann, 1928-30, V; Franz Unterkircher, *Inventar Der Illuminierten Handschriften...Der Österreichischen Nationalbibliothek*, Wien: 1957, I; Anon., *Tabulae codicum manuscriptorum...in Bibliotheca Palatina Vindobonensi... Vindobonensi: Venum dat Caroli Gerdaldi Filius*: 1864, I.

*H. Glasgow, Hunter 253, ff. 130-154.*

Description: XIIIth-XIVth c.; vellum; 260-190mm.; 161 ff.; double columns ff. 1-105, long lines, ff. 122-154, triple columns, ff. 155-159; one hand, excepting table of contents; 40 lines, 48 lines, and 53 lines; alternating blue or red initials, illuminations in gold, violet-brown, blue with white scrolling, green, lavender; catchwords. Formerly owned by John Dee, John of London (I.R.H.T. file: Fol. 1: "Io<hann>es Dee,/1556; fol. 104: "+imus aequorum/Cela secretum meum/J.D. Fol. 4, in hand of XIV-XVth c. - "Liber fratris Iohannis London in quo continentur..." John of London, first owner of the manuscript, offered it to the abbey of Saint Augustine at Canterbury).

Collation: one paper fly-leaf, two vellum fly-leaves, 1<sup>12</sup>-8<sup>12</sup>, 9<sup>9</sup>, 10 missing, 11<sup>8</sup>, 12<sup>12</sup>, 13<sup>12</sup>, 14<sup>9</sup>, 15<sup>7</sup>, 16<sup>8</sup>, three vellum fly-leaves, one paper fly-leaf.

Further literature: John Young and P. Henderson Aitken, *A Catalogue of the Manuscripts in the Library of the Hunterian Museum in the University of Glasgow*, Glasgow: James Maclehose and Sons, 1908.

*D. London, Royal College of Physicians 354.*

It has not been possible for me to examine this manuscript *in situ*. Fortunately N. R. Ker provides a description of the *codex* in his *Medieval Manuscripts in British Libraries* (Oxford: Clarendon Press, 1969), vol. I, pp. 205-206. Ker thinks the *codex* was copied in the second half of the XIIIth century. I shall quote his description here: "ff. ii + 84 + ii. 227 x 165 mm. Written space 163 x 110 mm. 26 long lines. Seven quires of twelve leaves, the first four in each quire marked respectively with one, two, three, and four dots, and the next seven with numbers v to xi on versos. 2-line initials in the

ink of the text touched with red as far as f. 22: after this point the spaces have not been filled. Binding of s. XX. Secundo folio *trarianum*. Written in England. "36" at head of f. I is the Old Royal College of Physicians number."

Further literature: Dorothea Waley Singer, *Alchemical Manuscripts in Great Britain and Ireland...*, (Brussels: Maurice Lamartin, 1928-31), vol. III, p. 1069, p. 1122, *et sparsim*.

Latin Text of the *Summa perfectionis*

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[61ra] <1> **Incipit liber Yeber de summa collectionis complementi occulte secretorum nature. Prohemium perfectionis in arte**

Totam nostram scientiam quam ex libris antiquorum abbreviavimus compilatione diversa in nostris voluminibus  
 5 hic redigamus in summa una et quod in libris a nobis scriptis diminutum est sufficienter in hac traditione huius nostri libri recompensavimus et ipsorum defectum supplevimus sermone brevi. Et quod occultum fuit a nobis in parte una  
 10 manifestum fecimus illud in parte eadem in hoc nostro volumine, ut sapientibus patefiat complementum tam excellentissime nobilisque partis philosophie. Scias igitur karissime

---

1-2. Incipit - arte: Incipit liber Gebri de summa collectionis complementi secretorum nature prohemium P Liber primus B Incipit summa Geberi de perfectione magisterii prohemium R Incipit Geber perfectionis magisterii T Summa perfectionis Geber de secretis nature. Et dicitur secunda philosophia. Est enim secunda pars philosophie que metheora nuncupatur, idest de hiis que fuerint in sublimi quando fit separatio puri ab impuri. W<sup>2</sup> Summa perfectionis Geber philosophy W Incipit summa Geber perfecti magisterii H *om.* D//4. abbreviavimus: abreviamus BH//5. redigamus: redegimus P redigimus RTWD//6. *post* hac *add.* alia summa A//hac: hac nostra W//7. nostri *om.* D//recompensavimus: recompensamus T//supplevimus: supplemus T//8. sermone: ratione R//brevi *om.*H//occultum: occultatum R//a nobis *om.* R//9. hoc *om.* BH//10. excellentissime: excellentissimum R//11. nobilisque: nobilis R//partis: partibus H//igitur: ergo TD// karissime *om.* D//

fili in hoc opere totam artis operationem in capitulis  
 generalibus universali disputatione sine aliqua diminutione  
 sufficienter contineri. Per deum qui secundum hunc librum  
 15 operatus fuerit finem huius artis adinvenisse letabitur.

Sed scias karissime quoniam qui principia naturalia in se  
 ipso ignoraverit iam multum remotus est ab arte nostra,  
 quoniam non habet radicem veram super quam intentionem  
 fundet. Et qui principia sua sciverit naturalia et causas

20 omnes non tamen adeptus est verum finem et proficuum huius  
 artis occultissime, habet tamen faciliorem aditum ad artis  
 principia, licet cadat ignorantia super intentione eius de  
 modo huius nostri operis. Et hic parum remotus est

---

12. artis: martis *ante corr.* artis *post corr.* A//13. diminutione *om.* A *add.*  
*in mg.* A<sub>2</sub>//14. deum: deum iuro BT deum vero H//qui: quicumque  
 R//15. fuerit: fuerit verum PBTWH//huius *om.* BRHD//artis: artis se  
 W//16. karissime: fili karissime W//quoniam: quod PW//*post* principia  
*add* non sciverit D//16-17. in se ipso: sed ea D//17. ignoraverit: ignorat  
 A//iam *om.* R//nostra *om.* BTHD//18. quam: qua R//19. fundet:  
 fundat BH// sua sciverit: sui sensit A//20. tamen: dum W//proficuum:  
 profundum A//21. tamen: tam A//22. licet: hic A alius licet *in mg.*  
 A<sub>2</sub>//super *om.* A *add.* *in mg.* A<sub>2</sub>//intentione: intentionem  
 BHWRT//eius: suam BH//23. huius *om.* BH//Et hic *om.* WD//23-24.  
 parum - introitu *om.* D//

ab artis introitu. Qui vero sciverit omnium

25 principia et causas mineralium et generationis modum  
 qui ex nature intentione consistit parum quidem aufertur ab  
 eo de operis complemento, sine quo non potest scientia nos-  
 tra perfici, quoniam ars in omnibus imitari non valet natu-  
 ram operibus sed imitatur eam sicut debite potest. Karissi-  
 30 me igitur fili secretum sit tibi quod pandimus - quoniam in  
 hoc artifices errant quia naturam in omnibus proprietatum  
 differentiis actionis imitari desiderant. Labora  
 utique studere in nostris voluminibus et ea sepissime  
 in mente tua revolvere nitaris, ut intentionem ex nostre  
 35 loquere modo veram acquiras, quia ex eis invenies super  
 quo mentem tuam fundare debeas. Et scias ex eis errores

---

24. omnium: nature BRTWH//*post* omnium *add* operibus D// 26.  
 consistit: consistitur T// parum quidem: parumque A //aufertur:  
 auferetur A//28. imitari: sequi BRTW//valet: valeat B//29. eam: eandem  
 TD//sicut: ut BRTWD//potest *om.* D//30. sit *om.* PRTWH//quod *om.*  
 PBRTWH//32. actionis: et actionibus W//33. utique: itaque  
 RW//sepissime: sepius RT//34. revolvere nitaris: revolve BRTWH //34.  
 nostre: nostro P nostra BRTH//35. loquere: loquela BRTH//modo *om.*  
 D//*post* acquiras *add* finem *in ras.* D//ex: in PWHD//36. quo: que P  
 quod BWD//mentem: intentionem vel mentem B//debeas: desideras D.

a te repellere, et in quibus imitari naturam possis in  
tui operis artificio.

<2> Sermo generalis in ordine capitulorum quatuor  
exercitationis totius. Rubrica

40

Ponemus igitur breviter tibi impedimenta omnia quibus  
in opere impeditur artifex ne verum finem adipiscatur, et  
dicemus ea que artificem huius artis oportet in se habere.

45

Secundo vero disputabimus contra ignorantes et sophystas  
qui propter eorum ignorantiam et impotentiam huius artis  
magisterii proficuum inquirendi artem interimunt et eam ponunt  
non esse. Ponemus igitur omnes rationes illorum et postea  
ipsas evidentissime destruemus, ita quod prudentibus patefiat  
aperte nullam illorum sophysmata continere veritatem. Et tunc

---

37. a te: arte A om. H//repellere: expellere B//et om. D//in quibus: ut  
scias in quibus BH scias in quibus RTWD//38. artificio: artificio T// 39-  
40. Sermo - rubrica om. codd. rell.//41. Ponemus: Ponamus  
BRWHD//igitur: ergo WHD//breviter: imprimis et breviter B primo  
breviter TW primo et breviter HD//tibi om. R//quibus: in quibus W//42-  
3. et - habere om. A//et dicemus: dicemus etiam BH Dicemus et W  
dicemus D//in om. TD//44. Secundo vero: primo D//sophystas:  
sophisticas D//45. eorum: suam RT//46. magisterii: magisterium  
R//proficuum: proficua T//47. Ponemus: ponamus T//illorum: eorum  
BWH//et om. H//48. ipsas: eas BRTWHD//patefiat: add. satis in mg. A<sub>2</sub>  
satis patefiat PR satefiat B satis patefiat TWD satis fiat H//49. illorum:  
eorum WHD//sophysmata: sophisticationem W//Et om. PBRTWH//Et  
om. D//tunc: tercio P secundo BRTHD om. W//

[61rb] disputabimus super principia naturalia que sunt de  
intentione nature, et ibidem super modo generationis et  
mixtionis eorum ad invicem ab opere nature. Tertio  
disputabimus super eorum effectus secundum antiquorum  
philosophorum sententiam. Quarto vero narrabimus principia  
5 que sunt de intentione huius nostri operis in quibus imitari  
naturam possumus, et modum permiscendi et alterandi  
secundum cursum naturalem cum causis suis et ad intentum  
nostri operis reducendi.

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1. principia naturalia: principiis naturalibus D//2. ibidem: idem T eiusdem  
D//super: de P//modo: materia BRD modum H//generationis  
om.T//alt. et om. BTHD//3. mixtionis: commixtionis T om. BHD//2-3 et  
ibidem - nature om. W//et mixtionis - nature: eorum adinvicem ab opere  
nature et ibidem super modo mistionis adinvicem ab opere nature R//3.  
eorum ad invicem om. T//ab: alio H//Tertio: Et consequenter P  
Consequenter R Insuper BWHD// 4. disputabimus om. A disputamus  
B//super om. BWHD//effectus: effectus scilicet consequenter BH  
effectibus T effectus consequenter D//5. sententiam: sermonem T  
summam H//vero om. RT//narrabimus: monstrabimus BWH//6. de  
intentione: ad intentionem D// nostri om. T//de - operis: ad huius artis  
intensionem et nostri operis W//7. possumus: possum R//8. cursum:  
cursu D//naturalem: nature BRTWHD//et om. TWD//intentum:  
intentionem BWHD//9. reducendi: reducendo BTWHD//

10 <3> Sermo generalis in executione primi capituli de  
impedimentis huius artis

Sunt ergo impedimenta huic operi supervenientia duo  
generaliter - naturalis scilicet impotentia et necessarie  
impense defectus vel occupationis laboris. Naturalem  
15 tamen impotentiam multipliciter esse dicimus, ex parte  
scilicet organi artificis et ex parte ipsius anime. Ex  
parte autem organi artificis multipliciter vel quia organum  
sit debile vel ex toto corruptum. Et anime impotentis  
multipliciter vel quia sit anima perversa in organis propter  
20 organa nil rectitudinis vel rationis in se habens sicut  
anima insani et fatui, vel quia sit fantastica, contrarium

10-11. Sermo - artis: Explicit prologus. Incipit liber primus. Prohemium ad  
summam intentionis huius libri que est de impedimentis huius artis in  
genere P De impedimentis quibus impeditur huius operis artifex BTWH  
Incipit prima pars de impedimentis huius artis in genere R De  
impedimentis quibus artifex impeditur D//12. Sunt: Nunc WD//ergo:  
igitur T om. D//duo: duo sunt W//13. generaliter: naturaliter  
D//naturalis: naturaliter D//scilicet om. BT//14. impense: indigencie  
A//laboris: labores TWHD//15. tamen: scilicet BH//multipliciter:  
multiplicem BRTWH//dicimus: diximus A//16. ipsius om. W// 17.  
autem om. BT//vel om. T scilicet RD//organum: scilicet organum W si  
organum R scilicet si organum T//18. sit: potest esse BH//Et: Ex PRT ex  
parte vero BWH//anime: anime natura P//impotentis: vero impotentia  
D//19. sit: est B om. H//propter om. T//20. organa: organorum  
defectum BH om. T// sicut: vel rationis sicut A//21. insani et fatui: insana  
vel fatua A fatui vel insensati T insani vel fatui D//

formarum susceptiva facile et indebite, et de uno scibili ad  
eius oppositum extensiva subito, et de uno velle ad eius  
oppositum similiter.

25 <4> Sermo particularis de impedimentis corporum artificum

Iam tibi generaliter determinavimus huius operis  
impedimenta. Nunc vero specialiorum sermone te alloquimur  
in hoc capitulo et magis aperte, et narrabimus tibi omnia illa  
impedimenta plenissime seriatim. Dicimus igitur si artifex  
30 non habuerit sua completa organa non poterit ad huius oper-  
is complementum per se devenire, velut si cecus fuerit vel  
in extremis detruncatus, quoniam non iuvatur a membris  
quibus mediantibus ars hec perficitur tanquam nature

22. et indebite: indebite D//et de uno scibili: de uno simili D//23. eius  
oppositum: eius apositum M suum oppositum W illius oppositum  
D//velle: universali R//eius: illius BRTW aliud H//24. similiter om.  
D//25. Sermo - artificum: De impedimentis operis ex parte corporis  
artificis P De impedimentis ex parte corporis BRTHD De impedimentis ex  
parte corporis artificis. Capitulum secundum W//26. tibi: igitur  
TWH//determinavimus: terminavimus RT//27. vero: autem  
BH//specialiorum: specialiore PW specialiori RD//sermone: ratione  
R//28. aperte: aperto BWH//alt. et om. D//narrabimus: nominabimus  
R//illa om. RTWHD//29. plenissime: planissime et BH//Dicimus:  
Dicamus R// igitur: ergo P//artifex om. ABRTWH//30. ad om.  
B//huius: hoc R//31. velut: ut BRTWHD//32. iuvatur: iuvabitur  
RTWHD//33. hec: ista BRTWHD//nature: naturalibus D//

35 ministra. Si vero fuerit artificis corpus debile et egrotum  
sicut febrientium vel leprosum quibus corpora membra  
cadunt, et in extremis vite laborantium, et iam etatis  
decrepitate senium, ad artis complementum non pervenit. His  
igitur naturalibus corporis impotentibus impeditur artifex in  
intentione sua.

40 <5> De impedimentis ex parte anime artificis. Rubrica

Premissimus tibi capitulum unum in quo narravimus  
sermone absoluto et manifesto impedimenta ex parte corporis  
artificis dependentia. Restat nobis narrare breviter  
impedimenta ex parte ipsius anime que sunt impedientia hu-  
45 ius operis complementum. Dicimus igitur quoniam qui non  
habuerit ingenium naturale et animam perscrutantem subtili-  
ter principia naturalia et nature fundamenta, et artificia  
que consequi naturam possunt in sue actionis

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34. ministra: ministrantibus PBRTWH instrumentis D//vero: autem  
BH//corpus: corporis D//et: vel H om. T//egrotum: egrum AT//35.  
febrientium: febricitantium RT//corpora: corporis A//37. senium: senes  
enim BH senum W//pervenit: perveniunt D//38. igitur: ergo P//corporis  
om. BR// impotentibus om.R//in: ab T om.W//40 De - artificis: De  
impedimentis ex parte anime D//ex: huius artis ex P// anime: anime  
Capitulum tertium W//artificis om. BRTWH// Rubrica om.  
PBRTW//41. Premissimus: Promissimus AR//tibi om.BRTWHD  
//narravimus: narrabimus A narramus P//sermone: ratione R//42.  
absoluto: absoluta BRTWH ab sonitu D//et om.BWH vel T//manifesto:  
manifesta BRTWHD//43. nobis om. BRWHD//narrare: videre R  
narrare et videre T//44. ex: de H//ipsius om. BRTWHD//post que add.  
maxime D//impedientia: impedimenta P// 45. complementum:  
complementi P//quoniam: quod P om. D//46. habuerit: habuerint  
W//47. nature: nostra A//48. naturam: rerum D//possunt: possint R//

[61va] proprietatibus non inveniet huius pretiosissime scientie  
veram radicem sicut sunt multi qui duram habent cervicem  
et omni perspicatione vacuum ingeniosa, qui vix communem  
intelligere sermonem queunt et opera similiter cum difficulta-  
5 te discunt vulgo communia. Ab his et multos invenimus  
animam habere facilem opinantem fantasiam quamlibet. Sed  
quod credunt se verum invenisse fantasticum est totum et  
rationi devium et errore plenum et semotum a principiis na-  
turalibus, quoniam eorum cerebrum in multis repletum fumosi-  
10 tatibus non recipere potest veram rerum naturalium intentio-  
nem. Sunt et preter istos alii qui mobilem habent  
animam de opinione in opinionem et de voluntate in voluntatem

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1. inveniet: invenit R// pretiosissime: pretiose RD//2. sicut: ut  
BRTHD//sunt om. W//3. et: in A om. B//qui: qui et D//post vix add.  
ratione D//4. sermonem: rationem BRTWH //queunt: possunt BTWH  
om. R//cum om. R//5. discunt: discunt negotiari BWH distinctionis  
negotiari T//et: etiam PR similiter T om. W// invenimus: iudicimus  
W//6. facilem: facile PBWD//sed: secundum H//7. fantasticum: fantasia  
BH//8. rationi: ratione diminutum vel rationi T a rationi H ratione D//et  
errore: errore B// semotum: remotum TH//9. eorum: illorum W//in om.  
PBRWH// in multis: multis D//10. recipere: recaperare A percipere P  
recipit D//11. Sunt: Sed sunt T//et preter: preter RT//alii: aliqui  
T//mobilem: in oblivionem T//12. opinionem: opiniones A//

sicut qui modo credunt hoc et idem volunt sine rationis  
 ullius fundamento post illud vero parum et aliud credunt  
 15 similiter et aliud volunt. Et hi tam mobiles  
 sunt ut vix minimum eius ad quod intendunt  
 complere possint, sed diminutum potius illud relinquunt.  
 Sunt similiter et alii qui aliquam videre non possunt  
 20 veritatem ex rebus naturalibus plusquam bestia,  
 velut mente capti, insani, et pueri. Sunt et alii qui  
 condemnunt scientiam et ipsam non esse putant, quos et  
 similiter scientia hec condemnit ipsosque ab huius precio-  
 sissimo fine operis repellit. Et sunt qui servi sunt pecu-  
 nie desiderantes hanc scientiam mirabilem et ipsam

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13. sicut: ut BRTWHD//qui: quod D//hoc et idem: hoc idem A et hoc  
 idem W et idem H//rationis: ratione H//14. ullius: istius B illius W//14.  
 illud: illum D//et aliud: aliud RW//15. similiter et *om.* R//Et hi tam: ita  
 B et ita RTWH et hi cum D//mobiles: molles D//16. ut vix: et vix R ut  
 T//minimum: minime T//eius: illud A// quod: illud quod BH//17.  
 complere: consummare PBRTWHD//possint: possunt BWH valeant  
 RT//illud relinquunt: delinquent PW relinquunt BH derelinquent R  
 delinquentur D//18. Sunt *om.* T//similiter *om.* R//et alii: alii  
 BWH//aliquam: nullam RT// non *om.* RT//19. ex: in T//20. velut: ut  
 BRTWHD//capti: rapti T//insani: et insani PWH et insana T//et pueri:  
 et pigri B pueri T *om.* W et pingui H//21. et ipsam non: nec ipsam  
 RT//quos et: quos R//22. similiter: naturaliter T//ipsoque: *om.* B quia  
 W et H//23. operis *om.* RTWHD//repellit: proculpellit BRTWHD//Et -  
 qui: etiam alii qui P alii qui BR alii T//servi sunt pecunie: propter  
 pecunie avaritiam T//24. scientiam: artem BRTWH//mirabilem *om.*  
 RT//

25 affirmantes, sed ipsa dispendia interponere timent. Ideoque  
 ipsam licet affirmant et secundum rationem ipsam investi-  
 gent, tamen ad operis experientiam non perveniunt propter  
 pecunie avaritiam. Ad hos igitur non pervenerit scientia  
 nostra. Qualiter enim qui ignoraverit et ipsam  
 30 scientiam investigare neglexerit ad ipsam perveniet?

**<6> De impedimentis huius operis extrorsum artificii  
 supervenientibus a casibus et fortuna**

Reduximus ad duo capitula impedimenta huius artis omnia  
 finem retardantia que sunt ex principiis radicalibus secun-

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25. affirmantes: affirmant vanam B affirmant R affirmant veram  
 TWHD//sed: et secundum rationem in BH verum R *om.*  
 TWD//dispendia: tamen dispendia B impensam R impensa tamen T  
 tamen W//ideoque: ideo BHD *om.* W//26. ipsam: illam PBWH  
*om.* RT//27. experientiam: perfectionem W//28. hos: hoc P//pervenerit:  
 pervenit PBRH//29. enim: autem BH//et ipsam: vel PBRTWHD//31-2.  
 De-fortuna: Sermo de impedimentis extorsum operis artificii A De  
 impedimentis casu supervenientibus B De impedimentis supervenientibus  
 casu similiter R De impedimentis causarum fortunarum supervenientibus  
*fort.* T De impedimentis contingentibus a fortuito et casu supervenientibus  
 W De impedimentis casu fortuito supervenientibus H De impedimentis  
 fortuito supervenientibus D//35. Reduximus: Deduximus B Reducimus  
 T//34. sunt: sit B//



- 35 dum naturam artificis huius pretiosi negotii. Expediit ergo  
narrare tantum impedimenta exterius supervenientia a contin-  
gentibus fortunis et casibus quibus impeditur hoc opus glo-  
riosissimum. Vidimus ergo quosdam astutos et ingeniosos  
minime ignorantes opera nature et ipsam in quibus  
40 est possibile sequentes principiis et operibus quibus est  
investigatio non fantastica in omnibus rebus que nature re-  
gulantur actionibus infra lunarem circulum. Hi tamen ultra  
paupertatem depressi ex dispensationis indigentia hoc tam

35 negotii: operis W//36. narrare: tamen narrare B//tantum om.B//a: ex  
BRH et WD//37. fortunis: formis vel naturis R fortunis naturis  
T//gloriosissimum: gloriosum BTW//38. ergo om. W//et om. RTD//39.  
opera: operationem T//et - quibus: que ipsam T//ipsam: ipsius AD om. P  
ipsa W//40. sequentes: sequaces P sequuntur B sequi in T//41. omnibus:  
communibus fort. H//nature: naturaliter P//42-3. ultra paupertatem:  
ultima paupertate PBRTWH paupertate D//43. depressi: compressi A  
dispersi B depressa H//ex dispensationis: dispensatione D et dispense  
omnis R//hoc tam: hoc tamen M hoc T hac causa W//

- [61vb] excellentissimum magisterium coguntur postponere. Sunt et  
multi alii preter nunc dictos curiosi vanis huius mundi cu-  
ris et sollicitudinibus detenti se in omni negotio seculari  
totos occupantes a quibus hec nostra scientia pretiosa refugit.  
5 Iam ergo tibi satis ex premissis capitulis patet quot  
sint ab hac arte distrahentia impedimenta. Concludimus igitur  
ex iam dictis quoniam oportet artificem huius operis in  
scientiis philosophie naturalis eruditum et provecum esse,  
quoniam qui tantum pecuniam et ingenium naturaliter profun-  
10 dum habuerit et desiderium in hoc artificio, non tamen  
ipsius finem acquirat nisi ex doctrina philosophiam natura-

1. excellentissimum: excellens RT excelsum D//magisterium: negocium  
sive magisterium BH opus et magisterium W//2. multi: om. R// nunc:  
iam RT//vanis: variis PBRTWHD//3. se in omni: se omni PRT cum B se  
cum H//4. totos: toto B om. R//a quibus: quos B H//hec nostra scientia:  
nostram scientiam W//pretiosa: pretiosissima BH//refugit: restringet  
D//5. ergo tibi: igitur B//ex premissis: expressis H//capitulis: capitulis vel  
causis BWH causis fort. R//quot: quod D//6. sint: sunt B sint vel fuerint  
T//distrhentia: retrahencia PRTD trahencia BWH//impedimenta om.  
H//post impedimenta add. De his que necessaria sunt artifice ut sit  
ydoneus ad hanc artem P Conclusio qualem oportet esse artificem huius  
artis R Que oportet artificem considerare W igitur: om.  
BH//Concludimus: Concludamus W//7. iam dictis: predictis  
PRTWD//8. scientiis: sententiis H//9. quoniam quitantum: quoniam  
quicumque P tantum quia quantumcumque B quia quantumcumque  
RTWHD//pecuniam et om. BTWH potest fort. R et D//10. et desiderium  
om. P//tamen om. B//

lem adeptus fuerit. Quia quod per ingenium naturale non adipiscitur huius defectui per doctrinam subvenitur. Oportet iterum altissima perscrutatione artificem iuari, per doctrinam enim quantamcunque scientiam acquisiverit, nisi ab industria iuuetur naturali, ad epulas tam pretiosissimas non invitabitur. In puncto enim errorem suum emendaret per suam industriam, cui remedium adhibere ignoraret si sola doctrina fundatus foret. Et errori similiter subveniret in puncto ex acquisita scientia per doctrinam, que per solam naturalem industriam evitare non posset, quoniam ars ab ingenio iuatur et ingenium ab arte similiter. Et ipsum similiter

12. adeptus: adeptum D//Quia: Quare A//quod *om.* T//13. defectui: deficiui *fort.* R defectus H defectu D//14. iterum *om.* BH igitur RTW//perscrutatione: perscrutantem R//iuvari: adiuuare B adiuuari RTWHD// 15. enim: quia D//15-16. ab - naturali: per industriam iuuetur naturalem W//16. pretiosissimas: preciosas BH//17. In: potest in T//enim: enim est A//suum *om.* W//emendaret: emendare T//adhibere: adherere B//19. fundatus: fundatur A//errori: errori suo BTWH//20. que: quem W//naturalem *om.* R//22. similiter *om.* BH//

necessarium est constantis voluntatis in opere fore, ut non modo hoc modo illud attemptare presumat, quia in rerum multitudine ars nostra non perficitur. Est enim lapis unus medicina una in quo magisterium consistit cui non addimus rem aliquam extraneam nec minuiimus nisi quia in preparatione superflua removemus. Oportet etiam ipsum sedulum operi usque ad ipsius consummationem insistere ut non opus detruncatum dimittat, quia nec scientiam nec proficuum ex opere diminuto acquireret sed potius desperationem. Expedi etiam ipsum huius artis principia et radices principales que sunt de esse operis non ignorare, quoniam qui principium ignorat

24. modo *om.* A//attemptare: acceptare B//25. multitudine: multiplicitate TWH//nostra: ista W//enim: et enim W//26. medicina: mediante B//quo: qua W//magisterium: totum magisterium W//consistit: quod asserit consistere *fort.* T//addimus: adminus D addimus *s.l.* D<sub>2</sub>// 27. quia: que R quod T//28. Oportet etiam: sed R Oportet igitur TW Oportet D//operi: opera A//29. consummationem: consummationi B//detruncatum: detruncet et W destructatum H//31. desperationem: desperationem et damnum PBRTWHD//etiam: enim B autem D//32. artis: operis W//33. quoniam: quia BRTWH//principium: principia BW//

35 finem non inveniet. Et nos tibi dicemus principia illa omnia sermone completo necnon et prudentibus sufficienter aperto et manifesto secundum huius nostre artis exigentiam. Expediit ergo similiter temperatum et parcum ad iram esse, ne subito propter ire impetum iam incepta dissipet et destruat. Similiter et pecuniam suam custodiat, ne presumptis eam vane  
40 distribuatur, ut si forte artem non invenerit consumetur in miseria depaupertatus et desperatione, vel ne forte cum iam ad finem huius magisterii per suam indagationem approxima-  
verit consumpta sint ipsius dispendia et verum finem miser

34. inveniet: invenit W//tibi om. B//illa om. BT//omnia: naturalia omnia BH//35. et: etiam R etiam et T//sufficienter: filii sufficienter R sufficientiam T//36. aperto: aperte B// secundum: sermone secundum T//huius om. BRTHD//nostre: communem R omnem T om. W//37. ergo om. PT etiam W// similiter: ipsum similiter W//ad iram: in ira BWHD//38. impetum om. A add. in mg. A<sub>2</sub>//dissipet: dissipat H//destruat: destruet BH//39. et om. B//presumptis: presumptive BRTHD presumptiose vel presumptive W//vane: varie P//40. ut: et R//invenerit: inveniat BH//consumetur: consumetur in ras. A relinquatur ut vid. in mg. A<sub>2</sub> relinquitur P relinquatur BRTWD relinqueretur H//41. depaupertatus: paupertatis PBRTWHD//et desperatione: desperatione B in desperatione THD//iam om. D//42. huius magisterii om. BRTWHD//per: propter R//approximaverit: appropinquaverit RT//43. consumpta: et consumpta P//consumpta - dispendia: bona sumpta sint eius dispendia T//ipsius:eius BRWHD//verum: sic verum B//miser: maxime miser T//

[62ra] violenter ex paupertate relinquat, sicut qui in principio cum ignorat prodigaliter suum thesaurum totum exterminat. Cum autem huic affines fuerint non habent ulterius ex quo laborent. Unde dupliciter hi tales in errore sepeliuntur, et  
5 quia pecuniam suam dispensaverint in rebus inutilibus, et quia scientiam quam perditis indagassent nobilissimam amittunt. Non enim oportet tua bona consumere quoniam vili precio si artis principia non ignoraveris que tibi tradimus et recte intellexeris ad completum magisterium pervenies.  
10 Si es tuum igitur perdideris non attendendo nostra monumenta que tibi in hoc libello scripsimus aperta et mani-

1. relinquat: relinquitur T//2. cum: qui A cum finem BH//ignorat: ignoraverit BRTH//exterminat: exterminant PRW//3. huic: hi R //affines: a finis B ad fines R ad finem T affinis H// fuerint: fuerit ABH sumere T//habent: habeat T fort. H habeant WD//ulterius: ultra RTWHD//4. laborent: laboret BH//hi: hic B om. RT//in errore: merore BRWHD//sepeliuntur: sepelitur BH//et om. RW// 5. dispensaverint: dissipat B dissipaverunt R dissipaverit H dissipaverint D//6. quam om. RT//perditis: cum perditis PBWHD om. RT//indagassent: unde indagasset B om. RT lene indagasset H//amittunt: admittunt A amittit H//7. enim om. H ergo P//tua: te tua RTW sua H//bona om. R //8. si: qui H//tradimus: trademus PBRTWHD//9. intellexeris: intelligeris H//10. es tuum: pecuniam tuam R pecuniam tuam vel es tuum T//attendendo: attendens BRWH attenderes T//11. monumenta: monita BWHD precepta RT//libello: loco BWH libro RTD//

12-13. festa, non nos inique corrodas nec nobis blasphemias iniungas, sed tue imputa ignorancie et presumptioni.

- 15 Non igitur hec scientia bene convenit pauperi vel indigenti, sed potius est ei inimica et adversaria. Nec etiam adinvenire nitatur sophisticam metam operis sed soli sit complemento intentus, quoniam ars nostra in potentia divina servatur et cui vult elargitur et subtrahit qui est gloriosus et sublimis et omni iustitia et bonitate repletus. Forte  
20 enim ex sophistici vindicta operis tibi artem denegaret et in devio erroris te detruderet, et ex errore in infelicitate et miseria perpetua. Miserrimus et infelix est qui

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12-13. nec nobis blasphemias *om.* R//13. iniungas: inferas: BTWH *om.* R  
feras D//imputa: imputes RT//14. igitur: enim BH// hec *om.* D//bene *om.*  
R//vel: nec B et RT//15. ei: illi RT *om.* D//et adversaria: et adversa  
BTWHD *om.* R //nec etiam: nec non etiam AD nec RW nec non T//16.  
adinvenire: invenire R//metam operis: operationem T//soli sit *om.* R soli  
T//17. intentus: intendat R intendat ne ex vindicta sophistici divina potentia  
tibi auferatur fortuna T //quoniam: enim RT//potentia: poteste B//divina:  
dei BRHD// 18. servatur: reservatur BRTHD// elargitur: eam largitur P  
eam elargitur BWH illam largitur R//subtrahit: aufert R//18-22. qui - qui  
*om.* R//19. et omni: *non legitur* W et in H//iustitia: scientia D//20.  
sophistici: sophisticii B//21. detruderet: traderit T//21. infelicitate:  
infelicitatem TWH//22. miseria perpetua:miseriam perpetuam  
BTWH//miserrimus: miserrimus enim TWHD//qui: quem BTWHD//

operis sui atque laboris finem verum denegat conspicere quoniam vite sue spatium semper in errore concludit et terminat.

- 25 Hic enim in labore constitutus perpetuo omnique infortunio et infelicitate obsessus totam huius seculi consolationem gaudium et delectationem amittit et vitam suam in merore sine proficuo consumit. Studeat similiter cum in opere fuerit omnia signa que in qualibet decoctione apparent in mente sigillare et illorum causas inquirere. Hec igitur sunt que artificii necessaria sunt ad artem nostram idoneo. Si vero alterum eorum que narravimus eidem defuerit huic arti non adhereat.

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23-28. operis - consumit *om.* R//23. operis: semper deus semper post  
operis P deus post operis BTWH//laboris: labore B//finem: sui finem  
W//verum: veritatem PD in veritatem BTWH//conspicere: conspice T  
pervenire et conspicere W//24. errore: merore PTWH in merore *in ras.*  
D //27. delectationem: letitiam BWHD senciam T//merore: dolore  
BH//Studeat: Studeas BRTWH studiat D//similiter: igitur D//fuerit:  
fueris BRTWH//29. sigillare: recordare R//30. illorum: eorum T//  
inquirere: investigare R//Hec: hec predicta BTHD hec precepta  
W//igitur *om.* D//artificii: artificii B//30-32. Hec - adhereat *om.* R//ad  
artem nostram *om.* BTWD//31. alterum: alicui alterum W//32. eidem  
*om.* TWHD//

## &lt;7&gt; Sermo generalis de argumentationibus sophistarum artem negantium

Quoniam in summa una huius nostri libelli iam premisimus  
 35 tibi omnia huius operis impedimenta et doctrinam tibi dedimus ad  
 artis adherenciam huius sufficienter, expedit nos secundum nostri  
 operis intentionem contra sophistas et ignorantes disputare, pri-  
 mo ipsorum rationes ponendo secundum quod premissimus ex prin-  
 cipio nos determinaturos esse, ultimo vero eas omnes interimere  
 40 et ostensione manifesta demonstrare sapientibus nil veritatis  
 continere. Sunt autem diversi qui eam negant et destruunt.

33. Sermo - negantium: Explicit liber primus. Incipit secundus. Prologus ad summam intentionis huius libri que est de argumentationibus contra artem et ipsorum solutionibus P He sunt persuasiones sophistarum BWH Incipit secunda pars de persuasionibus sophistarum et argumentis eorum R Hee sunt persuasiones sophistarum et argumenta eorum T Incipit liber secundus sive secunda pars nostri tractatus de persuasionibus et argumentis sophistarum et ignorantium qui hanc hanc(!) artem vituperant et eam dicunt non esseveram W<sup>2</sup> hec sunt suasiones sophistarum D//34. huius nostri libelli: huius nostri libri BRTHD nostri libri W//premissimus: principalis fort. R//35. post impedimenta add. que s.l. D//et: per D//tibi om. TBWH//huius operis om. R//alt. tibi: eius R//36. huius sufficienter: sufficit B sufficienter WH//expedit: oportet W//nos: ut A nunc P nobis R//37. operis: propositi D//sophistas: sophisticos P sophisticas HD //38. ponendo: ponentes AP disponendo R//ex: in BRTWHD//39. nos om. D//esse: fore BRTWHD//eas om. TW//omnes interimere: omnes interimendo BWH interimendo T om. R interimendo D//40. et om. BWHD//demonstrare: in determinando R//nil: nichil D//41. continere: continere denudabimus R//diversi om. R//qui: quidam qui T//eam om. R//

Alii vero simpliciter, alii ex datis supponunt eam non esse.

## [62rb] &lt;8&gt; Sermo generalis de argumentationibus sophistarum artem negantium. De negantibus artem simpliciter

Sunt enim aliqui asserentes artem non esse, simpli-  
 5 citer suam opinionem sophisticè taliter roborantes: distincte  
 sunt rerum species et diversitates, quia diverse sunt et dis-  
 tincte elementorum adinvicem in commixtione proportionem. Est  
 enim asinus ab homine diversus in specie quia multo diversam  
 habuerit in sui compositione elementorum proportionem. Sic et  
 10 in ceteris rerum diversitatibus est inducere, ergo et in  
 mineralibus. Ignota igitur miscibilium proportione qua  
 adipiscitur forma et rei perfectio, quomodo et mixtum formare

1. vero om. T qui W//simpliciter: simpliciter negant RT//alii: alii vero H//datis: dictis A datis et assumptis BH//supponunt: ex supponente P ponentes BH et a supponente RWD a supponendo T//non om. PMRTWD//post eam add. illam reprobant RT reprobasse W reprobant D//esse om. RT esse sicut in sequentibus patebit capitulis P esse dicuntur W//2-3. Sermo - simpliciter: De argumentationibus sophistarum artem simpliciter fore negantium P om. BRTWHD//4. aliqui: quidam RTW//artem: eam BH//simpliciter: simpliciterut prius diximus T simpliciter ut diximus R ut prediximus simpliciter BWHD//5. sophisticè om. RT//roborantes: corroborantes: P reprobantes H//7-11. Est enim mineralibus. om. R//7. in om. D//8. multo om. A add. in mg. A<sub>2</sub> multum T//9. sui: sua BH//10. ceteris: terris fort. B// ergo: igitur B genus T//11. Ignota: Ignorata R//12. adipiscitur: acquiritur R//mixtum: mixtum vel miscendum D//

scimus? Sed ignoramus solis, lune, et elementorum  
 proportionem, et ipsa formare ignorare debemus. Ex his igitur  
 15 concluditur inutilis est ars ista et impossibilis. Similiter  
 etiam et aliter arguunt magisterium nostrum interimentes.  
 Dicunt enim etsi proportionem elementorum scires, modum tamen  
 mixtionis eorum adinvicem ignoras, quoniam in cavernis et  
 absconditis locis et mineris hec natura procreat. Ergo cum  
 20 modum mixtionis eorum ignoras et hec similiter ignoras.  
 Similiter item si hec debite scires in mixtionis actione,  
 ignorares calorem equare agentem, quo mediante res ista per-  
 ficitur. Certam enim habet natura caloris quantitatem qua me-  
 tallata in esse deducit, cuius mensuram ignoras. Similiter et

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13. scimus: sciemus BRWHD nescimus T//Sed: Si PD Sed igitur B  
 Similiter si T//et: nec non D//13-15. Sed-impossibilis om. R//solis: sola  
 T solis et H//lune et: et lune B lune necnon WH//et elementorum:  
 elementorum T//14. proportionem: proportionem nec non et in aliis et  
 T//et: in D//ipsa: ipsam PBHD ipsum W//post Ex add. ideo ut vid. in  
 mg. A<sub>2</sub>//15. concluditur: concludunt PBTD concluduntur H//inutilis:  
 quod inutilis TWH//est: sit vel est T//ars: aliter ars B//16. etiam et: et  
 BR autem TH//arguunt: arguunt similiter W//magisterium nostrum  
 interimentes R//18. eorum om. BWH//ignoras: ignoramus B nescis R  
 ignorares W//18-20. quoniam - ignoras om. H//in cavernis: cavernis  
 P//19. absconditis: in absconditis RWD//mineris: in mineris RD//hec:  
 hoc BD//procreat: procreant: A//Ergo: Igitur B//20. mixtionis:  
 commixtionis W//eorum om. T//ignoras: ignores PBTW//21. ante  
 similiter add. facere D//item: iterum arguunt P iterum BD iterum arguunt  
 et RTW iterum arguitur et H//si hec: et si hoc BD si predicta R//in  
 mixtionis: immixtionis H//actione: actionem H//22. ante calorem add.  
 autem D//calorem: calore H//mediante: mediantes A//ista: ita D//23.  
 Certam: certa T//23. natura: unam T//24. deducit: ducit R//

25 alias nature causarum differentias agentium ignoras, sine qui-  
 bus non posset natura intentum perficere. His igitur ignoratis  
 et totus similiter agendi modus huius artis ignorabitur. Pre-  
 terea etiam rationem experientia tibi adduco. Tamdiu enim est  
 a viris sapientibus hec scientia requisita quoniam si possibi-  
 30 le esset ad eam per aliquem perveniri iam eam millies comple-  
 vissent. Similiter etiam cum philosophi nisi sint in suis  
 voluminibus eam tradere nec in eis veritatem reperiamus mani-  
 festam satis per hoc probabile est hanc scientiam non esse.  
 Similiter etiam multi huius mundi principes et reges thesaurum

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25. ignoras: nescis PR nescis sive ignoras W//sine om. T// 27. et om.  
 RD//similiter om. BRTWH//huius artis ignorabitur: ignoratur W//28.  
 etiam om. RTWH//rationem: ratione D//experientia: ex experientia  
 PBRW per experientiam T et experientiam H//adduco: adducto B//enim  
 om. R//29. viris: viris prudentibus R// requisita: perquisita PBWHD  
 quisita RT//29. quoniam: quia R quod T//possibile: vera R//30. esset-  
 complevisset: iam millies esset inventa R iam millesies foret inventa  
 T//aliquem: artem aliquam PBWH aliquam D viam s.J. D//perveniri:  
 pervenire WH//millies: millesies BWHD//eam: enim AD//31-44.  
 Similiter-etiam om.R//31. etiam: et BW autem T//nisi sint: noluerunt T  
 visi sint H//32. voluminibus: libris et voluminibus BH//reperiamus:  
 reperimus W//34. similiter: sunt D//multi: muli(!) P om. W//huius  
 mundi P//

- 35 infinitum et philosophorum copiam habentes hanc artem adinvenire desideraverunt. Non tamen ad hunc pretiosissime artis fructum pertingere potuerunt. Hoc utique satis sufficiens est argumentum quod ars sit frivola probativum. Similiter et in debilibus mixtionibus specierum sequi naturam non possumus, quoniam in formando asinum secundum naturam organizatum, sequi naturam non valemus. Asinum enim fingere ignoramus et consimilia quorum mixtiones sunt debiles et manifeste quasi sensibus, quare et multo magis metallorum mixtionem que est fortissima fingere ignorabimus, que est etiam

35. *post* habentes *adds.* qui D//adinvenire: invenire W//36. desideraverunt: desiderant et desideraverunt W// ad hunc *om.* W//pretiosissime: pretiosissimum PH//38. ars: ars hec PB//probativum: et reprobativa P Probant T//et: etiam P autem BH *om.* TW qui D//40 organizatum: organizatum orgatulatum(!) B//41. enim *om.* BTWH//42. consimilia: consimilium AD cetera consimilia P//44. est *om.* RH//etiam: in A *om.* BRW autem T //

- [62va] nostris experiētiis et sensibus penitus occultata, cuius signum est difficultas elementorum ex ipsis resolutionis. Similiter etiam non videmus bovem in capram transformari nec aliquam speciem in aliam per aliquod artificium reduci. Quomodo igitur cum metalla differant specie niteris adinvicem secundum speciem transformare ut de tali in specie tale in specie facias? Absurdum nobis satis videtur et a veritate data ex principiis naturalibus semotum. Similiter et in multis annorum millibus natura metalla perficit. Quomodo et tu in artificio transmutationis per annorum millia durare poteris, cum vix annorum centum metam

1-22. nostris - in *om.* R//nostris: nostris etiam A//2. difficultas: difficultates W//3. etiam *om.* W//videmus: vidimus P//in: et W//4. aliam: aliquam aliam TD//5. differant: differunt BTH//specie: secundum speciem D//6. niteris: inter se P in terris B in cetera T vel esse *ut vid.* D//secundum: scis illa secundum P illa secundum BTWHD//ut: si A//6-7. de tali in specie tale in specie: de tali specie tale in speciem A de tali in specie talem in speciem B de tali in specie tali talem speciem T de tali specie tale in specie W *fort.* H//7. nobis: hoc nobis P nobis hec D//videtur: hoc videtur WH//8. ex principiis: quo ex principibus D//data ex: data quo ex BWH devia et a T//semotum: remotum BH//9. et: etiam P *om.* BH//multis *om.* PBTWD milibus H//10. et tu *om.* B tu TW//transmutationis: permutationis P transformationis D//11. durare: perdurare P//metam: etatem BTWH

pertingere valeas? Si tamen ad hoc utique taliter  
 responderes quia quod non potest natura perficere in magno  
 temporis spatio in brevi per artificium nostrum complemus,  
 15 quoniam artificium in multis nature defectum complet,  
 dicimus tamen quia et hoc impossibile est in metallis  
 specialiter cum sint fumi subtilissimi qui temperata  
 decoctione indigeant ut in se ipsis inspissentur secundum  
 equalitatem humiditas etiam propria inspissetur et non  
 20 fugiat ab eis et relinquat ipsa omni humiditate privata qua  
 contusionem et extensionem suscipiunt. Si igitur per  
 artificium tuum volueris tempus decoctionis nature in

---

12. si: Et si W sed D//tamen: cum D//utique *om.* BW//13. responderes:  
 fuerit responsum BTWH//magno: maximo P magno quamvis H//15.  
 quoniam : quia B//artificium: artificia D//16. tamen: et B *om.*  
 TWHD//17. fumi subtilissimi: sine subtili elemento A//17-18. temperata  
 decoctione: temperatam decoctionem B//18. indigeant: indagent P  
 indigent BWHD//inspissentur *om.* W//secundum: secundum igitur  
 B//19. equalitatem: ergo qualitatem H//humiditas: humiditatis  
 BTWH//etiam propria: propria P *om.* BTWH//inspissetur: inspissentur  
 BH *om.* T inspisset W//20. fugiat: fugiant B//relinquat: relinquatur  
 W//ipsa omni: ipsa B omnia TWH//humiditate: tam humiditate BWH  
 iam humiditate T//qua: quam BW//21. contusionem: concussionem  
 PTHD//suscipiunt: suscipiant B//22. tuum *om.* H//volueris: vis  
 BTWHD//

mineralibus metallicis corporibus abbreviare ob excessum  
 caloris oportebit hoc facere, qui non equabit sed potius  
 25 humiditatem dissolvendo ex eorum corporibus dissipabit et  
 destruet. Solus enim temperatus calor humiditatis est  
 inspissativus et mixtionis perfectivus non excedens. Simili-  
 ter etiam esse et perfectio datur a stellis tanquam a primis  
 perficientibus et moventibus materiam generationis et  
 30 corruptionis ad esse et non esse specierum. Hoc autem fit  
 subito et instanti cum pervenit una stella aut plures ad  
 situm determinatum in firmamento ex motibus a quo datur

---

23-27. mineralibus-excedens *om.* R//23. metallicis: et metallicis PD  
 metallorum B et in metallicis T et metallorum WH//ob: per  
 PBTWHD//24. caloris: coloris//oportebit: oportet te B oportebit te  
 H//qui: quod T//equabit: equaliter BWH equabit W<sup>2</sup>//25. corporibus:  
 cordibus H//26. destruet: destinet D//27. non *om.* W *add.* W<sup>2</sup>//post non  
*add.* super D//28. etiam: et A *om.* R autem TD//esse et *om.* B//29. *pr.* et  
*om.* T//materiam: naturam BRTWH//30. non: non ad A//31. *ante*  
 instanti *add.* in PRTW//pervenit: pervenerit P//aut: vel W//32. situm:  
 insitum D//



perfectum esse, quia unaquaque res ex certo situ stellarum  
 acquirit sibi esse in momento. Et non est solus unus situs  
 35 immo plures et sibi invicem diversi, quemadmodum ipsorum  
 effectus sunt diversi et horum diversitatem et distinctionem  
 adinvicem pernotare non possumus cum nobis sint incogniti et  
 infiniti. Quomodo igitur supplebis defectum in opere tuo ex  
 ignorantia diversitatum situum stellarum ex motu earum?  
 40 Et tamen si situm unius aut plurium stellarum certum quo  
 datur metallis perfectio scires, non tamen opus tuum perfice-  
 res. Non enim est alicuius operis preparatio ad suscipiendam

33. perfectum: perfectionis PBRTWHD//unaquaque: unaquaque P  
 qualibet R//34-42. Et non-suscipiendam om. R//34. acquirit: requirit  
 T//est om. H//35. ipsorum: eorum W//36. effectus: effecta  
 PBHD//diversi: diversa PBHD//diversitatem: diversitate D//alt. et: ad  
 D//37. incogniti: penitus ignoti W//38. igitur om. T ergo WHD//38-39.  
 ex ignorantia: etiam et ignorantiam BTH et ignorantiam W et ignoras  
 D//39. post ignorantia add. in mg. diversitatum A<sub>2</sub>//sitiuum-earum: si  
 tuum intentum stellarum ex motu earum diversitatum perfectio suscitaret  
 A//diversitatum: diversitatem D//40. certum: cum P circum D//41.  
 datur: datur intelligi A//perfectio: perfectionem B//tamen om. D//tuum:  
 add. in mg. intentum A<sub>2</sub> intentum P tuum intentum D//perficeres:  
 inceptum perficeres BTHW//

[62vb] formam per artificium in instanti, sed successiva.

Ergo operi forma non dabitur cum non sit in instanti.  
 Similiter etiam in rebus naturalibus iste est ordo quoniam  
 facilius est eas destruere quam construere. Sed vix aurum  
 5 possumus destruere: quomodo igitur et construere possumus  
 illud? Propter has igitur rationes sophisticas et alias his  
 minus apparentes, credunt hanc artem divinam interimere. He  
 omnes sunt persuasiones sophistarum artem nostram simpliciter  
 fore negantium. Rationes vero eorum qui ex suppositione  
 10 negant artem ponam cum destructionibus illarum in sequentibus.

1-2. formam-instanti om. R//1. instanti: instanti est A//successiva:  
 successive T//3. etiam om. PR et W//rebus: rebus etiam W//4. est eas  
 destruere: destruuntur R//4-5. Sed - construere om. D//quomodo:  
 quoniam A quo et P//igitur: ergo BRW//et om. RTWH//construere  
 possumus: construemus R//6. illud om. D//post has add. predictas  
 D//has igitur rationes: hec argumentationes R//sophisticas: predictas  
 sophisticas BTWH//hiis: ab hiis BTWH predictis R//7. apparentes:  
 valentes R valentes vel apparentes T//credunt: add. multi  
 W<sup>2</sup>//interimere: destruere R non esse volentes eam interimere W<sup>2</sup>//He:  
 predicte R//8. omnes: omnes predicte BHD add. predicte rationes  
 W<sup>2</sup>//persuasiones: rationes P//nostram: hanc R//9. fore om. RW//vero  
 om. WH add. W<sup>2</sup>//qui: et D//ex om. BR//10. destructionibus:  
 distinctionibus B//sequentibus: sequentibus in uno capitulo sufficienter B  
 sufficienter in uno capitulo T sequentibus scilicet capitulis W sequentibus  
 in capitulo sufficienter itaque H//

Dehinc vero ad harum interemptiones nunc positaram transeundum a nobis est, prius ponentibus nobis super has veram intentionem ad operis complementum.

<9> Narratio perveniens per quam respondetur ad omnia sophismata  
15 artem negantium

Dicimus utique quod principia super que actionem suam natura fundat sunt durissime compositionis atque fortissime, et sunt sulphur et argentum vivum ut dicunt quidam philosophorum. Igitur quia durissime compositionis,

20 difficillime sunt resolutionis. Sed inspissatio eorum

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11. interemptiones: interemptionem BWH interpretationes R reprobationem T//nunc sufficienter itaque W//12. a nobis om. R nobis TW ave hoc ut vid. D//est om. W//ponentibus: ponentibus usque ad versiculum Restat secundo sequenti B ponentibus usque ad versiculum Restat in tractatu secundo sequenti H ponentibus usque ad versiculum in tractatu secundo sequenti TW ponentibus usque ad versiculum. restat columpna sequenti D//has: his BRTWHD//13. veram: naturam D//14-15. Narratio-negantium: De actionibus nature super principia naturalia per quod apertius responditur ad omnia sophismata artem negantium P De principiis naturalibus super que actionem suam fundat natura THD De principiis naturalibus super actionem suam fundat natura B De vera intentione philosophy super principiis naturalibus super quo actionem suam fundat natura propter quod sophisticè suum roborant argumentum R De principiis naturalibus super que actionem suam fundat natura Septem W//16. Dicimus: Diximus A Scimus B//utique: itaque BW om. R//suam om. R sua D//17. atque: difficillime atque T//18. ut om. B sicut RT//19. philosophorum: philosophi RTWHD//20. sunt om. BHD//

adinvicem et induratio taliter quod fiat in eis contusio et extensio per malei compulsionem et non confractio non est nisi per hoc: quod humidum viscosum in eorum adinvicem commixtione salvatur per successivam et diuturnam inspissationem et  
25 temperatissimam in minera decoctionem. Sed regulam tibi tradimus karissime fili generalem, quoniam non fit inspissatio alicuius humidi nisi prius fiat ex humido partium subtilissimarum exhalatio et conservatio ex humido partium magis grossarum, si sit humidum in mixtione superans siccum.  
30 Sed vera mixtio siccum et humidi, ut humidum contemperetur a sicco et sicco ab humido et fiat hec substantia una in suis partibus omniomera et temperata inter durum et molle et

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21. pr. et om. BH s.l. D//taliter: taliter est BH qualiter R taliter sunt D//fiat: fiant P//contusio: concussio PBTWHD//22. et non confractio: absque confractioe RT//post confractio add. s.l. confractio D//23. viscosum: unctuosum P//26. karissime fili om. R//28. exhalatio: excolatio A exhalatio vel exaltatio WH exaltatio D//et: et nisi prius fiat similiter RT//29. humidum: humidus A//superans: stans B//mixtione: commixtione RTWHD//30. Sed: et BRTWHD//vera: vera fiat B non D //mixtio: commixtio BW amixtio D//humidi: humidi non commixtio siccum humidi B humidi aut commixtio siccum humidi H//ut: est D//contemperetur: temperetur WH temperaturatur D//31. et fiat: ut fiat P//32. omniomera: omnomeria P omniomera idest omogeneia BD omogeneia omniomera vel omogeneia W omniomera homogena(!) H//

extensiva in contusione, non fit nisi per diuturnam mixtionem  
 35 humidi viscosi et subtilis terrei per minima quousque humidum  
 idem cum sicco et siccum cum humido fiat. Et huiusmodi subtili  
 vaporosi non fit resolutio subita immo paulativa et  
 in millibus annorum, et illud ideo quoniam uniformis est  
 principiorum substantia nature. Si subito ergo fieret ab eis  
 superflui humidum resolutio, cum non differat humidum a sicco  
 40 propter fortem mixtionem, resolveretur utique humidum cum  
 sicco, quare totum in fumum evanesceret. Nec separari posset  
 humidum a sicco in resolutione, propter fortem unionem quam  
 habent adinvicem. Huius utique videmus manifestam experientiam in  
 spirituum sublimatione, quoniam cum in eis per sublimationem fiat

33. contusione: concussione PTHD//non fit: et hoc non fit P sed hoc non  
 fit TWHD//diuturnam: diuturnitatem WH//mixtionem: mixtionis  
 BWH//34. viscosi om. W add. W<sup>3</sup>//minima: minime BH//35. siccum:  
 siccum idem RWH//fiat: idem fiat P//huiusmodi: huius RTWHD//36.  
 vaporosi: vaporis T//resolutio: subtilis resolutio R//subita: subito  
 WD//paulativa: paulatim BWHD//37. annorum: annis RT//est: esse  
 D//39. cum: quod D//40. mixtionem: permixtionem RD commixtionem  
 T mixtionem quam habent W//resolveretur: resolvere D//cum: a B//41.  
 quare: quia R//41-2. quare-sicco om. W add. W<sup>2</sup>//42. unionem:  
 mixtionem vel unionem T//42-3. quam habent om. R//43. habent: habet  
 ut vid. in ras. D s.l. habent D//43. adinvicem: huius itaque adinvicem  
 BH//utique: autem T//44. spirituum om. P//fiat: fit T//

[63ra] subita resolutio, non separatur humidum a sicco nec siccum  
 ab humido ita quod dividatur in partes totaliter mixtionis  
 eorum, sed tota ascendit ipsorum substantia aut parum ex eorum  
 componentibus dissolvitur. Resolutio ergo humidum, subtilis,  
 5 fumosi, successiva, diuturna, et equalis, est causa  
 inspissationis metallorum. Hanc quoque facere non possumus  
 inspissationem. Per hunc ergo modum naturam sequi non valemus.

1. subita: subito D//a sicco om. A//post sicco add. in ras. neque siccum  
 hoc D//1-4. non-dissolvitur om. H//2. mixtionis: mixtio R//3. ascendit:  
 conscendit A //4. Resolutio om. H// ergo: igitur B//5. diuturna: et  
 diuturna PBRWHD//6. inspissationis: spissacionis D//quoque: utique  
 B//7. inspissationem: inspissationis (-is in ras.) A//post inspissationem  
 add. in ras. causam A//ergo: trans. post modum PRTHD in mg. W igitur  
 (post modum) B//sequi: in hac sequi WD in hoc sequi PBRTH//  
 valemus: valemus non enim naturam possumus in omnibus proprietatum  
 differentiis actioni ... imitari ut diximus P valemus. Non enim possumus  
 naturam in omnibus proprietatum differentiis actionis imitari ut supra in  
 capitulo Karissime igitur propter hoc unde subiungitur hic Nostra igitur. B  
 valemus. Non enim possumus naturam in omnibus proprietatum  
 differentiis actionis imitari ut supra in prohemio diximus. RT valemus.  
 Non enim possumus naturam in omnibus proprietatibus differentiis  
 actionis imitari ut supra in prologo hic ut karissime. Igitur propter hoc  
 bene subiungitur Nostra igitur etc. W valemus. Non vero possumus  
 naturam in omnibus proprietatum differentiis actionis imitari ut supra in  
 proximo capitulo ut karissime. Igitur propter hec bene subiungit hic Nostra  
 igitur intentio. H valemus. non enim possumus naturam in omnibus  
 proprietatum differentiis imitari ut supra in prologo (?) hoc karissime  
 igitur propter hoc bene subiungitur hec nostra igitur et cetera. D//

Nostra igitur intentio non est in principiis naturam sequi  
neque in proportione miscibilium elementorum, nec in modo  
10 mixtionis ipsorum adinvicem, nec in equatione caloris  
inspissantis, cum hec omnia sint a nobis impossibilia et  
penitus ignota. Restat ergo rationes sophistarum interimere  
hanc excellentissimam scientiam ignorantium.

< 10 > **Sermo in solutionibus artem negantium simpliciter**

15 Si ergo dixerint nos proportionem elementorum et modum  
mixtionis eorum adinvicem et equationem caloris metalla  
inspissantis causasque alias multas et accidentia nature  
actionem consequentia ignorare, concedimus eis utique, sed  
non propter nostram hoc scientiam divinam interimunt, quoniam  
20 nec scire volumus illa nec possumus nec ad opus possunt

8. Nostra igitur: Solutiones ad persuasiones sophistarum Nostra igitur BW  
Solutiones ad persuasiones sophisticarum Nostra igitur D//

9. *post nec add. in mg.* adinvicem A<sup>2</sup>//9-10. in modo-adinvicem: in  
commistionibus adinvicem ipsorum R//10. *post mixtionis add. in mg.*  
similiter *in ras.* A//11. *hec om.* BWHD//a *om.* BRT//12. ergo: igitur  
D//sophistarum: sophisticarum D//*post interimere add. s.l.* dicencium  
D//13. excellentissimam: excelensam(!) B excelsam RTWHD//*post*  
ignorantium *add.* non posse esse D//14. Sermo-simpliciter: De  
intemtionibus rationum sophistarum simpliciter artem negantium P *om.*  
BWD Solutiones ad persuasiones mistionis sophistarum R Solutiones ad  
sophisticas persuasiones sophisticarum T Capitulum 8 W//15. Si: igitur  
BT//16. mixtionis: mixtionum P permixtionis W//16. eorum: illorum  
RTWD//equationem: equationis BTWH//caloris: calorem B//  
17. inspissantis: inspissantur B//18. actionem: in actione T//consequentia:  
consequentiam B consequentis T utique *om.* R//19. nostram *om.*  
R//divinam *om.* R//19-20. quoniam-possunt: quoniam nec scire  
possumus nec ad opus possunt pervenire nostrum nec etiam scire volumus  
A//possunt: potest B//

pervenire. Sed aliud ab hoc nobis principium assumimus  
aliumve generationis modum metallorum in quibus  
sequi naturam possumus. Si dixerint etiam philosophos et  
principes mundi huius hanc desiderasse scientiam et ipsam non  
25 invenisse, respondemus eos mentiri, quoniam et quosdam  
principes - licet paucos et maxime antiquos - et sapientes  
et nostro tempore repertos, iam ex sui industria hanc  
indagasse legimus scientiam. Sed talibus nec ore nec scriptis  
eam tradere voluerunt, cum indigni sint eius. Ergo quia non  
30 viderunt aliquos hanc scientiam possidere, cecidit super  
mentes illorum error, ut estiment nullos hanc scientiam  
invenisse. Ad hoc etiam si arguant fantastice asserentes

21. *post pervenire add.* nostrum D//aliud: alium D//ab hoc: ob ad hoc  
BWH//assumimus: consumimus P//22. aliumve: aliumque BRT aliud  
aliumque WH//23. Si: Et si T//*etiam om.* BRT et W//*et om.* R//24.  
principes *om.* R//huius *om.* BRH//mundi *om.* R//desiderasse:  
desiderare BH *om.* R//*et ipsam: et eam* BTWHD *om.* R//25.  
respondemus: respondebimus R//*et om.* D//quosdam: in quosdam  
HD//25-32. quoniam-etiam *om.* R//26. licet: et licet APBWD//28.  
legimus scientiam: scientiam A//scriptis: scripto vel scriptis W//29. eius  
*om.* BTHD//*post eius add. in mg.* nec tamen sudaverunt et laboraverunt  
pro ea habenda ut fuit Augustus cesar, Numa pompilius, ptholomeus, Iaves  
et Mambres, Hermes, et Kalid rex nimuentinus W<sup>2</sup>// quia: cum P//30.  
aliquos: alios B//possidere: plenare possidere W//31. illorum: eorum  
BTRWH//estiment: existiment W //32. Ad hoc: Adhuc PH//*etiam: ergo*  
T//*si om.* WH//arguant: arguunt BW//*post arguunt add.* sophisticate et  
W<sup>2</sup>//

impotentiam nostram non posse solum in debilibus mixtionibus naturam imitari, sicut in mixtione asini et bovis, ergo non in  
 35 fortibus, dicimus errorem suum esse multiplicem, quia in arguendi modo non cadit necessitas qua coartemur artem nostram non esse concedere, quia a simili, vel a maiori, ad minus, suam corroborant fantasiam et errorem, in quibus non contine-  
 40 tur necessitas sed contingentia ut in pluribus. Ostendimus quoque per aliam viam demonstrando illos nullam assignare apparentem similitudinem inter debilem mixtionis compositionem animalium et mineralium firmam et fortem. Et hoc ideo quoniam in animalibus et aliis viventibus in quibus compositio est debilis, non est perficiens solum proportio, neque miscibilia proportionis, neque  
 45 qualitates miscibilium, neque complexio, que sequitur ex illarum actione adinvicem et passione, que est ex aggregatione illarum

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33. nostram *om.* P//posse *om.* T//34. imitare: imitari RT//sicut-bovis *om.* R//et: vel PTWHD//non: nec W//35. fortibus: fortioribus R//dicimus: de eis A dicemus R//errorem - multiplicem *om.*R//suum: eorum W//esse multiplicem: multipliciter A//quia: et quia A quod R quia nec BH//in *om.* W//36. arguendi: agendi B//cedit: cadet R//36-39. qua-necessitas *om.* A quia ars destruat quia de maiori ad minus suam roborant fantasiam R//37. concedere: credere P//quia-maiori: quia a maiori non a simili P//38. quibus: quo T//38-40 et errorem - viam *om.* R//40. viam: rationem seu viam W//demonstrando *om.* B//40-46. demonstrando - illarum *om.*R//41. apparentem: sed apparentem T//inter: et T//debilem: debilem esse T//42. firmam: debilem T//quoniam: quia P//43. aliis: in aliis W//44. perficiens: sufficiens sive perficiens AB//proportionis: proportionibus H//45. complexio: commixtio TWHD//46. illarum: istarum W//

[63rb] primarum qualitatum. Sed est anima, secundum opinionem plurium, que est ab occultis nature sicut ab essentia quinta vel a primo motore. Et hoc etiam secundum sententiam plurium diximus, et huius occultum ignoramus. Ideo hec talia, licet in  
 5 eis sit debilis mixtio, perficere nescimus quia perfectivum, quod est anima, infundere ignoramus. Per hoc utique patet quoniam non est defectus ex parte mixtionis, quod non perficiamus bovem vel capram, sed ex defectu infusionis anime, quoniam sic debilem et magis debilem, et sic fortem  
 10 et magis fortem compositionem facere secundum viam et cursum naturalem imitantes artificium nostrum sciremus.

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1-22. *om.* R//1. Sed: Sed sicut W sicut H//2. est *om.* D//3. vel: nulla H//a primo: primo W//sententiam: sermonem P//4. diximus: dicimus BTH dicitur *in ras.* (-mus *s.l.*) D//4. et *om.* D//5. mixtio: commixtio BH perfectivum: perfectionem P//6. est: iam est A//per: et D//7. quoniam: quod B//9. sic: sicut W//et magis debilem *om.* P//et sic: sic W//10. viam et: viam et artificium sive A//

In metallis ergo perfectio minor est quam in eis, et versatur  
 illorum magis circa proportionem et compositionem perfectio  
 quam circa aliud. Ideoque cum in eis minor sit perfectio quam  
 15 in aliis, que narravimus liberius, ipsa perficere possumus,  
 illa vero non. Diversificavit ergo deus perfectus, altissimus,  
 et gloriosus, perfectiones adinvicem multipliciter. Nam in  
 quibus compositio que est secundum naturam fuit debilis,  
 in illis maiorem et nobiliorem perfectionem posuit, que est  
 20 secundum animam. Sed quedam fortioris condidit compositionis  
 et firmioris, sicut lapides et mineralia, sed in eis posuit  
 minorem perfectionem et ignobiliorem. Et ex mixtionis modo

12. ergo: igitur PTH autem W//12-13. ergo-illorum *om.* B//13. circa:  
 contra *fort.* P//perfectio: igitur perfectio B perfectio magis W *om.* D//14.  
 aliud: alia BTWH//Ideoque: Ideo quia T//15-6. possumus illa vero *om.* A  
*add. in mg.* A<sub>2</sub>//16. vero: enim D//non: non scilicet sensibilia et motiva,  
 illa vero sic scilicet metalla *in ras.* A//Diversificavit: diversificat B//ergo:  
 ideo T enim WH//perfectus *om.* PTWHD//17. et gloriosus: gloriosus  
 P//ante perfectiones *add. in ras.* perfectionem seu A//perfectiones:  
 perfectionem B//multipliciter: multiformiter PWH *fort.*//Nam *om.*  
 BTWH//18. est: fuit B *om.* WH//fuit *om.* B//19. que est: et que APD  
*om.* T//20-22. secundum-ignobiliorem *om.* T//20. Sed *om.* D//quedam:  
 quidam B//21. firmioris: infirmioris H//sicut: sint H//22. ignobiliorem:  
 ignobiliorem et que ex metallo consistit A ignobiliorem que est ex P in  
 nobiliorem W//Et: et que BD//ex: ut illam scilicet que ex T est ex  
 W//modo: modo sequitur et perficitur T modo sunt BH//

patet utique quoniam non est eorum similitudo  
 bona, quoniam non ignoramus bovem vel capram formare  
 25 ratione compositionis sed forme perfective, quoniam perfectio  
 in bove vel capra nobilior et magis est occulta ea que in  
 metallo consistit. Si autem aliter arguant quoniam non  
 mutatur species in speciem, dicimus eos mentiri iterum, sicut  
 consueverunt sepius quam verum dicere super his, quoniam  
 30 species mutatur in speciem secundum hanc viam - cum individuum  
 speciei unius in alterius mutatur. Videmus namque  
 vermem et naturaliter et per artificium in muscam converti,  
 que ab eo differt specie, et vitulum strangulatum in apes, et

23-7. patet-consistit *om.* R//23. quoniam: quod BTWHD//24. quoniam:  
 que B quia TWH//25. ratione compositionis sed *om.* R//compositionis:  
 compositionis et mixtionis T *om.* WH//sed *om.* WH//forme: ratione  
 forme TD *om.* W *add.* W<sup>2</sup>//perfective: perfecte D//26. capra: in capra W  
 //nobilior: nobilior est et perfectior W//est occulta: occulta W//ea: quam  
 ea PW//27. metallo: metallis BHD//Si: similiter BWH//post autem *add.*  
 et D//aliter *om.* R et aliter TWH//arguant: arguant BWH 27-28.  
 quoniam-speciem: species non mutari R//28. dicimus: dicemus R//iterum  
*om.* RT//sicut: ut vero B ut THD//28-9. sicut-his *om.* R//29. quam:  
 magis quam W//30. species: et species TWH//post species *add. s.l.*non  
 D//cum *om.* T//31. alterius: alienum *fort.* P//videmus: vidimus W//32.  
 post artificium *add.* naturale *in mg.* A<sub>2</sub> *in textu* PBRWHD//converti:  
 mutari PBRTWHD//33. que-specie *om.* R//strangulatum: transmutari  
 D//

35 frumentum in lolium, et canem strangulatum in vermem per  
 ebullitionis putrefactionem. Sed hoc non facimus, facit  
 autem natura cui administramus. Similiter et metalla non  
 mutamus, sed natura cui secundum artificium materiam  
 40 preparamus, quoniam ipsa per se agit, nos vero administratores  
 sumus illius. Et si per aliam rationem taliter arguant et  
 suam corroborent sophisticè opinionem, quod in millibus  
 annorum natura metalla perficit, tu in millibus perdurare non  
 potes, dicimus quoniam natura super principia sua secundum  
 opinionem antiquorum philosophorum agens perficit in millibus  
 45 annorum, sed quia principia illa sequi non valemus,  
 ideoque sive in millibus annorum sive in

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34. lolium: oleum D//canem: carnem BTWHD//strangulatum:  
 transmutari BTWHD transgulatum R//vermem: apes R//34-5. per  
 ebullitionis *om.* R//35. putrefactionem: liquefactionem scilicet ad  
 putrefactionem B *om.* R//Sed: et T//hoc: nos R//36. administramus:  
 ministramus BTWH//Similiter et metalla: Similiter metalla R et similiter  
 etiam metalla W et similiter in metalla H //37. secundum: per BRTWH  
 per *s.l.* D//materiam: aliam naturam BWD naturam R aliam materiam  
 per naturam T//38. preparamus: paramus R//vero: autem BTWHD *om.*  
 R//39. illius: eius BRTWHD//39-45. Et si-in *om.* R//39. arguant et:  
 arguant ut W//40. sophisticè: sophisticam W//41. annorum: annis  
 W//natura *om.* D//tu *om.* D//in millibus: in millibus annorum PBTHD  
 millibus annorum W//perdurare: durare BTWHD//42. potes: poteris  
 BW//44. valemus: possumus BTWHD//45. ideoque: ideo  
 BTWHD//annorum *om.* BTWD//

[63va] pluribus sive in paucioribus vel in momento hoc natura  
 perficiat, non tenet illorum persuasio. Quia autem in  
 principiis imitari naturam non possumus, iam ex precedenti  
 negotio sermone abbreviato determinavimus, et completiore  
 5 sermone in subsequentibus demonstrabimus. Secundum tamen  
 opinionem aliquorum evidentium et perspicacium, intentum suum  
 natura cito perficit, scilicet uno die vel breviori tempore.  
 Et si hoc verum sit, non tamen valemus in principiis naturam  
 imitari - quod manifestius ostensione sufficiente probabimus -  
 10 residuum tamen huius questionis confitemur totum, quoniam  
 verum esse concedimus. Et si dicant quod a situ unius aut

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1-11. pluribus-concedimus *om.* R//1. sive in: seu HD//2. perficiat:  
 perficiet TD//illorum: eorum T//Quia: quod P quoniam//autem *om.*  
 BTWHD//3. *post* possumus *add.* videmus enim quod in millibus annorum  
 natura non decoquit lapidem in calcem, quod homo facit in brevi tempore  
 suo naturali ingenio per accidentalem calorem ideo in metallis depurandis  
 ingenio et artificio hominis reducuntur ipsa ad puram et nobiliorem  
 substantiam in brevi tempore, quod natura tam cito eorum defectum  
 supplere non potest BTWH//4. negotio: negatione vel negative BH  
 negatione T negationem W negante D//abbreviato: obviato  
 D//determinavimus: declaravimus et determinavimus T//abbreviato:  
 obviato WH//completiore: completiori W//5. in *om.* H//subsequentibus:  
 sequentibus D//6. aliquorum: antiquorum W//intentum suum:  
 intentionem suam B//7. cito: subito BTW//uno: una AP//8. in: a  
 WH//9. sufficiente *om.* BTWHD//probabimus: demonstrabimus BTHD  
 determinabimus W//10. huius *om.* BTWHD//11. concedimus: credimus  
 BWD//dicant: dicatur BT//unius: unius stelle PBTWHD//aut *om.* R//

plurium stellarum datur metallis perfectio, quam ignoramus, dicimus nos scire hunc situm non expedire, quoniam non est species generabilium et corruptibilium quin ex individuis eius  
 15 alicuius fiat generatio et corruptio omni die, per quod patet itaque situm esse stellarum omni die perfectivum cuiuslibet speciei individuorum et corruptivum. Non ergo necessarium est stellarum situm expectare, esset tamen utile. Sed sufficit  
 20 solum nature disponere ut et ipsa sagax disponat sitibus convenientibus mobilium corporum non enim potest natura perficere sine motu et situ mobilium. Unde si nature artificium disposueris, et consideraveris quecunque ex contingentibus fuerint huius magisterii, debite perficietur

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12. plurium *om.* R//stellarum *om.* PBTWHD//13. expedire: expedit B//est *om.* D//14. quin: quoniam APT ut R//individuis: individuo T//15. fiat: fit T//per quod: quare W// 16. itaque *om.* BRTWH ita quod D//esse *om.* B//omni die *om.* R//16-18. omni - stellarum *om.* D//17. individuorum: et individuorum R//et corruptivum: corruptibilium et corruptivum T//18. expectare: expedire T//utile: inutile A//19. solum *om.* BRTWHD//et *om.* T//sagax: que sagax est PBRTWHD//20. convenientibus *om.* D//21-3. Unde-perficietur *om.* R//21. et situ *om.* W//Unde: nam P//22. disposueris: disposueris vel disponis T//et *om.* BTW//23. fuerint: fient W//perficietur: perficietur BWH//

sub debito situ per naturam sibi conveniente, absque  
 25 consideratione illius. Videmus enim cum vermem ex cane vel alio animali putrescibili deductum in esse desideramus, non consideramus immediate situm stellarum, sed dispositiones aeris circumscribentis et alias causas putrefactionis perfectivas preter illum. Et ex tali consideratione  
 30 sufficienter scimus vermes secundum naturam in esse producere. Natura enim sibi invenit convenientem situm, licet a nobis ignoretur. Et si dicant perfectionem in instanti dari, et preparationem nostram non in instanti fieri, et concludant ex hoc non perficitur ergo per artificium hec ars, dicimus capita

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24-42. sub-formam *om.* R//24. debito situ: proprio situ debito W//conveniente: convenientem PBTWHD//25.cane: carne BTWHD//26. alio: aliquo BTWHD//deductum: deductam D//desideramus: consideramus B//28. circumscribentis: conscribentis AP//29. perfectivas: perfectius B//30. sufficienter: sufficientes AP//producere: perducere T//31. convenientem: scilicet convenientem H//32. perfectionem: perfectiones BTWHD//dari: creati W//33. preparationem: propriam rationem BH per artem T//instanti fieri: in continenti finimus BWH in continenti .. sumus T in continenti scimus D//concludant: concludunt BTWHD//34. perficitur: perficietur PBTWHD//hec ars: huius artis BWH huius ars D//34-6. ergo - assimilari *om.* T//



35 illorum vacua fore ratione humana, et magis bestiis quam viris  
 assimilari. Concludunt enim ex premissis nulla se habentibus  
 habitudine ad id quod illatum est. Tantum enim tenet hec  
 argumentatio, "asinus currit, ergo tu es capra," quantum et  
 40 sua, et hoc ideo, quoniam et si non fiat preparatio in  
 instanti, non prohibet tamen hoc, quod forma vel perfectio  
 non possit preparato dari in instanti. Non enim preparatio  
 est perfectio, sed habitatio ad suscipiendam formam. Si  
 dicant etiam quod facilius est res naturales destruere quam  
 45 destruere, et concludant impossibile esse construere

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35. illorum *om.* B//magis-viris: non magis viris quam bestiis B//36.  
 premissis: his premissis H//nulla: nullam TH//habentibus: habente  
 W//37. habitudine: habitudinem BTH//tenet: valet B//hec: huius  
 BTH//38. currit: est currens T //39. hoc *om.* AB//et si: si B//40.  
 prohibet: et prohibet T//41. possit *om.* H//preparato: preparatio AP  
 preparatis T//42. Si: sed D//43. etiam *om.* R//destruere *om.* D *add. s.l.*  
 D//quam: quod D//44. artificium: artificia *fort.* P//et *om.* BH//aurum:  
 autem A//45. et *om.* D//concludant: concludunt BTWH concludit  
 D//esse: fore R//

[63vb] illud, respondemus eis taliter, quoniam non concludunt de  
 necessitate qua coartemur aurum non posse construi credere.  
 Nam cum difficillime destruat, difficilius construitur, non  
 autem impossibile est illud posse construi. Huius autem  
 5 assignavimus causam, quia fortem habuit compositionem, ideoque  
 impossibile est faciliorem habere resolutionem, ideoque  
 difficulter destruitur. Et hoc est quod facit eos opinari  
 impossibilem esse illius constructionem. Sed quia ignorant  
 compositionem ipsius naturalem, ideo illius constructionem et  
 10 destructionem artificialem ex cursu nature ignorant.  
 Attemptaverunt tamen forte quod sit fortis compositionis, sed  
 quante fortitudinis compositionis sit non attemptaverunt.

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1. illud: id R//Respondemus: respondes B//concludunt de *om.* R//2.  
 necessitate-credere: est necessarium R//qua *om.* D *add. s.l.* de qua  
 D//aurum: ad BW a domino H annon *ut vid.* D//non *om.* D//3-4. Nam-  
 construi *om.* P//3. cum difficillime: quod difficile B difficulter R quod  
 difficulter TWH difficultum D//destruat: iam construitur B destruitur R  
 construitur TBWHD//difficilius construitur: difficile destruitur B  
 difficulter construitur R difficulter destruitur TWH difficultum destruitur  
 D//4. est *om.* D//illud: ipsum non BWHD ipsum RT//*alt.* autem *om.*  
 BW *add.* W<sup>2</sup>//5. assignavimus: assignamus TWHD// ideoque: ideo  
 BTWHD//6. impossibile-habere: difficiliorem habuerit PTWH  
 difficiliorem habuit BRD//7. difficulter: difficiliter BH difficultum D//8.  
 impossibile; impossibile D//esse *om.* BR fore P//9-10. compositionem-  
 ignorant *ante* [4.] Huius *trans.* T//9. compositionem ipsius: illius  
 constructionem vel ipsius compositionem B illius constructionem  
 R//naturalem: componere naturalem P//11-26. Attemptaverunt-a *om.*  
 R//11. compositionis: destructionis W//

< 11 > De diversis suppositionibus huius artis secundum  
diversos et de eorum erroribus in generali comprehensis

15 Sufficenter utique tibi, karissime fili, sophistarum  
fantasias attulimus. Restat ergo ex quo te attentum  
promissione fecimus, secundum illam, ad ea que determinanda  
sunt ex ratiocinationibus artem negantium a datis transire.  
Quecunque tamen determinata sunt principia, sunt de intentione  
20 nature, quorum essentiam nos oportet disputare sufficientius  
in sequentibus. Post illam vero determinationem etiam de  
ipsis sermonem faciemus, prout sunt principia huius nostri  
magisterii. In prima tamen traditione, singularem de  
unoquoque principiorum faciemus sermonem, in sequenti vero  
25 universalem. Ex nunc vero, ad presens, rationes negantium

13-4. De-comprehensis *om.* A Solutiones artem negantium a datis BTH  
Rationes artem negantium a datis. Capitulum nonum W Rationes  
abnegantium a datis. Rubricum.D//15. utique: ergo P itaque BWH *om.*  
T//tibi *om.* BTWH//16. fantasias: fantasias et eorum interemptiones  
P//attulimus: retulimus BTWHD//ex quo *om.* BWH//te: tibi  
D//attentum: artis D//17. promissione: ut promissionem BH//fecimus:  
quod fecimus W//illam: viam promissionis BTWH illam promissionem  
D//ad: et B//ea: eam H//18. ratiocinationibus: rationa..onibus A  
rationibus D racinationibus B *add.* at solutionibus W<sup>2</sup> ratiocinationibus  
H//a datis: artis A ex datis P//19. tamen: autem B enim T//de *om.*  
B//20. essentiam: essentia B//21. illam: istam W//etiam: et WH//22.  
nostri *om.* W//23. traditione: narratione P//24. sequenti vero: sequentibus  
T//25. ad presens *om.* A *add.* in mg. A<sub>2</sub>//

a datis et ipsarum intentiones inprimis afferamus. Hanc  
utique artem supponentes multiplices ex intentione diversa  
fore comperimus. Alii quidem in spiritibus, alii vero in  
corporibus, alii in salibus et aluminibus, nitris et  
30 baurachiis, alii vero in omnibus rebus vegetabilibus hanc  
inveniri scientiam et magisterium affirmant. Ex his omnibus,  
hi quidem secundum partem bene et secundum partem male, hi  
vero secundum totum male hoc divinum magisterium estimantes  
tradiderunt illud posteris. Ex ipsorum autem errorum  
35 multiplicantium veritatem nos collegisse difficilis et  
laboriose cautele coniectura, longaque ac tediosa experientia

26. a datis: artem *in ras.* A *add.* in mag. a datis A<sub>2</sub> artem a datis  
T//intentiones: intemptions A interemptions P//inprimis *om.*  
PW//*ante* hanc *add.* De erroribus supponentium artem fore in diversis  
rebus in genere R//27. multiplices: multipliciter BWH//28. Alii quidem:  
Aliique A//in spiritibus: de spiritibus W//alii *om.* W// vero *om.*  
BRWHD quidem T//28-9. in corporibus *om.* W//29. alii *om.*  
BH//salibus: salis P salibus et: salibus et alii in mineralibus  
R//aluminibus *om.* R //nitris: vitris TD//30. alii *om.* R//*post* alii *add.*  
non D//vero *om.* R//*ante* omnibus *add.* spiritibus et A//rebus: ex T//30-  
1. hanc-magisterium: hoc magisterium et artem T//31. scientiam: artem  
PBRWHD//omnibus: autem omnibus PBRTWHD//32. hi: alii  
TW//quidem: quoque A *om.* RT//33. vero: enim D//estimantes:  
machinantes vel estimantes B affirmantes et exterminantes T//34. illud: id  
RWH *om.* T//Ex: Et A *add.* in mg. ex A<sub>2</sub>//35. multiplicantium:  
multiplicitatibus PMH multiplicibus BT//nos *om.* B//difficilis: difficilis  
BWHD difficulter R cum difficultate T//et: atque P//36. cautele *om.*  
R//coniectura: coniecturam *ut vid.* D//longaque: longa T//ac *om.* T//

multorum sumptuum interpositione contingit. Et illorum error  
 per nostre mentis rationem sepiissime militavit et  
 desperationem adduxit. Blasphemati sunt igitur in eternum,  
 40 quia blasphemias posteris reliquerunt ex errore suo, et  
 maledictionem super philosophantes effuderunt, et non veritatem  
 sed diabolicam instigationem post mortes eorum dimiserunt. Et  
 ego blasphemandus sim nisi errores illorum corrigam et  
 veritatem tradam in hac scientia, prout melius exigit hec ars.  
 45 Hoc enim magisterium occulto sermone non indiget nec manifesto  
 penitus. Tradimus igitur eam sermone tali quem

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37. multorum: et multorum P//contingit: contigit BWH//Et om. R//38.  
 rationem: ipsum T//militavit: multiplicavit T //39. sunt: sint PT//igitur:  
 omnes igitur B ergo T//in: qui in B//ante in eternum trans. quia  
 RTD//40. quia om. B//40-42. et-dimiserunt om. R//41. super: suam  
 super W//effuderunt: profuderunt PBTWH perfunderunt D//42.  
 diabolicam: diabolicans A//instigationem: instigationes A//post: potius  
 post PD//mortes: mortem BWH//dimiserunt: relinquerunt P//43.  
 blasphemandus: blasfemande A blasfemias eorum incurram R//sim: sum  
 PBTWH //illorum: eorum TW//44. hac om. W// ars: ars nostra  
 BRWHD//45 enim: tamen T//46. Tradimus: trademus BRWH tradamus  
 T//igitur: enim fort. H//quem: quam H ut B//

[64ra] prudentes latere non accidet. Hic autem mediocribus  
 profundissimus erit, fatuis autem terminos utrosque  
 miserabiliter concludet in hac una eademque nostra traditione.  
 Redeuntes igitur ad propositum, dicimus quod qui in spiritibus  
 5 eam esse ponunt sunt diversi multipliciter. Alii quidem ex argento  
 vivo, alii autem ex sulphure et huic affini, lapidem  
 philosophorum perquiri asserunt necesse esse. Et ab his  
 quidam ex marchasita, quidam ex magnesia, quidam  
 ex thutia, et ex sale armoniaco quidam. Quidam  
 10 vero in corporibus, et horum, alii in plumbo, alii in quolibet  
 aliorum corporum esse dicunt. Alii utique in vitro, et quidam  
 in gemmis, et alii in diversitatibus salium et aluminum et

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1. accidet: accidat T//hic: hoc B//2. profundissimus: profundissima  
 B//fatuis: fatuos BWH fatuus D//3. eademque: et eadem  
 PBRTWHD//nostra om. P//4. propositum: propositum nostrum  
 BH//qui om. A add. in mg. A<sub>2</sub>//spiritibus: speciebus fort. B//5. esse: non  
 esse A//quidem: quoque A//ex: in B//6. autem om.  
 BRTWHD//sulphure: sulphur D//huic om. T //affini: affini arsenico  
 scilicet BRWH alii ex arsenico T// 6-7. lapidem philosophorum: lapide  
 philosophico BH lapidem philosophicum RTWD//8. ex marchasita: in  
 marchasita A//magnesia: tutia D//tert. quidam: et quidam B et alii PRT  
 et WD//9. thutia: marchasita D//et - pr. quidam: Alii ex sale armoniaco  
 BWH et ex sale armoniaco T et ex calce argenti quidam R//Quidam: Qui  
 R//10. et horum: quidam in stagno P om. BRTWHD//alii in plumbo: Alii  
 in saturno BRTWHD//11. utique: quidem B itaque W//et om.  
 RT//quidam: et B//12. gemmis: gummis B//pr. et om. RT//alii om. H  
 diversitatibus: diversis generibus B diversis H//

nitrorum et baurachium, et alii in omni genere vegetabilium rerum. Et horum unicuique supponenti est adversarius secundum  
 15 suam suppositionem, et his adversans, credit arti simpliciter adversari, et secundum plurimum utraque secta rationibus est vacua.

**< 12 > Sermo particularis de negantibus artem per  
 suppositionem in sulphure**

20 Quidam igitur in sulphure supponentes eam inveniri, in sulphure laborem impenderunt, et ignorantes eius preparationis perfectionem, ipsam preparationem diminutam relinquerunt. Crediderunt enim solam mundificationem et purificationem perfectionem preparationis fore: hec autem per sublimationem  
 25 fit. Ideoque adductum est intentioni eorum ut estiment quod

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13. nitrorum: vitrorum PBHD *om.* T//*pr.* et *om.* B//baurachium: in utroque boracium T//14. rerum *om.* T unicuique: quilibet *fort.* T//*est:* aliud esse T// secundum: et sibi ipsi T//15. suppositionem: opinionem vel suppositionem A supponentem P//his adversans: his adversarius A his adversarii R ut apparebit his adversari T//arti *om.* P ars R artem D//simpliciter: et similiter simpliciter D//16. utraque: utique A//secta: sic D//*est:* esse D//vacua: vacuam D//18-9. Sermo-sulphure: De negantibus artem per ipsius suppositionem in preparatione sulphuris et arsenici P De supponentibus artem esse in spiritibus et primo de sulphure BWH De erroribus supponentium artem fore in spiritibus solum in specie R De erroribus supponentium artem ore in spiritibus et ... T De supponentibus in corporibus artem fore et primo de Iove. Rubricum. D//20. igitur *om.* B ergo W//inveniri: invenire D//21. et *om.* R//preparationis: preparationem T preparationes D//23. solam: solam per A//24. fore: esse BRTWHD//

sola sublimatio in sulphure sit perfectio preparationis in ipso, et similiter in suo compari, videlicet in arsenico, autumantes induxerunt. Venientes igitur ad projectionem, que est ad intentionem alterationis, viderunt illud aduri  
 30 et evanescere, et non in corporibus longam moram contrahere, et corpora relinqui ab eis magis immunda quam prius fuerant sine projectione illius. Quia ergo viderunt hanc delusionem in operis sui complemento, et longissimis fuerit temporibus revolutum in eorum pectoribus ex solo sulphure hanc scientiam  
 35 reperiri, et in illo non invenissent, arguunt non posse hanc scientiam in alio inveniri. Quare cum nec in hoc nec in alio inveniat, arguunt nusquam inveniri.

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27. videlicet: scilicet PRTWHD *om.* B//in *om.* BH//28. autumantes: arguantes *fort.* P estimantes BWH//induxerunt: et dixerunt D//28. igitur: autem W//29. illud *om.* R//31. eis: eo PBWH//magis *om.* B//fuerant: fuerint RD//33. sui: scilicet R//fuerit: fuerint A//34. eorum: ullo *corr.s.l.* ad illorum D//revolutum - pectoribus: opinati A//35. non: etiam non P//invenissent: invenisse W//arguunt: ideo arguunt W//posse: posse et B//hanc : etiam hanc W *iter. in ras.* D//36. scientiam *om.* PBRH//*ante pr.* in *add.* et D//37. inveniat: inveniant PBRWH inveniant T//nusquam: nunquam BWH//

## &lt; 13 &gt; Sermo de responsione predictorum

Respondentes eis utique, breviter dicimus eos in hac  
 40 parum scientia sentire et minime sapere, quia supponunt  
 solum sulphur esse medicinam nostram. Et si tamen hec vera  
 esset suppositio, in modo utique preparationis decipiuntur,  
 quia solam sublimationem credunt sufficientem esse. Sunt enim  
 tanquam puer ex principio nativitatis sue usque ad senectutem  
 45 in domo conclusus, non putans mundi latitudinem extendi ultra  
 sue domus latitudinem vel ultra quam oculo possit conspiciere.  
 Non enim hi in multis lapidibus laborem suum

SBD / FFLCH / USP

38. Sermo-predictorum *om. rell.*//39. utique *om. RT*//hac: hoc *rell.*//40. scientia *om. rell.*//41. medicinam: materiam AD medicinam *in mg.* A<sub>2</sub>//tamen *om. A* cum D//hec *om. B* hoc D//42. decipiuntur: sunt decepti *rell.*//43. Sunt: Est A //44. puer: pueri T//ex: a T//sue *om. R*//45. conclusus: conclusi T inclusus W//extendi *om. A*//ultra *om. A*//46. sue domus *om. AR* domum BRTWHD//latitudinem *om. ABRTWHD*//vel *om. R*//ultra *om. R*//quam: quod quam B *om. R* quod T//oculo: oculis BT *om. R* oculus WHD//possit *om. R*// conspiciere: conicere *in ras. A* conspiciere *in mg. A<sub>2</sub> om. R*//

[64rb] adhibuerunt. Non igitur potuerunt sentire ex quo  
 medicina nostra eliciatur, et ex quo non. Manus  
 suas etiam a laborum copia excusaverunt. Quis ergo laborum  
 perfectivus sit vel non, merito ignorare debuerunt. Sed quare  
 5 fuerit opus illorum diminutum? Dicimus quia adurenciam  
 in sulphure dimiserunt et fugam, que non solum non perficiunt,  
 verum et dissipant et destruunt.

## &lt; 14 &gt; Sermo de negantibus artem ex suppositione illius in arsenico

Alii vero in eodem et suo compari hunc lapidem inveniri  
 10 estimantes necesse esse, et profundius ad operis  
 consummationem accedentes, non solum per sublimationem  
 mundaverunt adurentem sulphureitatem, verum etiam remove

1. igitur: enim RT//2. medicina: materia R//non: vero T *om. W*//et: sed B//3.//Quis: Quid BWH//4. perfectivus: perfectivum BWH//vel *om. ABWH*//non *om. A*//merito: necessario non immerito T immerito W//ignorare debuerunt: ignoraverunt R//Sed *om. T*//quare *om. R*//5. illorum: eorum BH//quia: quod P//6. que *om. T*//6-7. non-verum et *om. BWHD* non RT//7. et destruunt *om. R* nec destruunt alia vero causa est erroris illorum quia quamvis in sulphure fugam dissipant adurentiam eorundem relinquunt in eodem et suo compari T//8. Sermo-arsenico *om. rell.*//9. vero: autem T//eodem: ipso BTWH//suo: in suo H//hunc *om. BWH*// inveniri *om. R*//10. estimantes: existimantes A *om. R* credentes T//esse *om. R*//profundius: in profundo D//12. mundaverunt: mundaverunt acuitate superflua non legitur P//adurentem: adurentiam BTWH//sulphureitatem: sulphuris BTWH subtilitatem R//verum *om. P*//etiam *om. P* et ipsum B et T//remove: ipsam remove BH eam remove W//

- conati sunt relictam in illo fugam, ad quorum projectionem  
 similiter delusio supervenit, quia non adhesit stabiliter  
 15 in his ipsis corporibus, sed successive ac paulative  
 evanuit, relicto corpore in priori sua dispositione, qui et  
 similiter interimentes, arguerunt ut primi. Et  
 eisdem ut primis respondentem, artem affirmamus  
 et eam scimus esse, quia vidimus et veritatem tetigimus.  
 20 < 15 > Sermo magis particularis de negantibus artem ex sup-  
 positione in sulphure per administrationem ulteriorem illius  
 Alii quia profundius in ipso viderunt, mundaverunt et  
 eius fugam et adustionem abstulerunt. Et factum est eis

13. conati: coacti T//relictam: relicta PRT et relicta B//illo: eo  
 BRTWHD//fugam: fuga PMBRTWH//projectionem: perfectionem  
 BWH//14. supervenit: pervenit BWHD//stabiliter: stabilire R//15. ipsis  
 om. W//ac: et BTWHD//16. priori: prima BRTWHD//et: cum R//17.  
 arguerunt: arguunt W//17-8. Et-primis om. R//18. primis: prius W//19.  
 veritatem: veritatem et necessitatem T//20-1. Sermo-illius om. rell./22.  
 post mundaverunt add. id R add. illud T add. eum WHD //et: eam B//

- fixum et terreum, nullam dans ignis calore fusionem  
 25 bonam, sed solam vitrificatoriam. Et ideo non potuerunt in  
 projectione illius corporibus permiscere. Ideoque arguunt ut  
 primi, et eisdem respondemus ut primis, quia opus diminutum  
 dimiserunt, nec illud complere sciverunt. Ingressionem  
 enim, que est perfectionum ultima, inquirere ignoraverunt.  
 30 In omnibus similiter spiritibus aliis est idem modus  
 preparationis, nisi quod in argento vivo et tutiis excusamur  
 a maiori labore, qui est ex remotione adustionis. Hec enim  
 sulphureitatem adustibilem et inflammabilem non habent, sed

24. fixum et om. B//nullam: nullamque H//ignis: ad ignis T// calore:  
 calorem T//25. solam: solum WH//vitrificatoriam: vitrificationem W//26.  
 proiectione: proiectionibus BHD// illius: ipsum P illorum BH om.  
 RTWD//permiscere: commiscere P permisceri B//Ideoque: ideo  
 BWH//27. eisdem: nos eis RT//28. illud: id R om. W//29. enim om.  
 H//perfectionum: perfectio RT perfectivum BWHD//ultima: ultimum  
 BWH//post ignoraverunt add. De negantibus artem per ipsius  
 suppositionem in preparatione aliorum spirituum P//30. similiter: similiter  
 similiter B// aliis om. BWH//idem: illud B//31. quod: quia W//tutiis:  
 thutia BH//32. Hec: hi D//maiori: minori A//ex: a W//33. et: nec W//

35 solam fugam. Magnesia vero et marchasita omne genus  
 sulphureitatis habent, plus marchasita, minus vero magnesia.  
 Fugam tamen omnes habent, plus tamen argentum vivum et  
 sal armoniacus, minus vero sulphur, et adhuc minus compar  
 illius, quarto vero adhuc minus marchasita, quinto vero et  
 40 magnesia minus illa, sexto vero et ultimo, minime omnium  
 tutia utraque fuga participans est, alia tamen plus, alia  
 vero minus. Et ideo propter illorum fugam, quibusdam  
 supervenit experimentatoribus delusio  
 vehemens in illorum operationibus preparationum, et

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34. magnesia: magnesie APRD//marchasita: marchasite APRD//omne  
 genus: ars igitur A//35. sulphureitatis: sulphureitatem APD//  
 marchasita: magnesia A//36. plus tamen: tamen magis T plus W//36-7.  
 et-sulphur: minus vero sulphur adhuc vero armoniac sal A minus et sal  
 armoniacum minus vero sulphur B //et adhuc: adhuc vero et D//37-8. et -  
 illius: et minus compar sulphuris A adhuc vero et minus compar illius P  
 adhuc vero minus compar illius B et adhuc vero minus compar illius T//  
 38. quarto vero adhuc minus: minor vero adhuc T quarto vero et adhuc  
 minus H//38-9. quinto-illa: et magnesia minor illa T//39. illa: illi  
 A//sexto vero: et sexto T//et ultimo: ultime D//alt. minime: minus  
 AB//omnium: omnibus A omnis T//40. fuga: fugam BTWHD//41. vero  
 om. BRWD tamen T//quibusdam: de W//42. experimentatoribus:  
 expermutatoribus T//43. vehemens: veniens T//in: et B//illorum:  
 ipsorum RT//preparationum: peractionem R//et: in D//

[64va] ipsorum projectionibus similiter. Ideoque oportet ut ipsi  
 arguant et interimant ut in sulphure supponentes, et eisdem ut  
 in sulphure supponentes respondemus.

< 16 > Sermo generalis de negantibus artem propter suppositionem

5 illius in administratione omnium spirituum cum corporibus

Sunt et alii nitentes sese in experiētiis spiritus in  
 corporibus figere, nulla alia preparatione huic perveniente.  
 Sed eisdem delusio similiter attulit angarias et desperationem  
 et coacti sunt ex ea non esse hanc scientiam credere, et  
 10 contra ipsam arguere. Est enim turbationis illorum causa atque  
 incredulitatis hec, quoniam in fusione corporum, spiritus illa  
 dimittunt nec eis adherent. Immo asperitatem ignis  
 aufugiunt permanentibus in ea solis corporibus, quoniam  
 pressuram impietatis ignis illius compati propter fugam non

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1. ipsorum: in ipsorum W//oportet ut: et PBTWHD om. R//2. arguant et  
 interimant: arguunt et interimunt *rell.*//ut in: ut ut B//2-3. et eisdem-  
 respondemus om. TD//4-5. Sermo-corporibus: De negantibus artem per  
 ipsius suppositionem in coniunctione spirituum non preparatorum cum  
 corporibus P om. BRTWHD// 6. nitentes sese: intendentes sese W  
 intendentes B intendentes se H//spiritus: species D//7. huic om. R//9. et  
 coacti: coacti T//10. Est: et R//enim: et T//illorum: eorum B//atque: et  
 BH//11. incredulitatis: credulitatis A sedulitatis vel incredulitatis W//hec  
 om. B hoc D//spiritus: species D//illa: ita BH corpora RT ea W//12.  
 nec: ut B//asperitatem: asperitate WH asperitare D//13. aufugiunt:  
 fugiunt RT effugiunt W//ea: eo RT//solis: solum W//quoniam: quia  
 W//13-5. quoniam-non om. B// 14. illius: illi A//compati: pati D//

- 15 possunt, que ab eis non est ablata. Accidit et similiter  
quandoque delusio quia secum corpora fugiunt ignem. Et hoc  
est cum non fixi spiritus profundo corporum inseparabiliter  
adheserunt, quoniam volatilis summa summam fixi superat. Unde  
et similiter ut primi arguunt et similiter ut primis eis  
20 respondemus. Tota ergo illorum reprobatio est hec: si corpora  
- filii doctrine - vultis convertere, tunc si per aliquam  
medicinam fieri hoc possibile sit, per spiritus ipsos fieri  
necesse est. Sed ipsos non fixos corporibus utiliter adherere  
non est possibile. Immo fugiunt et immunda reliquunt illa.  
25 Ipsos autem fixos non est possibile ingredi, cum terra facti

16. quandoque: quandoque de suo fugere A//quia: quia et PBR//fugiunt:  
aufugiunt P effugiunt BRTWHD//17. est om. W//cum om. A quando  
T//spiritus: species D//profundo corporum: in corporum profundo  
BWH//ante inseparabiliter add. non W<sup>2</sup>// 18. post superat add. causa  
erroris quia cum fuga spiritibus ablata non sit asperitatem ignis fugiunt et  
corpora sola relinquunt et cum inclusi corporibus fixi apparent non tamen  
sunt aut ab eis recedunt ipsis manentibus aut ambo similiter fugiunt  
T//Unde om. T//19. pr. et om. BWH//primi: prius T// alt. similiter: nos  
sicut R nos similiter T//ut primis: et primis RT ut primi H//eis: eisdem  
PBW //20. om. BH// reprobatio: remplacio H//hec: hoc D//21. filii  
doctrine om. RT filii doctrine H//vultis: vis BH//22. medicinam: materiam  
P// possibile om. R//spiritus: spiritum T species D//ipsos om. T//23.  
corporibus: in corporibus B//utiliter om. T//adherere: adiungi R om.  
T//24. Immo: quia BH// illa: corpora R illa corpora T//24-5. Immo -  
possibile om. D add. in mg. D<sub>2</sub>//

- sint que non funditur. Et cum inclusi corporibus, fixi  
apparent non tamen sunt. Aut ab eis recedunt ipsis manentibus,  
aut ambo simul confugiunt. Igitur cum in magis affini materia  
nullis modis sit possibile hanc artem inveniri, in magis  
30 ergo remota non inveniatur, ergo nusquam. Responsio utique  
nostra est hec, quoniam quod scibile est circa hoc non totum  
sciunt, ideoque nec operationem ex eo totam inveniunt.  
Consequentis igitur vitium per insufficientiam ponunt eorum  
robur.  
35 <17> De negantibus artem per ipsius suppositionem in corporibus  
et primo in stagno. Rubrica

27. aut: sed PH //ab: ab ab B//recedunt: recedant A//28. confugiunt:  
aufugiunt P fugiunt T//Igitur om. A similiter T//29. nullis: in illis A//sit:  
sic R//possibile: impossibile A posse R//inveniri: similiter inveniri  
B//magis: materia magis BH// 30. pr. ergo om. BTWH//non: nunc  
D//invenietur: invenitur RT invehetur fort. D//ergo nusquam: ergo  
nusquam vel nullis .... B om. RT//utique: vero utique B om. RT itaque  
W//31. hec om. W//scibile: subtile B stabile D// 32. sciunt: sciunt factum  
T//operationem: operatum A comperatum B//nec om. T//ex eo: ex ea T  
om. W//32. inveniunt: non inveniunt BTH//operationem: operantes  
D//totam: totum A//33. Consequentis: consequens P consequentes  
D//35-6. De-rubrica: Sermo universalis de negantibus artem ex illius  
suppositione in corporibus A De supponentibus in corporibus artem fore  
et primo in iove BWH De erroribus supponentium artem fore in  
corporibus et quibusdam aliis rebus in specie R De erroribus  
supponentium in corporibus artem fore et primo in iove T De  
supponentibus in corporibus artem fore et primo de iove D//



Quidam autem tamen posuerunt illam in corporibus, cum  
tamen ad opus pervenerunt, illusi sunt, estimantes stagnum  
utrumque, lividum scilicet et plumbeum et album albedine non  
40 pura, multum nature lune et solis assimilari et approximare,  
lividumque multum soli lune vero parum, album vero lune  
multum, soli vero parum. Ideoque horum aliqui autumantes  
stagnum, iovem videlicet, multum lune assimilari, in stridore,  
mollicie, et liquefactionis velocitate solummodo differentem,  
45 credentes ex superfluitate sue humiditatis liquefactum esse  
facile et molle similiter, ex substantia vero fugitiva argenti  
vivi in illo intercidente partes stridorem possidere,

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37. autem tamen *om.* BRT autem WHD//posuerunt: ponunt P//illam:  
artem scilicet illam BH artem illam T artem scilicet istam W artem  
scilicet illam D//in-cum *om.* D *s.l. non leg.* D//38. estimantes: ut  
estimantes A existimantes WD//38-9. stagnum utrumque lividum *transp.*  
utrumque lividum stagnum P// 39. lividum: humidum T//scilicet:  
similiter R//et *om.* BRTWH// plumbeum: plumbum PBTH scilicet  
plumbum D//post plumbeum *add. in ras.* et lividum A//et album: album  
P//41. lividumque: lividum quidem PBWH dicuntque plumbeum R  
dicuntque plumbum lividum T//*pr. vero om.* BRTWHD//*alt. vero om.*  
BTWH//42. vero *om.* D//parum: parum appropinquare T//*post parum*  
*add. prestare in delusionem ceciderunt ut fragetur illis quodcumque*  
*duorum corporum. Sermo particularis de negantibus artem ex illius*  
*suppositione in stagno. Rubrica A<sub>2</sub>//horum: eorum B//autumantes:*  
*estimantes BTWH//43. stagnum om. P//iovem videlicet om. RT//lune:*  
*huic in ras. A lune s.l. A<sub>2</sub>//in: et BWHD ut T//44. differentem:*  
*differentes B differens RT//46. similiter om. T//47. in illo om. D//*

[64vb] exposuerunt illum igni. Et calcinantes ipsum, tenuerunt in  
igne quantum potuit tollerare quousque album factum est in  
calce sua, quam postea volentes reducere non potuerunt, sed  
estimaverunt impossibile fore. Et horum aliqui reduxerunt ex  
5 illo aliquid, et stridorem ut prius et molliciem in illo  
invenerunt, et liquefactionis velocitatem. Ideoque crediderunt  
hoc impossibile esse per viam hanc, et adducti sunt in  
incredulitatem, ut putent artem indurationis illius inveniri  
non posse. Horum vero aliqui calcinaverunt et reduxerunt,  
10 et iterum scoria illius supertrahendo cum maioris ignis

---

1. illum: illud BW//1-2. tenuerunt in igne: dimiserunt W tenuerunt in igne  
W<sup>2</sup> *s.l.*//2. quantum: quem PR//tollerare: tollerari B//in: cum  
RT//reducere *om.* D *add. s.l.* D//6. invenerunt: inveniunt R//Ideoque:  
Ideo RT//7. esse *om.* PBRTWD//in: ad T//8. incredulitatem:  
credulitatem APR incredulitatem T//*add. hanc RT//sunt om.*  
R//inveniri: invenire H//10. et iterum: et sic sepe reiterantes et iterum  
BH//scoria: scoriam RTW//supertrahendo: subtrahendo BH//

expressione calcinaverunt et reduxerunt. Et sic sepe  
 reiterantes opus ad illum, viderunt illum induratum et sine  
 stridore. Quia ergo velocitatem liquefactionis non omnino  
 removerunt, erravit mens illorum, et estimaverunt ad illud non  
 15 posse perveniri. Horum itaque et alii volentes eidem duritiem  
 et retardationem liquefactionis cum administratione durorum  
 corporum prestare in delusionem ceciderunt, ut frangetur illis  
 quodcunque durorum corporum admixtum ei fuerit, nec iuvat in  
 hoc eos ulla preparatio. Ideoque cum neque duris neque  
 20 igne illum parare potuerint, excusaverunt se de longa mora  
 inventionis artis, quia eam impossibilem dixerunt. Et

11. expressione: expressiones D//12. *pr.* illum: illud BTW id R aliud  
 H//*alt.* illum: illud BRTWH//13. *post* stridore *add.* rediderunt T//14.  
 illud: id R//15. perveniri: inveniri A deveniri BWHD veniri R venire  
 T//*ante* horum *add.* non causa erroris sed causa ignorantie paucitatis  
 sciencie T//horum: ipsorum P//itaque: quid T//et alii: alii B quidem alii  
 R//*post* volentes *add.* volentes A//eidem: eiusdem B *om.* R//*post*  
 duritiem *add.* in *ras.* molliciem A *add.* in *mg.* in *ras.* auferre A<sub>2</sub>//16. *post*  
 liquefactionis *add.* in *ras.* et duriciem A//17. ceciderunt: devenerunt  
 W//frangetur: frangeret BWH//illis: et illud PW//19. ulla: aliqua P illa  
 BRTD ista W//*post* preparatio *add.* qua sciverunt et propter ignorantiam  
 T//20. igne: cum igne T//illum: illud BWH//parare: preparare  
*rell.*//potuerint: potuerunt RW potuerant D//Et *om.* R//

crediderunt, per hoc et contra artem arguentes instanter,  
 posuerunt illam non esse. Ex hoc et ab his addentes  
 multa medicamina, viderunt illa nullam mutationem facientia  
 25 nec ei convenientia, sed potius corruptentia et  
 contra illorum propositum agentia. Et ideo libros abiecerunt  
 et capita retorserunt, et artem frivolam esse dixerunt  
 demum, quibus obviantes respondemus responsione prima.  
 < 18 > Sermo particularis de negantibus artem ex illius suppositione  
 30 in plumbo

Eundem est in plumbo reperiri illusionis modum, solo  
 abiecto quod corpora non frangit, et quod citius redit a

22. instanter: instantes B//23. illam: eam PBTWHD//addentes:  
 adolentes D//24. viderunt *om.* B//illa *om.* PBH multa medicamina  
 H//mutationem: immutationem PMTD//facientia: facere R//25. ei: eis  
 BTWH//25-6. et contra illorum propositum agentia *om.* R//26. illorum  
*om.* T//*post* agentia *add.* his et aliis addentes multa medicamina viderunt  
 que illa nullam immutationem facientia nec eis convenientia sed potius  
 corruptentia T//libros: librorum W//abiecerunt: abiectione  
 BWHD//27. et capita *om.* R//retorserunt: retrorserunt P *om.* R//artem:  
 arguentes artem B//esse: fore T divinam H//dixerunt :*om.* B//28.  
 demum *om.* PBW//obviantes: obviantibus BH *om.* T//29-30. Sermo-  
 plumbo: De negantibus artem per ipsius suppositionem in plumbo P *om.*  
 BRTWHD//31. Eundem: Cumdem A Eundem igitur T//est: et  
 BH//plumbo: saturno BRTWH//reperiri: reperitur B est reperiri H//32.  
 abiecto: obiecto W adiecto D//citius: potius T//

calce sua quam iupiter. Lividitatem attamen suam remove-  
 non possunt, quia ignorant. Ideo per illud dealbare non  
 35 possunt dealbatione bona, nec per suam phantasiam potuerunt  
 illud stabilibus corporibus stabiliter sociare, quin contingat  
 illud per fortem ignis expressionem recedere a commixto. Et  
 illud quod maxime decipit illos in huius preparatione  
 supponentes in nullo posse scientiam inveniri nisi in ipso,  
 40 est quia post duas reductiones a calce sua, nullam duritiem  
 suscipit, sed maiorem potius mollitiem quam prius habuerit,  
 et in aliis similiter non viderunt illud emendari differentiis.  
 Et ideo cum in ipso putantes propinquius et melius

---

33. sua *om.* R//quam iupiter: iove RT//attamen: tamen RT autem  
 BWH//34. non possunt: nequeunt RT//36. illud: illum BWHD id  
 R//sociare: associare PBWH//quin: et quin P//37. illud: illum  
 D//fortem: fortis BRWH//expressionem: impressionem T//38. illud:  
 illum D//quod: quidem est quod BH quidem quod W//preparatione: *fort.*  
 preparatione P//39. in nullo: nullam R//40. est *om.* ABTHD //41.  
 suscipit: recipit BTWH//potius: post R//habuerit: habuit W//42. *post*  
 aliis *transp.* differentiis BWH *post* non RT//illud: illum D id R//43. ipso:  
 ipsa P//

[65ra] inveniri, et non inveniunt, coguntur per hoc credere  
 et argumentari scientiam non esse hanc sed delusionem.  
 Et ideo hi peccant ut priores.

< 19 > Sermo de negantibus artem ex illius suppositione  
 commixtione durorum cum mollibus

5 Alii vero componentes dura cum duris, mollia cum mollibus  
 propter convenientiam voluerunt corpora a sese invicem  
 transmutari et transmutare. Et illud non potuerunt propter  
 suam ignorantiam, ut permiscentes solem vel lunam cum venere  
 10 vel cum alio unoquoque metallorum non transmutant illa in  
 solem vel lunam transmutatione firma quin expediat ignis  
 expressione forti unumquodque illorum a commixtione separari,

---

1.per: propter T//2. argumentari: arguere BH//*post* scientiam *transp.*  
 hanc *rell.*//3. hi *om.* BRTWHD//4-5. Sermo-mollibus: De negantibus  
 artem per suppositionem ipsius in quolibet corporum et eorum  
 commixtione adinvicem. Rubrica. P *om.* BRTWHD//6. Alii: Sunt alii  
 T//vero *om.* R//dura: durum BWHD//mollia: mollem B et mollia T  
 molle WHD//7. a sese invicem: a se invicem PR adinvicem BWH ad se  
 invicem T//7-8. voluerunt - potuerunt *om.* D//9. vel: et D//10. vel cum:  
 vel BTHD et W//non: et non B sed non T//transmutant: transmutent  
 BWHD//illa *om.* BT//10-11. vel-firma *om.* R//11. vel lunam: et lunam  
 BW//*post* lunam *add.* in//expediat: accidit B accidat RTWH//ignis: ex  
 ignis B//12. expressione: impressione T//forti *om.* B//

- vel comburi, vel ad priorem sui naturam redire. Quedam vero ex eis plus durant in commixtione, quedam vero minus, ut a nobis sufficienter determinatum est. He itaque delusiones supervenientes propter ignorantiam faciunt hos tales de hac diffidere arte, et illam arguere non esse.
- 15 **<20> Sermo particularis de negantibus artem ex suppositione per ulteriorem administrationem durorum cum mollibus**
- 20 Alii autem intimius et profundius super hoc inquirentes cogitaverunt et ingeniati sunt, et viam voluerunt invenire, ut dura mollibus unita ea stabiliter indurarent, et perfecta imperfectis ad perfectionem reducerent, et generaliter ad

---

14. eis: his W ex eis D//15. a nobis: alibi BWH//determinatum est: determinabitur in subsequentibus P//post est add. in libro de investigatione perfectionis T//he itaque: igitur huius T he utique HD//16. propter ignorantiam: ex ignorantia R //hos: eos RT illos B//tales om. T//hac: hoc P//16-7. de hac diffidere arte: ab arte desistere W//17. et illam arguere non esse om. R //illam: eam BWH//18-9. Sermo-mollibus om. rell.// 20. autem om. R//intimius et om. R vicinius et T//22. ea: eo T//post stabiliter add. induxerunt ut stabiliter A//post indurarent add. unita scilicet W scilicet HD//22-3. perfecta imperfectis: perfecta imperfecta P imperfecta perfectis R imperfectum perfectis T//23. perfectionem: perfectum BWH//alt. ad: a BWH//

- se invicem transmutarentur et transmutarent mutatione firma. Et ideo voluerunt similitudinem et affinitatem illorum invenire, tum quidem per medicinas, tum vero per ignis administrationem, videlicet attenuando grossa sicut venerem et martem, et inspissando subtilia sicut est iupiter et sibi simile. Et aliqui eorum credentes hanc administrationem perficere, delusi sunt in commixtione horum duorum corporum,
- 25
- 30 vel quia frangibile fecerunt omnino, vel omnino nimis molle non alteratum a duro, vel nimis durum non alteratum a molli. Et sic convenientiam non invenerunt, et ideo artem esse negaverunt.

---

24. transmutarentur: transmutatur B//et transmutarent om. D//mutatione: transmutatione BRW//25. voluerunt: volunt RD//similitudinem: similitudines W //affinitatem: affinitates W//illorum om. R//26. pr. tum om. T//quidem om. BRTWHD//vero om. W//27. videlicet: scilicet BRTWHD//sicut: ut BRTWH//28. sicut est: ut BTWHD sicut R//iupiter: iovem BRTWHD//28-9. sibi simile: saturnum T similem WH//30. perficere: perficerem H//in: et in A//31. pr. omnino: ideo D//nimis: fort. minus P nimium D//32. non alteratum: al non teratum(!) A //nimis: omnino nimis BH//33. convenientiam: convenientia H//esse om. R//

35 <21> Sermo de negantibus artem per suppositionem illius in  
ultima durorum cum mollibus administratione

Alii vero adhuc et profundius perspicientes, alterare  
voluerunt corpora cum animarum suarum extractione, et cum  
extracta anima omnia alia alterare similiter. Et ad illud non  
40 potuerunt eorum experientia pervenire, sed delusi fuerunt de  
intentione sua, per hoc estimantes artem non posse inveniri.

Alii vero solo igne ipsa perficere conantes, delusi  
fuerunt in opinione sua, quia ad illud pervenire  
nesciverunt, et hi eam ex hoc non esse putaverunt,

---

35-6. Sermo - administratione *om. rell.*//37. adhuc: ad hoc B *om.* R//*post*  
adhuc *om.* et BRTWH//38. voluerunt: volunt H//corpora: corda H//39.  
omnia alia alterare: aliam animam exaltare BTWHD//similiter *om.*  
A//40. potuerunt: potuit BRWH//eorum: illorum T//sed: et T//fuerunt:  
sunt D//41. estimantes: existimantes A//inveniri: invenire T//42-4. Alii -  
non *om.* D//vero: autem PBH//ipsa: eam B//43. fuerunt: sunt BH//44.  
et hi: hi R//ex: vel ex R//esse putaverunt *om.* D//

[65rb] quibus omnibus obviamus ut prius.

<22> Sermo de negantibus artem ex illius suppositione in  
gemma et vitro et similibus

Qui vero in vitro et gemmis illam posuerunt, experti sunt  
5 per vitrum et gemmas in corporibus alterationes facere et non  
potuerunt, quia non alterat quod non ingreditur. Et ipsum  
quidem vitrum et gemme non ingrediuntur, ideoque non alterant.  
Sed et si conati sunt vitrum secum unire, cum vix hoc possint,  
non tamen propositum habent, quoniam vitrum ex corporibus  
10 faciunt. Et propter hunc errorem, estimant errorem super  
totam cadere, et sic eam non esse, quibus respondemus eos  
operari in non debita materia: ideoque indebite terminantes,

---

1. quibus - prius. *om.* D//quibus: In quibus P//obviamus: obviavimus  
R//prius: primis B//2-3. Sermo-similibus: De negantibus artem per illius  
suppositionem in vitro et gemmis. Rubrica. P *om.* BRTWHD//4. Qui :  
Alii A//illam: eam PBWH//5. alterationes: alterationem T//et non: non  
T//6-7. ipsum-gemme: quia vitrum et gemme T//7. quidem: quoque A  
quod W *om.* D *add.* D<sub>2</sub>//et: neque A nec D//ideoque: et ideo R ideo  
BTWD//8. Sed *om.* P//et si: si B//secum: sic BWHD secum sic T //cum  
*om.* H//hoc: hoc non R//possint: facere possint T//10. estimant:  
existimant BW//11. totam: totam artem *rell.*//non *om.* A// 12. in non  
debita: indebita A non in debita BWH in debito D//materia: natura W  
modo D//ideoque: ideo W//indebite: in debito modo T//terminantes:  
determinantes B//

non possunt hanc ex eorum erroribus artem interimere.

<23> Sermo de negantibus artem ex illius suppositione  
in salibus et aluminibus

15 Sunt et alii supponentes eam inveniri in salibus et  
aluminibus, nitris et baurachibus. Possunt quidem et in his  
experiri, sed eam non posse haberi in his putamus. Ideoque si  
20 post suam experientiam paucam utilitatem transmutationis  
inveniunt, videlicet solvendo et coagulando et assando, non  
interimant hanc artem divinam, cum necessaria sit et scita.  
Possibile est tamen in his omnibus aliquam alterationem  
inveniri, sed remota est valde et maxime laboriosa. Adhuc  
vero et in aliis crescentibus omnibus magis laboriosa

---

13. artem *om.* R//*post* erroribus *add.* multiplicatam H//14-5. Sermo-  
aluminibus: De negantibus artem per illius suppositionem in salibus et  
aluminibus et nitris et bauracibus P *om. rell.*//16. et *om.* RT//eam: hanc  
BH *om.* W//17. aluminibus: in aluminibus T//17. nitris: vitris BTHD et  
nitris W// baurachibus: uracibus A bauraciis BTWH//18. non-haberi:  
inveniri minime PRTWH invenire B invenire minime D//his: eis  
*rell.*//Ideoque: ideo quod T//20. inveniunt: invenerunt PD invenerunt  
R//videlicet: scilicet BRTWHD//et coagulando: coagulando PRTD//et  
assando *om.* D//non: et A ut T//21. interimant: interimant vel  
exterminant T//hanc: itaque BWHD//divinam *om.* BRTWHD//scita:  
certa PBTWH//22. his *om.* T//aliquam: aliam B//23. valde *om.* R//*post*  
laboriosa *add.* De negantibus artem per suppositionem illius in  
vegetabilibus. Rubrica. P//

25 fore probatur. Ideoque qui eam in vegetabilibus omnibus  
ponunt, possibile quidem ponunt, sed non eis, quoniam potius  
deficerent in labore quam laboratum perfici sit possibile.  
Ideoque et si hi tales artem suis laboribus non inveniunt,  
artem nullis laboribus inveniri posse argumentari non licet.  
30 Prius autem dicti errantes unam medicinam suam posuerunt, et  
nullam aliam supposuerunt preter illam. Et hi quidem iam  
redarguti sunt omnes. Alii vero multi et quasi infiniti  
harum omnium rerum compositiones aut quarundam sub diversa  
proportione facientes ignoraverunt, et inscianter  
35 incedunt. Et error illorum in infinitum extenditur, quoniam

---

25. probatur: primam *ut vid.* D//qui: quidam A per R//omnibus *om.*  
BWH//26. eis: est eis T// 27. deficerent: defecerunt RT//laboratum:  
labor autem R laborem T//28. Ideoque: ideo BWHD//hi *om.* T//suis:  
sub R//29. nullis-licet: nullis invenire posse laborem argumentum non  
habent B penitus reprobare non licet RT nullis laboribus inveniri posse  
argumentum non habent WH nullis inveniri posse laboribus argumentum  
non licet D//*post* licet *add.* ut nullis inveniri laboribus posse supponere  
T//30. Prius autem: Omnes autem prius dicti PBRTD Omnes autem  
predicti W//unam: utique W//medicinam: materiam BR naturam D//31.  
supposuerunt: supponunt T//quidem: quidam H//iam: ideo W//32. *post*  
omnes *add.* De negantibus artem per illius suppositionem in commistione  
plurium rerum adinvicem P//33. harum: horum D//compositiones:  
compositionem *rell.*//*post* rerum *add. mg.* vel aut quarundam  
compositione sub diversa procreatione faciendo P//aut: aliarum T//34.  
proportione: proportionem R preparatione W procreatione D//  
ignoraverunt: ignorantur BD//inscianter: si scient A non scienter P//35.  
incedunt: insciantur B incedunt H//Et error: error P in errorem BW  
errorem TH//extenditur: extendunt BTWH//

infinita est diversitas proportionis miscibilium et  
 infinita est diversitas numeri rerum miscibilium, et in his  
 ambabus infinitatibus infinite contingit errare, aliquando ex  
 superabundantia, aliquando ex diminutione, et his impossibilis  
 40 est correctio. Sed nos quoque longitudini et sermonum  
 prolixitati parcentes, super infinitis insistere nolumus,  
 quoniam scientiam universalem trademus brevibus locutionibus,  
 qua evidenter infinitatem suorum errorum emendare poterunt, et  
 illos corrigere. Nunc vero principia naturalia disseramus  
 45 secundum omnes eorum causas, ut ex principio  
 in illorum commemoratione te attentum fecimus.

---

36-7. proportionis-miscibilium: numeri rerum miscibilium et infinita  
 diversitas proportionis R numeri rerum miscibilium et infinita diversitas  
 proportionis vel procreationis miscibilium T procreationis miscibilium  
 D//36. proportionis: *add. mg.* vel procreationis P procreationis B  
 preparacionis WH//37. est *om.* B//numeri *om.* PBH preparacionis  
 W//his: huius T//39. impossibilis: non est D//40. correctio: correptio  
 A//quoque: quidem P//et: etiam B//sermonum: sermonis BWH//41.  
 nolumus: nolimus A//42. universalem: utilem R//43. infinitatem: infinita  
*a.c.* A infinitati *p.c.* A infirmitatem D//44. illos: illa A illorum errores B  
 illos errores THD aliorum errores W// 44-6. Nunc-fecimus *om.* P *add.*  
*mg.* Nunc vero principia naturalia disseramus secundum omnes eorum  
 causas ut ex principio te attentum fecimus in memoracione illorum P//44.  
 disseramus *om.* A *add. in mg.* A<sub>2</sub> disceptemus W//45. ut: et ut W//ex: in  
 T//46. commemoratione: memoracione BRTWHD//fecimus: fecimus.  
 Explicit Liber primus. B//

[65va] <24> **Sermo universalis in principiis naturalibus secundum  
 antiquorum opinionem**

Innuimus ergo tibi, secundum aliquorum opinionem qui  
 fuerunt de secta nostram artem imitantium, quod principia in  
 5 opere nature sunt spiritus fetens et aqua viva, quam et siccam  
 aquam nominari concedimus. Spiritum autem fetentem divisimus:  
 est enim albus in occulto et rubeus et niger uterque in

---

similiter 1-2. Sermo-opinionem: Explicit liber secundus. Incipit tertius.  
 Prohemium ad summam intentionis huius libri tercii que est de spiritibus  
 et corporibus et de diffinitionibus et proprietatibus eorundem. Rubrica.  
 Sufficenter ergo in precedenti particula ut a nobis in principio promissum  
 fuerat et rationes sophistarum artem negantium simpliciter et a datis a  
 supponente eam posuimus et eorum apertissimas et sufficientes  
 interemptions attulimus. Nunc vero principia naturalia et eorum effectus  
 qui sunt corpora metallica disseramus secundum omnes eorum causas ut  
 ex principio te attentum in memoracione illorum. De principiis naturalibus  
 in genere et de modo creationis metallorum ex ipsis secundum diversas  
 antiquorum opiniones. Rubrica. P Incipit liber secundus de principiis  
 naturalibus scilicet mercurii sulphuris et arsenici. Et est sermo VIII. B  
 Incipit tertia pars principalis de principiis naturalibus in genere R De  
 naturalibus principiis mercurii sulphuris et arsenici et est pars tertia in qua  
 disputat super eorum effectus secundum antiquorum scientiam  
 philosophorum. T De naturalibus principiis scilicet mercurii sulfuris et  
 arsenici. WD Incipit liber secundus de principiis naturalibus scilicet  
 mercurii sulphuris et arsenici et est sermo universalis. H//3. *post* tibi  
*add.* quod principia naturalia in opere nature sunt A//aliquorum:  
 antiquorum PR antiquorum aliorum B antiquos D//opinionem: opiniones  
 R *om.* D//4. *post* principia *add.* naturalia D//4-5. quod-sunt *om.* A *add.*  
*in mg.* A<sub>2</sub>//6. divisimus: dividimus W//7. et rubeus: rubeus T//*alt.* in:  
 convenit T//

magisterio huius operis, in manifesto autem uterque tendens  
ad rubedinem. Dicemus igitur sermone brevi nec non  
10 completo et sufficiente generationem uniuscuiusque istorum et  
modum similiter generationis. Expedi igitur nos ampliare  
sermonem nostrum et dilatare, et singulum capitulum de  
singulo naturali principio tradere. In genere vero dicemus  
15 quod unumquodque ipsorum est fortissime compositionis et  
uniformis substantie, et illud ideo, quoniam in eis per minima  
partes terre taliter partibus aereis, aqueis, et igneis sunt  
unite, ut nulla ipsarum alteram in resolutione possit  
dimittere. Immo quelibet cum qualibet resolvitur propter

---

8. autem: ergo T//9. Dicemus: dicimus H//igitur: ergo BTD//non: non et  
PT//10. completo: expleto D//et sufficiente: sufficiente B sufficientem  
RTH sufficienter W//11. similiter *om.* RT similiter et WH//igitur: ergo P  
*om.* BH//nos *om.* R//12. nostrum *om.* T//et dilatare *om.* W//et  
singulum capitulum: et singula capitula R et singulam et singulum  
capitulum et capitulam T//13. vero: tamen *rell.*//dicemus: dicimus  
PBWH//15. per: propter R//minima: minime BH//16. partibus *om.*  
T//17. ipsarum: ipsorum T//possit: posset B//

fortem unionem quam habuerunt adinvicem per minima a calore  
20 multiplicato in mineralibus equali terre visceribus et  
conculcato et equato secundum debitum cursum nature, ad  
exigentiam illorum essentie, secundum opinionem quorundam  
antiquorum philosophorum.

25 Alii autem aliter dixerunt quoniam principium non fuit  
argentum vivum in natura sua, sed alteratum et conversum in  
terram, et sulphur similiter alteratum et in terram  
mutatum. Unde dixerunt quod principium fuit aliud quam  
spiritus fetens et spiritus fugitivus in intentione nature.  
Et ratio qua moti sunt fuit quoniam non inveniunt in mineris  
30 argenteis vel aliorum metallorum aliquid quod sit argentum

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19. fortem *om.* A *add. in mg.* A<sub>2</sub>//habuerunt: habent D//per: propter  
R//a *om.* BWH//20. equali: *transp. post* calore BRTWH//et *om.*  
*rell.*//21. multiplicato *transp. post* conculcato PBRWH *post* occultato  
T//conculcato: occultato TD//22. essentie: *fort.* extrancie B//opinionem  
*om.* D//quorundam *om.* T quosdam D//23. antiquorum *om.* W//*post*  
philosophorum *add.* Sermo universalis in principiis corporum naturalibus  
secundum opinionem auctoris A//24. autem: *om.* R//aliter: *om.* P//27.  
mutatum: immutati D//28. spiritus fetens et *om.* D//fetens: fetentes  
H//29. quoniam: quia T//30. argenteis: argenti R//aliorum: aliorum T//



vivum in natura sua et aliquid quod sit sulphur similiter.  
 Immo per se inveniunt unumquodque illorum separatum, et in  
 propria sui minera in sua natura inveniuntur. Et similiter  
 per aliam rationem hoc quoque affirmant, scilicet non est  
 35 transitus a contrario in contrarium nisi per dispositionem  
 mediam. Ergo cum sic sit, coguntur confiteri et credere quod  
 non sit transitus a mollitie argenti vivi ad duritiem alicuius  
 metallorum, nisi per dispositionem que est inter duritiem et  
 mollitiem illorum. Sed in mineris non inveniunt aliquid in  
 40 quo salvetur hec media dispositio: ideo hac ratione  
 compelluntur credere argentum vivum et sulphur in sui natura  
 non esse principium de intentione nature, immo aliud quod  
 sequitur ex illorum essentialium alteratione in radice  
 nature ad terream substantiam. Et est iste modus quoniam

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31. sua: sui W//et: nec T//aliquid: aliquid H//similiter om. T//32.  
 inveniunt: inveniunt vero B invenerunt D//separatum et: fort. semper  
 unicuique T//33. sui: sua RT//sua: sui W//inveniuntur: inveniunt  
 BRTWH//Et om. BWHD//34. quoque: quidam PM idem W//scilicet:  
 quod T//36. Ergo: igitur B//cum: si D//sit: fit T om. D//credere: dicere  
 et credere W//37. sit: est B//38. metallorum: metalli BTWHD//39.  
 aliquid: aliquid P//40. hac ratione: contra rationem D//41. compelluntur:  
 coguntur R//in sui natura om. R//43. illorum: illarum BR//44. est: ex D//

[65vb] ut prius unumquodque eorum convertitur ad terream  
 naturam. Et ex his ambabus terreis naturis resolvitur  
 fumus tenuissimus a calore multiplicato in viscere;  
 et hic duplex fumus est materia metallorum immediata. Hic  
 5 tamen fumus a calore temperato minere decoctus convertitur  
 in naturam cuiusdam terre. Ideoque fixationem quandam suscipit  
 quam defluens aqua per viscera minere et terre spongiositatem  
 dissolvit et ei uniformiter unitur unione naturali et firma.  
 Ideoque sicut prius dixerunt, sic opinantes quia aqua fluens  
 10 per meatus terre invenit substantiam dissolubilem ex

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1. ut om. *rell.*//eorum: illorum BWH istorum T//3. tenuissimus:  
 remissimus D//multiplicato : *multiply* B//viscere: visceribus terre  
 BRH terre T viscere terre PWD//5. fumus: duplex fumus R//7. quam:  
 quia A//defluens: dum fluens A//8. unitur: unitur et inmiscatur P  
 immiscatur vel unitur B inmiscatur R unitur et inmiscatur T inmiscatur vel  
 unitur WH//9. sicut prius: sic APBRTHD//sic : PBRWH *non legitur* R  
 om. T//quia: quod PBWD//10. ex: et ex D//

substantia terre in visceribus illius, et illam dissolvit  
 et uniformiter secum unitur quousque ex substantia terre in  
 visceribus dissoluta et aqua fluens dissolvens unum fuerit  
 unione naturali. Et ad talem mixtionem veniunt omnia elementa  
 15 secundum debitam naturalem proportionem, et miscentur per  
 minima quousque faciant uniformem mixtionem. Et hec mixtio  
 per successivam decoctionem in minera inspissatur et  
 induratur, et fit metallum. Et hi quoque sunt affines  
 veritati, non tamen veritatem coniciunt puram.  
 20 <25> Sermo particularis in corporum principiis naturalibus  
 Iam sermone universali determinavimus de metallorum

11. illius: ipsius T//illam: illo modo A//dissolvit: solvit PRTWHD//12.  
 ex: et PMW in BH *om.* T//13. fuerit: fiunt PW fiant T//14. Et *om.*  
 H//mixtionem: unionem BWH//veniunt: deveniunt P inveniunt W//16.  
 minima: minime BH//mixtionem: unionem T//17. per: secundum T//18.  
 Et hi: hi T//quoque: quidem P//19. coniciunt: committunt B//20. Sermo-  
 naturalibus: Prohemium quoddam de ordine subsequentium P *om.*  
 BRTWHD//21. Iam: Iam quidem T Hactenus W//

principiis naturalibus. Restat igitur ut nunc ponamus  
 uniuscuiusque principii capitulum. Cum ergo tria sint,  
 sulphur et arsenicum videlicet, et argentum vivum, primo  
 25 ascribemus capitulum de sulphure, secundo de arsenico, tertio  
 de argento vivo. Deinde uniuscuiusque metallorum, que sunt  
 effectus eorum, ponemus capitulum determinatum secundum quod  
 est ex opere nature. Dehinc ad ea que huius magisterii sunt  
 fundamenta et illorum operationes transeundum, horum causas  
 30 omnium assignantes.

<26> Sermo singularis in primo quod est sulphur

Dicimus igitur quod sulphur est pinguedo terre in minera  
 terre per temperatam decoctionem inspissata quousque induretur

22. naturalibus: universalibus W//igitur *om.* BRTWD//ut *om.*  
 W//ponamus: ponemus T quod ponamus W//23. principii capitulum:  
 capituli principium H//ergo: igitur BH itaque W //et arsenicum:  
 arsenicum W//tria sint *transp. ante* primo R//24. sulphur: scilicet sulphur  
 P//videlicet *om.* PBRTWD//26. deinde: demum TW//uniuscuiusque:  
 uniuscuiusque B//27. eorum *om.* B//28. ex: in T//ad ea: adhuc de ea  
 T//29. illorum: eorum P// transeundum: transeundo BRH//29-30. horum  
 causas omnium: omnes causas eorum BH horum causas R//31. Sermo-  
 sulphur: De diffinitione sulphuris et proprietatibus eius. Rubrica. P  
 Capitulum de sulphure et ipsum diffinit BH De sulphure in specie R  
 Capitulum de sulphure in specie T De sulphure W Capitulum de sulphure  
 D//32. igitur: ergo B *om.* T//minera: minera in visceribus T//terre in:  
 terre non D//32-3. in minera terre *om.* B//

et sicca fiat, et cum indurata, sulphur vocatur. Habet  
 35 siquidem sulphur fortissimam compositionem, et est uniformis  
 substantie in suis partibus, omniomera, quia homogeneous est.  
 Ideoque non aufertur eius oleum ab ipso per distillationem  
 sicut ab aliis rebus oleum habentibus. Qui ergo querunt ipsum  
 calcinare non perdendo de illius substantia aliquid de quo sit  
 40 curandum, in vanum laborant, quoniam non calcinatur nisi per  
 magnam industriam et multum de illius substantia dissipando.  
 Ex centum enim partibus, vix tres sufficienter reservas post  
 calcinationem. Figi similiter non potest nisi calcinetur  
 prius. Commisceri attamen et aliquantulum illius  
 45 potest fuga tardari et illius adustio reprimi

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34. sicca: spissa vel sicca B//post indurata add. fuerit D//35. siquidem om.  
 B quoque T sic quoque WD sic H//36. omniomera: omnino materia A  
 omomera idest omogenia B omnibus omniomera WH //38. sicut: ut  
 BRTWH aut D//querunt: querit BWH//ipsum: illud H om. D//39.  
 calcinare: oleum R//non: in D//sit: est B//40. laborant: laborat  
 BWH//41. magnam non legitur H//illius: ipsius T//42. tres: tibi tres  
 BRWH//reservas: reservabis T//44. attamen: autem B tamen W//illius:  
 eius BRTWHD//45. tardari: retardari *rell.*//potest: post *in ras.* potest *in*  
*mg. A<sub>2</sub>*//

[66ra] et cum commixto facilius calcinatur. Qui ergo  
 querit ex eo opus elicere illud per se preparando, non eliciat  
 quoniam cum commixto perficitur, et sine illo magisterium  
 protelatur usque ad desperationem. Et cum suo compari fit  
 5 tintura et dat pondus completum unicuique metallorum et ipsum  
 feditate depurat, et illustrat et perficit cum magisterio,  
 sine quo nihil horum prestat sed potius corrumpit et denigrat.  
 Non igitur sine magisterio ipso utaris. Qui etiam ipsum in  
 preparatione commiscere et amari corporibus novit, sciet  
 10 unum de secretis nature maximum, et viam unam perfectionis cum  
 multe sint vie ad unum effectum et ad unum intentum. Et

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1. calcinatur: calcificatur P//ergo: vero T//3. illo: ipso P// 4. ad: in  
 BH//5. metallorum: ex metallis T//ipsum: *fort.* ipsam serenitatem a T//6.  
 feditate: fetiditate WD a feditate BH//6. depurat: purat B//7. corrumpit:  
 corrumpat T//8. etiam: igitur T//ipsum om. W//9. preparatione:  
 reparacionem B//novit: noverit P//sciet: scit R//10. *ante maximum add.*  
 et D//11. Et: quia D//

quodcunque corpus ex ipso calcinatur acquirit pondus, sine dubio. Es quoque assumit ex eo solis effigiam. Mercurio quoque associatur, et associatum per sublimationem fit uzifur.

- 15 Calcinantur denique omnia corpora facile ex eo preter solem et iovem, sol vero difficillime. Et non coagulatur ex eo argentum vivum in solem vel lunam in quibus sit utilitas per artificium debile, sicut quidam philosophorum fatui putaverunt. Et ita dicimus quecunque corpora minus habent de humiditate facilius per sulphur calcinantur quam que multam.
- 20 Per deum altissimum, ipsum illuminat omne corpus quoniam est alumen et tinctura. Difficillime quoque solvitur, quoniam

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12. ipso: illo H//12-3. sine dubio: rectum BH *om.* W *add.* W<sup>2</sup>//13. Es: Venus R//eo: ipso W//Mercurio: si mercurio T//14. quoque *om.* T//associatur: associat W//associatum: ei associatum TD//*post* uzifur *add.* et sine quo nihil horum prestat sed potius corrumpit et denigrat T//15. denique: quidem denique B//eo: ipso RTWD//16. *post* vero *add.* difficillime et *in ras.* A//non: ideo T//16-9. Et-putaverunt *transp. post* 20. multam P//17. argentum vivum; mercurius vivus T//vel: et T//18. sicut: aliud B//19. Et ita dicimus: Et sic dicimus B Et ideo dicimus et ideodicimus H //20. multam: multa B//21. ipsum: id ipsum BRWH illud ipsum T//quoniam *om.* D *add.* D<sub>2</sub>//22. quoniam: quia BTWHD//

non habet partes salsuginosas sed oleaginas, que non facile in aqua solvuntur. Que autem facile vel difficile solvuntur in aqua in capitulo solutionis monstrabimus satis aperte.

- 25 Sublimatur vero quia spiritus est, et si commisceatur veneri et aduratur secum, fit mirabile violaceum. Cum mercurio quoque similiter miscetur et fit ex eis per decoctionem celestinus color et delectabilis. Non putet quis quod sulphur
- 30 per se opus compleat alchimie, non enim esset hoc nisi vanum credere; hoc autem satis lucide probabimus in sequentibus. Eligitur autem crassum et lucidum; sed de sulphure hec dicta sufficient.

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23. salsuginosas: saliginosas B//facile: faciliter T//23-4. in aqua: inquam *in ras.* D in aquam D// 24. aqua: aquam R//difficile: difficulter R difficulter T//25. aqua: aquam PRW//26. commisceatur: misceatur T//27. aduratur: aduritur B addatur W//violaceum: volatium B//28. *post* quoque *add.* et saturno R ipso saturno T//similiter *om.* T//29. putet: autem putet P//30. alchimie: alchimie aliud B aliquod TWHD //31. probabimus: probamus A probabitur W//sequentibus: sequenti BRTWHD//32. autem: enim B ergo T//crassum: grossum RT// Sed: et BRTWHD//33. sufficient: sufficienter D//

**<27> Sermo in principio quod est arsenicum**

35 Restat nos de arsenico determinare ad presens.  
 Dicimus igitur quoniam est de subtili materia et similiter cum  
 sulphure, idcirco non oportet illud aliter diffiniri quam  
 sulphur. In hoc tamen diversificatur a sulphure, quia est  
 albedinis tinctura et rubedinis similiter defacili, sulphur  
 40 vero rubedinis defacili, albedinis autem difficillime. Est  
 autem sulphuris duplex genus et arsenici, citrinum quoque et  
 rubeum que sunt huic arti utilia, reliqua autem multa genera  
 non. Figitur autem arsenicum sicut et sulphur, utriusque vero  
 sublimatio a metallorum calcibus melior

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34. Sermo-arsenicum: De diffinitione arsenici et proprietatibus eius. Rubrica. P *om.* R Capitulum de arsenico BHD De arsenico capitulum T De arsenico W//35. determinare: videre A determinari B //36. igitur *om.* T//quoniam: quod BTWHD//similiter: simile BH simili R consimili T//38. quia: quoniam BWH quod T//39. tinctura: tinctura defacili RT//similiter defacili: difficulter R de difficili T//39-40. sulphur - defacili *om.* D//40. autem: vero T bone B//*post* albedinis *add. s.l.* rubedinis D<sub>2</sub>//41. genus: generi *ut vid. A//ante* citrinum *add. similiter in ras. A//42.* utilia: necessaria W//43. et *om.* P//vero *om.* RT//

[66rb] est. Non sunt autem sulphur et arsenicum materia  
 perfectiva huius operis, non enim complent. Sunt autem  
 adminiculum perfectionis in casu. Eligitur autem lucidum,  
 squamosum, et scissile.

5 **<28> Sermo in principio quod est argentum vivum**

Argentum quippe vivum, quod et mercurius appellatur  
 antiquorum usu, est aqua viscosa in visceribus terre  
 substantie subtili, terree, albe, per calorem temperatissimum  
 unita totali unione per minima, quousque humidum contemperatur  
 10 a sicco, et siccum ab humido equaliter. Ideoque fugit  
 superficiem planam defacili, propter sue aque humiditatem.

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1. autem *om.* R//materia: materia sive medicina BH medicina RT materia vel medicina W//2. non: quia non B//*enim om.* D *add. s.l.* etiam D<sub>2</sub>//*autem om.* APRTD//5. Sermo-vivum: De diffinitione argenti vivi et proprietatibus eius. Rubrica. P De mercurio B De mercurio in specie R De argento vivo TW Capitulum de mercurio HD//6. quippe *om.* RT//*et om.* B//*post* appellatur *add. secundum s.l.* D<sub>2</sub>//7. usu: usum D//terre: terree P//8. subtili: subtilis ARTWHD//terree: et terree A terre PRT//9. minima: minimam B//contemperetur: temperetur BWHD//11. propter: per P//suc: suam AT sui RWH//aque: aquam T//

Non autem adheret, licet viscosam habeat humiditatem, propter  
 siccitatem illius, que illam contemperat et non adherere  
 permittit. Est etiam, ut quidam dicunt, materia metallorum  
 15 cum sulphure. Adheret quoque tribus mineralium defacili, sa-  
 turno videlicet, iovi, et soli, lune autem magis difficulter,  
 veneri vero difficilium quam lune, marti autem nullo  
 modo nisi per artificium. Ex hoc utique maximum elicias  
 secretum. Est enim amicabile et metallis placabilis, et  
 20 medium coniugendi tincturas. Et non submergitur aliquod in  
 argento vivo nisi sol; solvuntur tamen iupiter et  
 saturnus, luna et venus ab eo, et commiscuntur. Et sine  
 ipso aliquod metallorum deaurari non potest.

12. adheret: adhereret B//licet: nisi BHD//habeat: haberet B//13.  
 contemperat: temperat R contemperet T//14. etiam: autem  
 BHD//materia: medicina R//15. post adheret add. cum A//16. videlicet  
 om. BWH scilicet RTD//iovi: cum iovi D//soli: lune BWH//magis  
 difficulter: difficilium BWH magis T//17. veneri-lune: veneri autem  
 difficillime BH veneri quoque difficilium quam lune T veneri difficillime  
 W//autem: vero P //18. utique: quoque B autem W//20. tincturas:  
 tincturas est etiam B//Et om. RT//aliquod: corpus aliquod P aliquid  
 T//21. argento vivo: mercurio BRTWHD//sol: vi sol B//22. luna: et luna  
 T//et venus om. T//ab eo om. W add. W<sup>2</sup>//commiscuntur: miscentur  
 BH//23. aliquod: nullum BH//metallorum: metallum BWH//non om.  
 BH//

Figitur et est tinctura rubedinis exuberantissime refectionis  
 25 et fulgidi splendoris. Et non recedit a commixto donec est.  
 Non est tamen medicina nostra in natura sua, sed  
 iuvare quandoque potest similiter in casu.

<29> Sermo generalis de effectibus que sunt corpora metallica

Dicimus de metallicis corporibus que sunt effectus  
 30 ipsorum nature principiorum. Sunt autem sex numero - aurum,  
 argentum, plumbum, stagnum, es, et ferrum. Dicimus igitur  
 quoniam metallum est corpus minerale, fusibile, sub malleo ex  
 omni dimensione extendibile. Est autem metallum, ut diximus,

24. rubedinis: rubedinis et B//refectionis: rectitudinis BWH//25. fulgidi:  
 fulgidissimi BW//recedit: recedat R// commixto: commixto donec  
 mixtum manet T//26. medicina nostra: materia et sive medicina nostra B  
 materia vel medicina nostra nostra W materia sive medicina nostra  
 H//quandoque: quoniam A//28. Sermo-metallica: Capitulum VII de  
 differentia corporum metallorum in genere et eorum alteratione et  
 perfectione P om. T De metallicis corporibus que sunt effectus  
 principiorum nature B Incipit quarta pars principalis de metallicis  
 corporibus que sunt effectus principiorum in genere R De metallicis  
 corporibus W Capitulum de metallicis corporibus que sunt effectus  
 principiorum nature H De metallicis corporibus que sunt effectus  
 principiorum nature. Rubricum. D//29. Dicimus: diximus T//30. ipsorum:  
 horum *rell.*//post principiorum add. enim predictorum Et *in ras.* A est  
 enim add. s.J. A<sub>2</sub>//aurum: scilicet aurum T//31. et: om. B//32. minerale  
 fusibile: miscibile fluxibile BWH malleabile fusibile RT //33.  
 dimensione: distensione BH//diximus: dicimus B//



examinationem cineritii et cementi tollerans. Ex hoc utique  
 elicias quod aliquid non est aurum nisi causas diffinitionis  
 et differentias omnes habeat auri. Quidquid tamen metallum  
 15 radicitius citrinat, et ad equalitatem perducit, et mundat, ex  
 omni genere metallorum facit aurum. Ideoque per opus nature  
 perpendimus et artificio es in aurum mutari posse. Vidimus  
 namque in mineris eris a quibus emanabat aqua, secum adducens  
 eris squamas tenuissimas, quod ipsas diuturno et continuo  
 20 lapsu lavat et mundat, deinde vero aqua cessante fluere, cum  
 sicca arena has squamas per triennium in solis calore excoqui,  
 inter quas inventum est aurum verissimum. Estimavimus utique

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12. examinationem: examinatio A -nem *add. s.l.* A<sub>2</sub>//hoc: hac diffinitione  
 BHD hac autem diffinitione W//utique: itaque T//13. aurum: aurum nec  
 argentum BH//14. Quidquid tamen: quisquis tamen BRWH quicquid  
 autem vel quisquis T//metallum: metallorum BH//15. *pr. et om.* D//17.  
 et: ex BWH//Vidimus: videmus P//18. namque: enim BT tamen  
 R//emanabat: emanat BWH//19. quod ipsas T: ipsasque APRW ipsas  
 quoque BH//20. *post fluere add.* vidimus D//21. *has om.* PB//in *om.* BH  
 ex W et D//*ante verissimum add.* purissimum D//22. Estimavimus:  
 Existimamus BWH Estimamus RTD//utique *om.* B//

per aque beneficium illas mundatas fuisse, per solis autem  
 calorem et arene siccitatem equaliter digestum et ad  
 25 equalitatem pervenisse. Imitantes igitur naturam cum  
 possumus, similiter alteramus, non tamen in hoc sequi  
 naturam valemus. Aurum quoque est pretiosius metallorum, et  
 est tinctura rubedinis quia tingit et transformat omne corpus.  
 Calcinator autem et solvitur sine utilitate. Et est medicina  
 30 letificans, in iuventute corpus conservans. Frangitur  
 facillime cum mercurio et odore plumbi, et teritur. Non est  
 autem in actu quod magis in substantia sibi conveniat quam  
 iupiter et luna, in pondere autem et surditate et  
 putrescibilitate saturnus, in colore autem venus, in potentia

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23-4. *per-pr. et om.* B//23. aque: aquam D//24. digestum: digestas  
 BWH//25. Imitantes igitur: Imitamur ergo T//naturam: *om.* B//cum:  
 quantum TD//28. quia: que W//29. autem: aurum D//solvitur: solvitur  
 labore maximo BH//29. sine: sine ulla P sine omni BH//30. conservans  
*om.* BWH//corpus: omne corpus W//31. facillime: facile T//32. autem:  
 tamen R *om.* T//quod: aliquid quod W//magis: ei magis T//conveniat:  
 conveniant B//sibi: sua sibi T//33. autem *om.* T/ *post surditate add* in  
 PB//33-4. et putrescibilitate *om.* T//34. colore: calore W//*alt.* in: sed  
 W//



quoque magis venus, deinde luna, deinde iupiter, deinde saturnus, ultimo vero mars: et hoc est unum de secretis nature. Cum ipso similiter commiscetur spiritus et figuntur per ipsum maxime ingenio, quod non pervenit ad artificem dure cervicis aut petrine.

40

<31> Sermo in luna. Rubrica

Solis itaque premissis capitulo, dicamus sermonem nostrum in luna, communi vocabulo argento. Dicimus quoniam argentum est corpus metallicum, album albedine pura, mundum, durum, sonans, perdurans in cinericio, ignibile, fusibile, et

35. quoque: quidem P autem B *om.* WH//36. saturnus: vero saturnus H//37. nature: nature maximum BH//39. aut petrine *om.* BRTWHD//40. Sermo-Rubrica: De diffinitione argenti et proprietatibus eius P Capitulum de luna BHD De luna in specie R De luna capitulum T Capitulum lune in diffinitione W//41. dicamus: dicimus BD//41-2. Solis-argento: Sermonem conficientes in luna RT//42. communi: convenienti BWH //argento: argentum B//quoniam: igitur quoniam BWH//43. est corpus *om.* B//44. perdurans: perseverans T//et *om.* D//

[66vb] sub malleo extendibile. Est itaque albedinis tinctura. Et indurat iovem per artificium et convertet ad se. Et commiscetur soli, et non frangit, sed in examinatione sine artificio secum non perseverat. Qui novit ipsum magis subtiliare, et post subtiliationem inspissare et figere secum associatum, cum eo manet in pugna et ipsum non amittit penitus. Super fumum acutorum sicut aceti, salis armoniaci, et agreste, fit celestinus color mirabilis. Et est nobile corpus, sed diminutum a nobilitate auri. Et invenitur eius  
5  
10  
minera determinata, et aliquotiens habet confusam mineram cum

1. itaque: utique D//2. indurat: durat B//convertet: convertit D//3. frangit: frangitur BTWHD//4. non *om.* D *add. in mg.* D<sub>2</sub>//perseverat : durat B *om.* D *add. in mg.* D<sub>2</sub>//qui: sed qui P//novit: noverit P //5. inspissare: magis inspissare BWH//6. associatum: associare H//cum: est D//7. fumum: fumum ponitur P suco R fumum vel succum R//8. et agreste: *ras.* et super fumum etiam *agrestei* A et cucumeris *agrestis* et T// fit: et fit PBWH//10. minera: mineria D//confusam: deconfusam H//

aliis corporibus, et illud non est sic nobile. Calcinatur autem similiter, sed cum maximo labore solvitur, et cum nulla utilitate.

<32> Sermo in saturno. Rubrica

- 15 De plumbo similiter tradamus capitulum, et dicamus quoniam plumbum est corpus metallicum, lividum, terreum, ponderosum, mutum, parva participans albedine, cum lividitate multa, cineritium et cementum refugiens, facile omni sua  
20 dimensione parva compressione extendibile, et facile fusibile sine ignitione. Plumbum, ut quidam dicunt fatue, in natura sua multum auro approximatur. Sed quoniam sunt dure cervicis

12. autem *om.* T//similiter sed: et P similiter et BRTWHD//cum *om.* D//et: sed B *om.* RTWHD//nulla: maxima H//14. Sermo-Rubrica: De diffinitione plumbi et proprietatibus eius P Capitulum de saturno BHD De saturno in specie R De saturno TW//15-6. De-quoniam *om.* RT//15. similiter *om.* BWH//16. lividum: humidum T//17. parva: parvam W//albedine: albedinem W//18. et cementum: cementum H//20. plumbum *om.* BTWH//ante ut *add.* dissolubile T dissolubili WH//dicunt: dicunt *in textu* A putant *in mg.* A<sub>2</sub> dicunt *in ras.* P imputant (*im- in ras.*) et dicunt P putant dicunt T putant BWH/20-1. plumbum-cervicis *om.* R//21. approximatur: approximare PBTWHD//post quoniam *add.* hoc dicunt B//

- omni ratione vacue, nullam veritatem conicere ex subtilissimis rebus queunt. Sed de eis secundum sensum iudicant: quoniam vident illud ponderosum et mutum et non  
25 putrescere, credunt illi multum approximare. Sed hoc quoque erroneum est et latius a nobis in sequenti negotio reprobatur aperte. Plumbum quoque multum habet de substantia terrea, ideoque lavatur et in stagnum per lavacrum vertitur. Per hoc ergo patet stagnum magis perfecto assimilari. Et plumbum  
30 similiter aduritur et fit minium; et ponitur super vapores aceti et fit cerusa. Et licet non multum perfectioni approximetur, ex eo tamen per nostrum artificium defacili argentum formamus. Et non conservat pondus proprium in transmutatione, sed in novum pondus mutatur. Et hoc totum in

22-7. omni-quoque *om.* R//22. vacue: vacua P vacui BTWHD//nullam: nullam rationem vel T//conicere: cognoscere PBTWHD//ex: valentes ex BTWH volentes *s.l.* D<sub>2</sub>//23. queunt: quantum in se est BTWH *in mg.* D//24. quoniam: qui cum D//25. credunt: et ideo credunt BH//multum: multum auro BH//hoc *om.* D//quoque: totum PBTWHD//27. aperte: aperte W//28. in-vertitur: per abluionem in stagnum convertitur R per lavationem in stagnum convertitur T//29. ergo: igitur P *om.* RT//Et *om.* BRWH// plumbum: *om.* R//30. et ponitur: in ponendo B si ponatur RT et ponendo WHD//vapores: vaporem D//31. et fit: fit BRWHD//post licet *add.* vero D//perfectioni: argento PBRTWHD//32. approximatur: approximetur W//eo: ipso B//artificium: magisterium T//34. transmutatione: transformatione R//34-5. Et - *alt.* in *om.* R//

35 magisterio acquirit. Est etiam plumbum argenti examinatio in cineritio, cuius causas dicemus.

<33> Sermo in iove. Rubrica

Iovis ergo traditione non ommissa, significamus filiis doctrine quod est corpus metallicum, album non pure, lividum  
40 parum, terreatate pauca participans, consonans parum stridulum, molle, sine ignitione liquefactionis velocitatem in radice possidens, cineritium et cementum non expectans, sub malleo extendibile. Est igitur iupiter inter diminuta a perfectione corpora magis perfectioni radice sue nature  
45 affinis soli videlicet et lune, lune magis,

35.magisterio acquirit *om.* R// acquirit: consistit B//Est etiam: Est igitur BWH Et erit T//examinatio: examen *rell.*//37. Sermo- Rubrica: De diffinitione iovis et proprietatibus eius P Capitulum de iove BHD De iove in specie R Diffinitio iovis T De iove W//38-9. iovis-quod *om.* R//38. filiis: fili BTWH//39. non: sed non B//*post* quod *add.* stagnum T//pure: parum T p(!) W//40. *pr.* parum *om.* BRWHD//consonans parum: et sonans *rell.*//41. stridulum: stridorem *rell.*//molle: mollitiem *rell.*//42-3. sub malleo extendibile *om.* A//43. igitur: ergo BRWH//44. perfectioni: perfectio in P perfectum in RT perfectum ex BWH perfectum et D//45. affinis: affinis est B//*alt.* lune *om.* A soli BRTH *ante* lune in *ras.* iovem W//

[67ra] soli vero minus. Hoc utique in sequenti lucide narrabitur.

Iupiter, quia albedinem multam ex radice sue generationis suscepit, ideo non alba corpora omnia dealbat. Vitium tamen est ei quia omne corpus frangit preter saturnum et purissimum  
5 solem. Et iupiter multum lune et soli adheret, et ideo ab eis per examina non defacili recedit. Et suscipit tincturam rubedinis, et splendet in eo fulgore inestimabili. Et pondus acquirit in magisterio huius artis. Induratur vero et mundatur facilius quam saturnus. Et qui sciverit eius vitium  
10 fractionis auferre subito ex eius proficuo perfrui letabitur. Conveniet enim soli et lune, nec separabitur ab eis semper.

1. soli: lune BRTH//Hoc: hec D//narrabitur: narrabimus P narratum est B dicemus RT narratur WH narratur D//2. quia: vero quia P que BW//*ex:* que ex P in BT//generationis: nature P et generationis B nature et generationis H// 3. suscepit: suscipit BT//*omnia om.* BWH//4. est: inest P//quia: quod T//omne corpus: omnia corpora T//5. Et iupiter: Iupiter vero BWH//*et-eis:* ideo ex eis BWH//6. per *om.* D *add. s.l.* D<sub>2</sub>//*examina:* examinationem P examen BRTWHD//*defacili:* facile W//*et suscipit:* suscipit BRTWH//6. *post* suscipit *add.* non defacili A//7-9. inestimabili - saturnus *om.* D// 7. inestimabili: inexterminabili P//fulgore: omni fulgore BH//8. Induratur vero *om.* BWH Induratur RT//10. auferre: corporum auferre BTWH//perfrui *om.* PRW//11. lune: argento T//semper *om.* BH//

## &lt;34&gt; Sermo in venere. Rubrica

De venere vero sermo noster sit ad presens. Et est corpus metallicum, lividum, viride, rubedine fusca participans,  
 15 ignibile, fusibile, sub malleo extendibile, cineritium et  
 cementum refugiens. Venus utique, ut narratum est, in  
 profundo sue substantie colorem et essentiam auri protendit.  
 Malleatur vero et ignitur ut argentum et aurum. Ideoque  
 secretum ex ea assumas, quia est medium solis et lune, et  
 20 facile ad utrumque convertitur. Et est bone conversionis et  
 pauci laboris. Convenit cum tutia vehementer et illam  
 citrinat citrinitate bona, ut ex hoc proficuum elicias.

12. Sermo-Rubrica: De diffinitione veneris et proprietatibus eius P Capitulum de venere BHD De venere in specie R De venere T Capitulum veneris in diffinitione W//13. De-presens *om.* R//sit: fit B sic D//Et: venus R//*post* Et *add.* dicimus quod BH dicimus quod venus T//14. rubedine: rubedinem rubedine B//15. sub malleo extendibile: malleabile BRT//16. ut narratum est *om.* R//17. profundo: fundo D//essentiam: materiam T//et *om.* B//protendit: portendit A//18. vero *om.* RTBWH//Ideoque: ideo BRTWH//19. ea: eo PBTWH//assumas: sumas R //quia: que B//20. convertitur: *post* convertitur *add. in mg.* naturam illius accidit A<sub>2</sub> converti naturam illius accidit PRW utramque convertere naturam illius accidit D converti tincturam vel naturam illius accidit BH converti naturam illum accidit T//conversionis: conversacionis H//21. cum: cum ea PBRWH cum eo T//illam: eam W//22. citrinitate: citrinatione W//ut: et B//

Excusamur utique per eam a laboribus indurationis et  
 ignitionis illius. Assumas igitur eam pre ceteris  
 25 imperfectis in opere minori et medio, in maiori vero  
 minime. In hoc tamen a iove vitium habet, quoniam  
 livescit defacili et infectionem ex aere et acutis suscipit.  
 Et eradicare illud artificium non est facile, immo profundum.

## &lt;35&gt; Sermo in marte

30 Martis vero narratio et secretum illius est totum ex  
 opere nature, quoniam est corpus metallicum, lividum multum,  
 parum vero rubeum, albedine non pura multum participans,

23. excusamur: Excusaberis P//per eam *om.* B//24. ceteris: ceteris corporibus BRTWH//26. a iove: a perfectione P// quoniam: quoque B//27. livescit: livescis H//infectionem: imperfectionem D//28. Et *om.* T// immo profundum *om.* R//29. Sermo-marte: De diffinitione martis et proprietatibus eius P Capitulum de marte BHD De marte in specie R De marte TW//30. illius: eius BTWH *om.* R//31. quoniam: qui D//32. vero: non D//multum *om.* P//

durum, ignibile, et non fusibile fusione recta,  
 sub malleo extendibile, et multum sonans. Est autem  
 35 mars dure tractationis propter impotentiam sue fusionis.  
 Quod si sine medicina illius naturam immutante fundatur,  
 coniungitur soli et lune, et non separatur ab eis per examen  
 separationis sine magna industria. Sed si preparetur,  
 coniungitur et non separatur per aliquod artificium, si eius  
 40 natura fixationis non immutetur ab eo, sola remota immunditia  
 illius. Est ergo tinctura rubedinis defacili, albedinis bone  
 vero difficillime. Et cum coniungitur non alteratum, non  
 immutans est colorem commixti sed augens illud in quantitate.

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33. et non: non *rell.*//34. sub malleo extendibile: malleabile R malleabile id  
 est sub malleo extendibile T//35. tractationis: tractionis W//36. Quod: qui  
 A//si *om.* D//sine: cum BTH//immutante: imitante H//fundatur:  
 funditur P //37. coniungitur: coniungatur BH//et non: non  
 BH//separatur: separabitur BWHD//ab eis *om.* BWHD ex eis T//37-8.  
 per-industria *om.* D//38-9. Sed-separatur *om.* BWHD//38. preparetur:  
 separetur R sepe T//39. coniungitur: et coniungitur P coniungatur T//40.  
 fixationis: fusionis PR fictionis B//immunditia: immunditie A et mundicie  
 D//41. illius: eius B//bone *om.* W//42. vero: non D//alteratum: alteratis  
 D//non: nec D//43. immutans: minuens immutans T mutans  
 WH//commixti: coniuncti BWH mixti T//augens: auget W//

[67rb] Inter omnia corpora igitur iupiter in splendidus et  
 lucidus, fulgidus solare et lunare transformatur corpus.  
 Sed in eo est opus facilis tractationis et longi laboris.  
 Post illum vero venus minus perfecte mutationis eligitur,  
 5 difficilioris tractationis, brevius vero laboris a iove.  
 Saturnus vero post venerem perfectionem in transmutatione  
 ab illa diminutam habet, facilis tamen tractationis,  
 longissimi vero laboris. Mars vero inter cetera minime  
 perfectionis in transformatione consistit, tractationis  
 10 utique difficillime, et laboris longissime. Quecunque igitur  
 a velocitate liquefactionis corpora remota sunt,  
 difficilis inveniuntur in transformationis opere

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1. *post igitur add. in ras.* iouis in splendida et in lucidiora sunt et in  
 perfectiora sunt solari et lunari A//in *om.* RTW//2. fulgidus: fulgidus et  
 perfectus PRTD et perfectus BWH//solare: in solare RTW//3. opus  
*om.* B//4. illum: illud BRWH ipsum T//minus *om.* B idest minus T//5.  
 brevius: breviorum B brevioris TWH//a *om.* BH//6. venerem: veneris  
 R//7. tamen: autem BRTH attamen W//facilis: facilem D//tractationis:  
 mutationis seu tractationis A attractionis turbationis W//8. cetera: cetera  
 corpora BH//9. tractionis *om.* D//10. utique: utile T//igitur *om.* RT//12.  
 difficilis: difficiles B difficillime R//

tractationis - et sunt huiusmodi venus et mars - que vero  
 15 magis, magis; que vero maxime, maxime. Quecunque vero  
 maioris lividitatis infectione sunt participantia, et hec  
 laboris longioris inveniuntur, et minoris perfectionis.  
 Quecunque tamen perfectionum diversitates paulo prius a nobis  
 determinate in minori et medio operis artificio reperte sunt.  
 In maiori vero unius perfectionis sunt omnia, non autem unius  
 20 tractationis aut laboris sunt. Remanent enim et que  
 tractationis facilitas et que difficultas, et que brevitatis  
 laboris et longitudo ex radice innata corporum invente sunt.  
 Iam ergo principia naturalia traditione vera que est ex

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13. huiusmodi: huius BTWHD//vero: vero sunt *rell.*//14. *pr.* magis: magne  
 P *om.* D//que: et que PBRTWHD //pr. vero *om.* BRTWHD//maxime  
*om.* D//Quecunque: quicunque B//15. maioris: magne D//sunt: insunt  
 T//infectione: infectionem BWH imperfectione D//hec: hoc B//16.  
 laboris: labore B//longioris: longiore B//et: etiam et BH//17.  
 Quecunque: quicunque B//tamen: autem PT attamen BWH//18.  
 minori et medio: medio minoris B minoris et mediocris T//artificio:  
 artificis A//reperte: reperto R//19. vero *om.* B unius: unius vel minoris  
 RT//non autem: autem ea T//20. aut: vel T//sunt: est nec T//Remanent:  
 Remanent et A//que: quoniam T//21. que difficultas: difficultas  
 PBRTHD difficultas W//*alt.* et que: atque T//22. longitudo: que  
 longitudo W//ex: in D//innata: in natura B *meram ut vid.* D//invente:  
 inventa BWH//23. *ante Iam add.* Remanent enim ut dictum est. A Explicit  
 liber .3. Incipit .4. Prohemium ad summam intentionis huius librique est  
 de principiis huius magisterii que sunt practica huius artis quibus  
 pervenitur ad huius operis complementum. P//ergo: vero WH//vera:  
 manifesta T//est *om.* BWH sunt T//

intentione nature ipsorum corporum ascripsimus, et ipsorum  
 25 corporum similiter determinatos sermones in singulis capitulis  
 veraciter exposuimus, et secundum sententiam eorum qui intima  
 nature videre potuerunt, et secundum nostram qui ad eam  
 pervenimus cum instantia laboris. Nunc vero secundum quod  
 30 invenimus expedit huius artis defectum supplere, et principia  
 omnia huius magisterii tradere in nostri ultima sermonis  
 parte, et perfectionem quam vidimus secundum eius exigentiam  
 monstrare cum causis suis.

**<36> Liber secundus de principiis huius magisterii et  
 perfectionis eiusdem. Sermo generalis in  
 35 principiis magisterii. Rubrica**

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25. similiter: supra W//determinatos sermones: determinato sermone BH  
 26. et *om.* T//sententiam: summam H//qui: que B//intima: in intima  
 D//27-8. et-laboris *om.* BWH//27. nostram: naturam PRT//qui: qua  
 RT//eam: ea PRTD//29. invenimus: promissimus T//huius: hic W//30.  
 nostri: nostra *rell.*//33-5. Liber-Rubrica *om.* P Explicit liber secundus.  
 Incipit liber tertius de principiis huius magisterii. B Incipit quinta pars  
 principaliter de principiis magisterii nostri et de consideratione rerum  
 quibus venit ad perfectionem et rerum in quibus consistit perfectio. R  
 De principiis magisterii nostri et de consideratione rerum quibus  
 pervenitur ad perfectionem et rerum in quibus consistit perfectio. T De  
 principiis nostri magisterii et eius perfectione W Incipit liber tertius  
 de principiis nostri magisterii et de perfectione eius H De principiis  
 magisterii et de perfectione eiusdem D//

Sunt vero que determinanda sunt principia scilicet huius  
 magisterii et perfectio eiusdem. Sunt itaque huius artis  
 principia modi operationum ipsius quibus applicatur artifex ad  
 hoc magisterium, qui a se invicem sunt diversi. Est enim unus  
 40 modus sublimatio, et descensio alter, tertius autem distillatio,  
 et unus ex modis est calcinatio et alius modus solutio, sextus  
 coagulatio, septimus vero modus fixio, octavus vero ceratio,  
 de quibus singulam narrationem faciemus. Perfectio consistit  
 ex consideratione rerum quibus pervenitur ad eam,

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36. Sunt: Nunc RD//que *om.* W//scilicet *om.* BRTWHD//37. perfectio:  
 perfectionis BTH// Sunt: *s.l.* A//38. modi: et modi D//operationum:  
 operationis B//39. *post* magisterium *add.* sunt A//qui: qui quidem  
*rell./a:* ad A//40. modus *om.* A *add. in mg.* A<sub>2</sub>//tertius autem: et unus  
 est BRHD et unus etiam TW//41. *pr.* et-modus: *mg.* A<sub>2</sub> *in textu* quartus  
*in ras.* A et ex aliis modis est calcinatio et unus est B *pr.* et - modus *om.*  
 RD *pr.* et *om.* et *add.* etiam T modus *om.* W et alius ex modis est  
 calcinatio et unus est solutio H//*post* modus *add.* quintus *in ras.* A et alter  
*add. s.l.* A<sub>2</sub>//41-2. sextus coagulatio: coagulatio sextus est calcinatio  
 (sextus est calcinatio *in ras.*) A alter coagulatio RD sextus est coagulatio  
 BH alter vero coagulatio T//42. vero modus: *mg.* A est B vero  
 RTWHD//octavus vero: octavus *in textu* vero *mg.* A octavus est BRWHD  
 octavus vero est T//43. singulam *om.* B singulam T singulis WHD//44.  
 ex-eam *om.* W//*ex:* in B//

[67va] et ex consideratione rerum iuvantium, et ex consideratione  
 ipsius rei que ultime perficit, et ex qua cognoscitur si in  
 perfectione fuerit magisterium vel non. Consideratio eorum  
 quibus pervenitur ad operis complementum est consideratio  
 5 substantie manifeste, et colorum manifestorum et ponderis in  
 unoquoque corporum mutandorum, et eorum que non mutanda sunt  
 ex radice sue nature absque ullo artificio, et consideratio  
 illorum similiter in radice sua cum artificio, et consideratio  
 principiorum corporum secundum suum profundum occultum et  
 10 manifestum, secundum naturam suam in artificio et eorum  
 similiter sine artificio, quoniam si non cognoscerentur

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1. et-et *om.* B//*pr.* et *om.* W//iuvantium: iuvantium perfectionem T//2.  
 ipsius rei: rerum scilicet ipsius rei B// ultime: ultimo RT//perficit:  
 perficitur T//et ex qua: et ex quarto A ex qua scilicet re BWH *om.* R et ex  
 cognitione rerum illarum quibus T//cognoscitur *om.* R recognoscitur  
 D//si in: *fort.* sine A//2-3. si-non *om.* R//3. fuerit: sit BT//4. quibus: ex  
 quibus T//6. corporum mutandorum: corpore immutandorum T//eorum  
*om.* A eorum scilicet corporum BWHD//non mutanda: immutanda T//7-  
 8. et-artificio *om.* T//8. illorum: eorum BWHD//et consideratio:  
 consideratio H//9. et *om.* B//10. suam in: sine PW suam sine BTH suam  
 R//in *om.* D//10-1. artificio et eorum similiter *om.* RD//11. sine: cum  
 PBTWH//sine - cognoscerentur *om.* D//

corpora et illorum principia in profundo sue nature et  
 manifesto, cum artificio et sine, nesciretur quid superfluum  
 in eis et quid diminutum esset, quare necesse foret nos  
 15 nunquam ad perfectionem illorum pervenire transmutationis.  
 Consideratio autem rerum iuventium perfectionem est  
 consideratio naturarum illarum rerum quas corporibus sine  
 artificio videmus adherere et mutationem facere - et sunt  
 20 marchasita, magnesia, tutia, antimonium, et lapis  
 lazuli - et consideratio eorum que sine adherentia corpora  
 mundificant - et sunt scilicet sales et alumina, nitra et  
 baurachia, et que sue nature sunt - et consideratio  
 vitrificationis mundantis per similem naturam.

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12-3. corpora - manifesto *om.* D//12. illorum: eorum R//et: in T//13.  
 cum *om.* D//artificio: suo artificio R *trans. post* sine D//*post* artificio *add.*  
 et si D//et sine: et fine B etiam sic W sine D //14. esset *om.* AR//foret:  
 esset *in ras. fort.* foret *s.l.* A<sub>2</sub>//15. nunquam *om.* RT//ad: aliter ad  
 B//perfectionem-transmutationis : perfectionis transmutationem  
 pervenire BH//pervenire: non pervenire RT//16. autem *om.* BWH//17.  
 rerum *om.* T//quas: que APRD//18. et mutationem: immutationem et  
 T//facere: superare B //19. thutia: et thutia B//et *om.* BRTWH//20.  
 lazuli: lazuli et similia T//21. et sunt: ut sunt P sicut T//scilicet: huius BW  
*om.* T huiusmodi H//sales: sal ART//nitra et: vitra et B nitrum et W nitra  
 D//23. vitrificationis: vitri R vitrificatione sua T// mundantis: mundant  
 ipsa R//similem naturam: consimilem naturam suam PBTWHD//

<37> **Sermo generalis in perfectione magisterii**  
 25 Consideratio vero rei que perficit est consideratio  
 electionis pure substantie argenti vivi. Et est medicina  
 que ex materia illius sumpsit originem, et ex illa creata  
 est. Non est autem illa materia argentum vivum in natura  
 sua, nec in tota sui substantia, sed fuit pars illius. Non  
 30 est autem nunc lapis noster, sed cum factus, est pars eius.  
 Ipse enim illustrat et ab adustione conservat, quod est  
 perfectionis significatio.

<38> **Sermo generalis in consideratione examinis  
 perfectionis magisterii. Rubrica**

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24. Sermo-magisterii *om. rell.*//25. perficit: ultimo perficit T//26.  
 medicina: materia AP medicina vel materia//27. que *om.* R//sumpsit:  
 assumpsit BWH//illa: ista BD ipsa T//28. illa materia: ista materia R  
 ista medicina T//argentum vivum: argenti vivi BRH//natura: tota natura  
 T//29. sui *om.* BWH//Non *om.* T//30. *pr.* est *transp. post alt.* est  
 T//autem: autem que R *om.* H//et *add. in ras. ante nunc A.*//cum *transp.*  
*post nunc ABRWHD post autem T//sed om.* ABRTWHD//31. ab  
 adustione: a combustione P ab ab adustione B ab ustione T//33-4.  
 Sermo-Rubrica *om. rell.*//



35 Consideratio vero rei ex qua cognoscitur utrum magi-  
sterium in perfectione sit vel non est consideratio cineritii,  
cementi, ignitionis, fusionis, expositionis super vapores  
acutorum, extinctionis, commixtionis sulphuris adurentis  
40 argenti vivi facilis vel difficilis. Hec autem omnia  
narrabimus cum causis suis et cum experimentis facilibus,  
quibus poteris manifeste cognoscere sermones vere nos  
narrasse; et hec experimenta erunt tibi penitus nota.

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36. sit vel: fuerit an P consistat vel W//39. corpora: corporum  
P//reductionis: reductio autem R et reductionis BH//et susceptionis:  
susceptio R//40. facilis vel difficilis *om.* A faciliter vel difficiliter  
T//autem: enim BH//41. *alt.* cum: eius T//experimentis: experienciis  
D//42. quibus: quo T//vere: vero P vos *fort.* B veros RTWHD//42-3. nos  
narrasse: narrasse nostros A//43. experimenta: experimento D//tibi *om.*  
PTWH//penitus *om.* P//

[67vb] <39> Sermo generalis in sublimatione. Rubrica  
Consequentes igitur nostrum propositum, dicimus de  
sublimatione. Et fuit causa inventionis eius quoniam non  
invenerunt antiqui nostri nec nos nec qui post nos erunt  
5 aliquid quod uniretur corporibus nisi spiritus solos, vel  
aliquid quod naturam corporis vel spiritus in se continet. Et  
hos proiectos super corpora sine illorum mundatione viderunt  
vel non perfectos colores dare, vel ex toto corrumpere,  
adurere, denigrare, et defedare, et hec secundum diversitatem  
10 ipsorum spirituum. Quidam enim sunt adurentes ut sulphur et  
arsenicum et marchasita, et hi quidem corrumpunt ex toto.

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1. Sermo-Rubrica: De sublimatione in genere et de causa inventionis illius  
P De sublimatione ad quid inventum B De causis sublimationis R De  
sublimatione et primo ad quid inventa sit T De sublimatione et causa  
inventionis illius W De sublimatione ad quid sit inventa H De  
sublimatione ad quid inventa sit Rubricum. D//2. Consequentes:  
Consequenter BRH//2-3. igitur-sublimatione: de sublimatione dicendum  
est R//3. Et *om.* RT//causa: causa vero T//eius: sublimationis  
R//quoniam: quia BRTWHD//nostri *om.* RT//nec - erunt *om.* W//5.  
uniretur: unirent P//corporibus: corporibus in ipsis T//6. continet:  
conteret P contineat BH//7. super: supra T//illorum *om.* B//8. *pr.* vel  
*om.* T//*alt.* vel: sed T// 9. denigrare: denigrari D//et defedare et hec *om.*  
B//defedare: fedare W defedari D//hec: hoc H// 11. et hi: hi T//

Alii vero non adurunt, ut omne genus tutie, et hec quidem imperfectos colores dat. Et ideo illud - quoniam qui adurunt, denigrant, et defedant, de duplici causa hoc faciunt, una  
 15 quia unctuositas adustiva sulphureitatis de cuius proprietate est inflammari defacili, per inflammationem denigrari, et per consequens denigrare, ab eis non est ablata. Altera vero causa est terreitas que ab eis similiter separata non fuit. In his autem in quibus non datur perfectus color,  
 20 est causa sola terreitas lividum faciens corpus. Potest autem adustio lividum creare colorem. Ideo ingeniati sumus hos mundare ab unctuositate videlicet adurente et

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12. omne genus tutie: omnes thutie igitur A//hecquidem: hec quoque A hi quidem T hoc quidem WH//13. dat: dant BRTH//qui: que BWH quod D//14. hoc: illud B//15. quia: quoniam BRTWHD//unctuositas: non occiositas A//sulphureitatis: sulphuris BRTWHD//16. inflammari: inflammarum A inflammare D//per: et B et per RTWH//17. denigrare: denigrata corrumpi BWH adurencia T//18. vero: autem W//18-20 que-terreitas mg. T//19. quibus: quo B//20. causa sola om. AP//lividum: et lividum T//corpus: fort. esse P om. BTWHD//potest autem: potestri(!) et P potest etiam BWH potest et ut vid. R potest etiam et D//21. adustio: et adustio W//creare: creavit P//Ideo: ideoque D//22. unctuositate: ventuositate D// videlicet: scilicet RT//adurente: adurentem W//post adurente add. eam habentes scilicet APRW eam habentes T eam habentes in ras. D//

a terrea superfluitate omnes. Et ad hoc per nullum magisterium potuimus pervenire, nisi per solam sublimationem.  
 25 Ignis enim, cum elevat, subtiliores partes semper elevat; ergo dimittit grossiores. Et hoc patet per sublimationem - spiritus terreitate mundari que et ingressionem impediabat et colorem immundum dabat. Experientia vero notum facit tibi satis per visum tuum illos ab ea absolutos esse. Vides enim  
 30 eos splendiores et magis pervios, et eos facilius corporum densitatem subintrare et penetrare, et non fedum ut prius facere. Quod vero per sublimationem spiritus adustio moveatur patet experimento, quoniam arsenicum quod prius ante sui

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23. omnes: eius D//24. potuimus: possumus BHD possimus W//25. subtiliores - elevat om. D add. in mg. D<sub>2</sub>//partes semper om. P partes super R//26. dimittit: dimittat P//ergo: et BH//Et: ex RTH et per W//27. terreitate: a terreitate PD//pr.et om. BTWH//28. notum om. P//facit om. A//29. visum tuum: visum BRWH//30. eos om. BR//30-1. corporum densitatem: operari diversitates W//31. ut om. B//32. facere: faciebant T// spiritus om. rel./moveatur: removeatur rel./33. sui om. BRH//post ante add. in H//

- sublimationem impurum erat ab adustione, post eius  
 35 sublimationem inflammari se non permittit, sed solummodo sine  
 inflammatione recedit. Et hoc idem in sulphure experimentum  
 invenis. Quia ergo in nullis aliis quam in spiritibus vidimus  
 adherentiam ad corpora cum alteratione, per nulla ergo alia  
 fuimus ab eis excusati, quin necessarium fuerit illos  
 40 preparasse cum mundificatione illorum, que est per  
 sublimationem. Ideoque hec fuit causa necessaria inventionis  
 sublimationis. Igitur narremus eius ordinem

34-5. impurum-sublimationem *om.* B//34. erat: fuit H//ab adustione: ad  
 adustionem A adustione et adustibile T per *s.l.* adustionem D//35.  
 inflammari-permittit: non inflammatur R//solummodo: solum R//36.  
 idem: quidem T//experimentum: expertum R//37. invenis: invenimus P  
 invenies BRTWHD//Quia: Quod Qua B//quam in: quam B a  
 W//vidimus: videmus T//38. adherentiam: adurenciam B//per: pro  
 BWH//alia: alia causa BWH//ergo *om.* R//39. ab eis *om.* BWH//quin:  
 quoniam A//fuerit: fuit HD//40. mundificatione: modificatione H//41.  
 hec: cum hec P hoc W *om.* D//necessaria inventionis: necessitatis W//42.  
 igitur: ergo T//

[68ra] totum sine diminutione et ipsius essentiam.

<40> Sermo particularis in sublimatione sulphuris et alie sicce rei

- Dicimus igitur quoniam sublimatio est rei sicce per ignem  
 elevatio cum adherentia sui vasis. Sublimatio vero  
 5 diversificatur propter diversitatem spirituum sublimandorum.  
 Quedam enim fit cum ignitione maiori, quedam cum mediocri,  
 quedam cum igne remisso. Si igitur sublimetur arsenicum vel  
 sulphur, necesse est illa per remissum ignem sublimari,  
 quoniam, cum habeant partes subtilissimas coniunctas  
 10 uniformiter grossis, ascenderet utique tota illorum substantia

1. sine: in H//ipsius: eius W//2. Sermo-rei: De sublimatione quid sit et  
 de diversitate et proprie de modo sublimationis sulphuris et arsenici cum  
 omnibus illius causis P Quid sit sublimatio B Diffinitio sublimationis. Et de  
 sublimatione sulfuris et arsenici. R Quid sit sublimatio et de diversitate  
 eius et qualiter debeat ordinari T Quid sit sublimatio et de diversitate  
 eiusdem et qualiter debet ordinari et primo de sublimatione sulphuris et  
 arsenici W Quid sit sublimatio et de diversitate eiusdem et qualiter debet  
 ordinari H Quid sit sublimatio et qualiter debet ordinari a diversitate  
 eiusdem rubri. D//3. Dicimus igitur quoniam *om.* R//quoniam: quod  
 BTWH//4. vero *om.* W//5. spirituum sublimandorum: rerum  
 sublimandarum B rerum sublimandarum sive spirituum W//6. fit: sunt  
 B//maiori *om.* PBTWH non legitur R//post ignitione *add.* ut marchaside  
 magnesie tuchie T//maiori *om.* D//*alt.* cum: vero cum PD//mediocri:  
 igne mediocri BWH igne mediocri ut mercurius et arsenicum T//7.  
 remisso: remisso ut sulphur T//sublimetur: sublimatur T//8. necesse:  
 necessarium W //illa *om.* BH//remissum: dimissum A tenuissimum  
 W//10. uniformiter: conformiter B//illorum: illius B//

sine purificatione aliqua, immo denigrata et combusta. Ut  
 igitur separet quis immundam terream substantiam, necesse est  
 ingenia duorum invenire generum, proportionem scilicet ignis  
 et mundificationem cum commixtione fecum, quoniam commixtio  
 15 cum fecibus partes comprehendit grossas et tenet illas in  
 aludel fundo depressas, nec eas scandere permittit. Unde et  
 necesse est artificem triplicem ignis gradum sublimationi  
 applicare, unum proportionare taliter quod per eum ascendant  
 alterata, tamen mundiora et lucidiora. Et per hoc manifeste  
 20 videat ipsa mundari a terra feculenta. Alter vero gradus est

11. purificatione: puritate W//12. igitur: sibi H//separet: separaret  
 B//immundam: mundam B//terream: et terream W//necesse:  
 necessarium W//est: fuit BWH//13. ingenia: ingenio D//generum:  
 generationum W//scilicet *om.* BH//14. cum: in R//15. illas: ipsas R//16.  
 aludel: allutelli BWH//fundo: in fundo D//scandere: ascendere RT//et  
*om.* RT//18. unum: primum B unum autem T//quod: quod ea que B ut  
 RT//ascendant: ascendunt BH//19. tamen *om.* BH//*post* tamen *add.* et  
 D//mundiora: et mundiora PW //lucidiora: lucidiora appareant BH//19-  
 20. *alt.* Et-feculenta *om.* T//20. videat: videatur B videantur D//terra:  
 terrea BRH terre W//feculenta: feculentia PBWHD substantia feculenta  
 R//Alter vero: Secundus vero B Alius vero modus vel T//est *om.* W *om.*  
 D *add. s.l.* D<sub>2</sub>//

ut quod in fecibus remansit de pura illorum essentia  
 sublimetur cum maiori expressione ignis, scilicet cum  
 ignitione aludel et ipsarum fecum quam videre poterit artifex  
 manifeste cum oculis suis. Tertius vero gradus est ut  
 25 administretur ignis debilissimus sine fecibus ei quod  
 sublimatum est a fecibus et quod est iam depuratum, quo vix  
 aliquid de illo ascendat. Et quod ascendet de illo fit res  
 subtilissima que huic operi nihil valet, quoniam illa est res  
 qua mediante perficitur adustio in sulphuribus. Est igitur  
 30 tota sublimationis intentio hec - ut remota terreitate illius  
 per ignis administrationem debitam, et abiecta similiter ex ea

22. sublimetur: *fort.* iterum sublimetur T//maiori: maioris  
 BRTWH//expressione: impressione T//scilicet: videlicet PBHD ut  
 W//23. quam: naturas T//artifex *om.* A//24. manifeste *om.*  
 ABWHD//cum oculis suis *om.* PR oculis suis T cum oculis W//vero *om.*  
 RTWD//25. sine: et sine PBWH//ei: eius R illi T//26. quod: quia D//*alt.*  
 est *om.* AD *add. s.l.* D<sub>2</sub>//*post* est *add.* ita BWHHD *add.* si T//quo: quod  
*rell.*//27. ascendat: ascendit BH//Et-ascendet: Et-illo *om.* W et quod de  
 illo ascendit *add.* W<sup>2</sup>//ascendet: ascendit BH//fit: sit R//29. sulphuribus:  
 sulphure et arsenico B sulphure WH sulphuri D//31. ex ea: ex eo BTWH  
*om.* R//

subtilissima et fumosa illius parte que adustionem cum  
 corruptione adducit, relinquatur nobis pars illa que ita  
 equalitate consistit, que simplicem fusionem super ignem  
 35 facit sine adustione aliqua, ea de igne fugiente sine  
 inflammatione illius. Quod vero subtilissimum sit adustivum  
 manifestissimis argumentationibus probatur, quoniam ignis ad  
 suam convertit naturam unumquodque eorum quod illi magis  
 affine est, - sed ex unaquaque re adustibili, magis affine est  
 40 quod ex illa est subtile, et adhuc magis affine est quod  
 est subtilius, ergo et maxime affine quod subtilissimum est -

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33. relinquatur: relinquatur RT//ita: in PRT//34. consistit: consistat  
 R//fusionem: fixationem BRH// super: per RT//35. sine-fugiente *om.*  
 BWH//ea *om.* P eadem RT//36. vero *om.* R//37. manifestissimis:  
 manifestis BTH//argumentationibus: argu A (- mentationibus *in ras.*) -  
 mentationibus *add.* A<sub>2</sub>//38. eorum : illorum PRT//illi: *mg.* A<sub>2</sub> sibi  
 R//post quod *add.* sibi *in ras.* A//39. unaquaque: unoquoque D//40.  
 quod-subtile: *trans.* quod autem ex illa est subtile *post pr.* est *l.* 39. A *add.*  
*in mg.* A<sub>2</sub> subtile R//ex - affine est *om.* D//40. illa: ea T eo W//ante et  
 adhuc *add.* *ras.* igitur A//alt. est *om.* TW//41. subtilius: magis subtile  
 B//ergo: igitur B//et *om.* R est W//maxime: magis W//affine: affine est  
 BTH//quod *om.* P//

[68rb] ab experientia similiter, quoniam sulphur vel arsenicum non  
 sublimatum velocissime inflammatur, sulphur vero facilius.  
 Sublimatum vero directe non inflammatur sed volat et extenuat  
 sine flammatione precedente, tamen fusione. His itaque patet  
 5 sermonem nostrum veridicum esse. Probatio vero  
 administrationis fecum cum proportione sua est ut eligatur  
 materia illa cum qua conveniunt plus spiritus sublimandi, et  
 cui permisceantur profundius, quoniam illa cui magis unientur  
 potentior est in retentione fecum sublimandorum quam cui non.  
 10 Huius rationabilis satis est manifesta probatio. Probatio

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1. ab experientia: Ad experientiam W//similiter: vides BH probatur  
 similiter T similiter patet W//vel: et RTW// 2. sublimatum: sublimata  
 TW//inflammatur: inflammanatur W//3. Sublimatum: Sublimatur A  
 sublimata T//volat: evolat PBWH volant T//extenuat: extenuatur  
 PBWHD exterminatur R extenuant T //4. flammatione: inflammatione  
*rell.*//tamen: cum BR//His: ex his PT//5. nostrum *om.* R//6.  
 administrationis: administrationum B//est *om.* R//eligatur: eliciatur  
 R//7. plus *om.* R//et *om.* R//8. //post illa *add.* natura RTD *add.*  
 materia B//unientur: ununtur BRWH unirentur T//9. sublimandorum:  
 sublimandarum W//10. rationabilis: rationi P rationalis B rationis  
 RTWD//

vero quod necessaria sit fecum administratio est quia si  
 non coniungeretur sulphur vel arsenicum sublimandum cum  
 fece de aliqua re fixa, tunc necesse esset cum tota sui  
 substantia ascendere non mundata. Ex experientia  
 15 vero sciunt nos verum dicere qui in sublimationibus  
 exercitati sunt. Probatio vero quod necessaria sit talium  
 fecum administratio quibus sublimanda conveniant et uniantur  
 in profundo suo est quoniam si secum non permiscerentur per  
 minima, tunc ideoque contingeret sicut si fecem non haberent,  
 20 scilicet ut ascenderet tota illorum essentia sine mundatione  
 aliqua. Si enim ascendunt sine fecibus cum tota

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11. vero *om.* T//est quia: quia A est quod P est quoniam BH//12.  
 sublimandum: sublimando D//13. de aliqua re fixa: alicuius rei fixe  
 RT//esset: foret BH est W//14. non mundata: immundatum B non  
 mundatum H//Ex *om.* BRTWHD//15. vero *om.* BRH//17. post fecum  
 add. scilicet D//conveniant: conveniunt H//uniantur: uniuntur H//18. est  
*om.* A//quoniam: quod D//secum: feces BWH D secum feces secum  
 T//permiscerentur: permiscerentur W//19. minima: minime H//ideoque:  
 idem BRTD eisdem W//si fecem: feces BD add. si *s.l.* D<sub>2</sub> si feces  
 TWH//20. essentia: substantia W//21. Si enim: si non enim R similiter  
 T//ascendunt: ascendant BWH D//

substantia, ergo et similiter a fecibus sublimata quibus non  
 uniuntur ascendere necesse est. Ex experientia scit  
 necessarium hoc esse qui hoc vidit et novit, quoniam cum  
 25 sublimavit a re extranea a corporum natura, sublimavit in  
 vanum, ut nullo modo depurata post ascensionem illorum  
 ipsa inveniret. Si vero cum calce alicuius corporum  
 sublimavit, tunc bene sublimavit, et perfecte mundare potuit  
 cum facilitate. Est ergo intentio fecum ut administrentur  
 30 calces metallorum. Est enim in illis facilis operationis  
 sublimatio, cum rebus autem aliis difficillime. Non

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22. et *om.* BTWH//sublimata: sublevata BWH//ante quibus add. a RD  
 cum BTWH//23. Ex: Et P *om.* BTWHD//scit: sit A *ras.* P add. scit P sic  
 BH illius scit T//24. necessarium: verum W// esse: fore RT//25. extranea  
 a: extranea ab eorum TWH//27. ipsa: illa W//corporum: corporis  
 RTWHD *fort.* B//28. *pr.* sublimavit: sublimatur P sublimaveris W//bene  
*om.* P//alt. sublimavit: sublimabis W//et perfecte: perfecte H//potuit:  
 poterit R poteris W//29-30. administrentur calces: administretur de  
 calcibus PBWHRT administrentur de calcibus D//30. metallorum:  
 metallicis R//in *om.* W//operationis: administrationis P//

est igitur aliquid quod locum illorum possit obtinere.  
 Non autem dicimus sublimationem impossibilem sine  
 calcibus corporum, sed eam difficillimam et longissimi  
 35 laboris, et protelationis usque in desperationem. Sed  
 in hoc tantum bonitatis habet, quoniam quod sublimatur absque  
 fecibus vel sine corporum calcibus est multe quantitatis, quod  
 vero cum fecibus minoris, adhuc vero et quod cum corporum  
 calcibus minime est quantitatis, sed facillimi laboris  
 40 et brevissimi. Illud vero quod plus nos excusat a fecibus  
 de corporibus est omne genus salis preparatum et huius

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32. illorum *om.* D *add. s.l.* D<sub>2</sub>//possit: possiderat vel possit A//34. eam  
*om.* BH//et *om.* R//35. protelationis: prolongationis T//in: ad H//36. in  
 hoc *om.* A hoc W//tantum: tanto A *om.* T tanta H//bonitatis: bonitas  
 H//quoniam: quia D//quod: spiritus qui T//37. *post* corporum *add.*  
 fecibus B//sine *om.* W//quod: qui T que W//*post* multe *add.* et D//38.  
 fecibus: fecibus est W//quod: hoc quod BH qui T *om.* W//corporum:  
 corporibus P//39. *post* calcibus *add.* sublimatur H//sed: sed operis  
 P//laboris: et laboris P//40. et *om.* P//41. de corporibus: corporibus A de  
*add. s.l.* A<sub>2</sub> corporum P//genus salis: sal D//huius: eius T//

[68va] consimilium in natura. Et est nobis cum eis sublimatio  
 multe quantitatis, et possibilis ab eis sublimandorum fecum  
 separatio per salium solutionem, quod in nullis aliis rebus  
 esse contingit. Proportio vero fecum est ut quantitas fecum  
 5 quantitati sublimandorum equetur, in hac enim et rudis artifex  
 errare non poterit. Mediocre[m] vero artificem ponere  
 medietatem ponderis sublimandorum ex fecibus sufficiens  
 esse contingit, et in hac errare non debet. Exercitato  
 vero et maxime experto minima illarum sufficit pars.  
 10 Quanto enim minoris quantitatis feces sunt, tanto et maioris  
 exuberantie sublimationem necesse est esse, dummodo

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1. *post* eis *add.* salibus BTWHD//2. possibilis: possibilitas T//eis: his  
 salibus B eis salibus TWH//fecum: secum T feces D//3. separatio:  
 reparatio T//solutionem: sublimationem T//quod: quid B//nullis: multis  
 BH//4. esse: esse non BH *om.* W//5. equetur: perequetur BRTWHD//in  
 hac: *non legitur* P in hoc T//enim: etiam BTH enim etiam D//et *om.* R  
 proportione BH//rudis: rudus T rudix W//6. poterit: potuit H//ponere:  
 proponere B//8. esse: *non legitur* R//contingit: convenit W//hac: hanc A  
 hoc PTW//debet: oportet T//Exercitato: Exercitatio APD//9. experto:  
 perito RT reperto H//pars *om.* B//10. minoris: minores B//sunt: sint  
 BD//et *om.* RT//

secundum diversitatem subtractionis fecum fiat proportionalis illi subtractio ignis. In parva enim quantitate parvus ad perfectionem sublimationis ignis eliciatur, in magna magnus, 15 in maiori maior. Sed quoniam non est res ignis que mensurari possit, ideoque contingit in illo errare sepissime eum qui exercitatus non est, tum ex diversitate proportionis fecum, tum ex diversitate fornacum et lignorum adurentium, et similiter vasorum et coaptationis illorum, de quibus omnibus 20 expedit artificem attentum et sollicitum esse. Sed communem adducimus regulam - quoniam inprimis expedit

12. secundum: et secundum BR//diversitatem: diversitates RT//13. illi: illis R//subtractio: subtracto H//post quantitate add. fecum TWH//14. sublimationis om. A//eliciatur: efficiatur BWH//15. maiori: maiore W//quoniam: quia B//16. ideoque contingit: ideo convenit W//eum: precipue illum B tum R illum W precipue eum H//qui: quia R//17-8. diversitate-tum ex om. PD//18. fornacum: fornacis BWH furnorum T//19. vasorum: rasorum H//coaptationis: coartationis RT//illorum: eorum BTWH//20. expedit: oportet RT oportet et expedit W//et sollicitum esse: sollicitari P sollicitare BWHD om. R//21. adducimus: addimus D//

cum parvitate ignis solam aqueitatem ex sublimandis exprimere, qua remota, si quid ascendit per illum, tunc in principio hic non augeatur ignis ut per debilissimum ignem 25 subtilissima pars tollatur et seorsum ponatur, que est causa adustionis. Cum autem iam nihil vel modice ascenderit - quod experiri poterit cum intromissione licinii bombacis in superius foramen aludel - vigoretur ignis sub eo, et quanti vigoris esse debeat ignis 30 tibi experientia licinii ostendet. Si enim parum de sublimando et mundum exierit, adhuc parvus erit ignis: augeatur igitur. Si vero multum et immundum, tunc superfluous

22. cum om. W//23. ascendit: ascenderit T//illum: ipsum B//24. hic om. TD hoc B//ut: nisi A//25. subtilissima pars: subtilissime partes B//tollatur: tollantur BWH collatur D//seorsum: seorsum separata A//ponatur: repereatur P reponatur R deponantur BWH deponatur D//25-6. est causa: sunt cause BWH//26. vel: aut vel P aut BWH//modice: modicum BRTWH//27. ascenderit: ascendit BWH//quod om. BH//cum intromissione: per intromissionem T//28. ante licinii add. radii involuti cotone sive RT//licinii: lichino T//in-aludel: om. R//superius foramen: superiori foramine BHD foramine T//28-30. in-licinii om. W//aludel-ostendet om. BH// 29. sub: super D//et quanti vigoris: in quanti vigore R//30. tibi-ostendet: experientia licinii te docebit R te docebit rei sublimande appositi docet et ostendit T hoc enim illud ostendit W experientia lichinii ostendet D//31. mundum: modicum B//erit: est BRH//32. augeatur : augmentatur W//et om. B//immundum: im- s.l. mundum A//tunc superfluous om. A tunc superfluous add. in mg. A<sub>2</sub>//



est: subtrahatur igitur. Si vero multum et mundum, proportio  
iam inventa est. Immundum vel mundum, multum vel parum,  
35 inveniri potest per extractionem licinii quod in foramen  
aludel positum fuit. Secundum enim quantitatem  
munditiam vel immunditiam ex sublimando quam respexerit  
artifex adhesisse licinio, sillogizare poterit et in  
40 ignis rectificationem inveniet sine fallacia. Melior  
vero modus fecum est ut sumantur ferri squame  
vel eris combusti, he enim propter privationem

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33. est - mundum *om.* A *add. in mg.* A<sub>2</sub>//33-4. proportio iam inventa est: proportionem invenisti T//vel: vero vel P//34. parum: paucum W//35. inveniri: invenire W//*post licinii add.* vel bombace sive radii predicti R vel bombacis sive radii predicti T// 35-6. foramen aludel: foramine alutelli BWHd foramine Aludel R foramine T//36. fuit: fuerit P//*post fuit add.* si vero multum et immundum exierit tunc superfluum est ignis subtrahatur igitur *ex parte in ras.* A//*secundum:* et secundum T//*enim om.* BH quam RT//*quantitatem:* munditiei vel immunditiei *ut vid.* P mundam vel immundam BH maiorem vel minorem T munditiam vel immunditiam WD//37. ex sublimando *om.* A *add. in mg.* A<sub>2</sub>//*quam: in ras.* A *om.* D//38. *ante sillogizare add.* similiter W//*et om.* T//*in iter.* A//39. necessario ignem proportionalem: necessariam proportionalem *ex parte in ras.* A necessario proportionalem PD necessarium ignem proportionare BH necessario ignem proportionare R proportionalem ignem necessario TW//42. he: hoc BWH//*propter: per* BH//*post privationem add.* multe *ras.* A //

[68vb] multe humiditatis defacili sulphur aut arsenicum  
sibi imbibunt et secum uniuntur. Huius autem veritatem  
scit exercitatus solus.

<41> Sermo in rectificatione sulphuris et  
arsenici sublimatione. Rubrica.

5 Expedit ergo rectificare arsenicum nos, in quibus  
contingeret omnibus errare ignoranter in horum duorum  
spirituum sublimatione. Narramus igitur ei quod si multas  
feces posuerit, tunc si non augmentaverit ignem proportionalem  
10 nihil ex sublimando ascendet. Quomodo autem illum inveniat  
iam sibi sufficienter narratum est. Et si paucam fecum  
quantitatem vel non ex corporum calce posuerit, tunc et

---

1. aut: ac R//2. uniuntur: uniunt A//*autem om.* BH//3. scit: sciet BWH//4-5. Sermo-Rubrica *om.* PD De errore a fecibus BH Rectificatio artificis in quibus illum errare contingeret in sublimando sulfur et arsenicum R Rectificatio artificis in his in quibus contingit errare in sublimatione sulphuris et arsenici et primo de errore a fecibus T De errore ex fecibus et fornace W//5. sublimatione *ego:* sublimationis A//6. ergo: igitur T//*transp.* nos *post* quibus P//*contingeret:* contingerit W contingit BH//*omnibus:* in omnibus P *om.* W//*ignoranter:* ignorantes PW ignorantibus BH ignorantibus D//8. spirituum *om.* BWH//*ei:* enim D//*Narramus:* Narremus BT//10. *post illum add.* scilicet ignem W<sup>2</sup>//*inveniat:* invenietur *ut vid.* P inveniet BTWH //11. sibi: igitur tibi P *om.* W//*Et om.* RT//*fecum:* fecis RT//*calce:* calcibus BH//*et om.* RT//

si illius proportionem non invenit, ascendet sublimandum  
cum tota substantia. Et huius tradidimus similiter  
15 inventionem sufficienter. Ex fornace vero et similiter  
contingit errare, nam magna fornax magnum dat ignem, parvum  
vero parva, si ligna et foramina auricularum eis  
proportionentur. Si igitur posuerit multam rei sublimande  
quantitatem in parvam fornacem, ignem elevationis  
20 sufficientem non poterit exhibere, si vero paucam in magnam,  
sublimationem exterminabit propter ignis excessum.  
Similiter vero spissa fornax conculcatum et fortem dat ignem,  
tenuis vero rarum et debilem, in quibus similiter errare

13. proportionem: proportioni P procreationem D//invenit: minuerit P  
invenerit BRTWH//13-4. sublimandum cum: sublimandi R sublimando  
T//14. tradidimus: tradimus ABWH trademus R//similiter: super  
W//15.inventionem: inventionem A//sufficienter: sufficientem BRTWH//  
vero et om. RT vero D//16-7. parvum vero parva: parva parvum RT//17.  
vero om. D//si: et R//eis: eius BTWH//18. igitur om. W//posuerit:  
posuerint et P posueris T//multam: multe BWH//sublimande: ad  
sublimandum T//19. parvam fornacem: parva fornace RT//elevationis:  
sublevationis R elevationi W//19-20. ignem-magnam: ignem elevationis  
sufficientem non poterit exhibere si vero paucam quantitatem in magnam  
fornacem mg. T// 20. exhibere: extitere ut vid. BH//magnam: magna R  
magnam fornacem W//21. sublimationem: quantitatum sublimationes  
R// propter: per R//22. conculcatum: concitatum BTH om. R  
continuatum W//et om. R//23. tenuis: tenue T tenuit H//et debilem:  
debilemque B//in om. R//errare: errari A//

contingit. Similiter vero spissa et cum spatiosis auriculis  
25 furnus clarum et magnum dat ignem, cum strictis vero debilem.  
Item etiam si maior fuerit in vasis coaptatione ad furnum  
distantia a spondilibus eius, magnum dabit ignem, si vero  
minor, minorem, in quibus omnibus contingit errare maxime.  
Rectificatio ergo horum est ut scilicet furnus constituatur  
30 secundum intentionem ignis quem querit - spissus scilicet et  
cum liberis auriculis cum distantia vasis aludel multa a  
spondilibus furni si magnum querit ignem. Si vero mediocrem,  
mediocritatem in his omnibus inveniat proportionalem, si vero  
debilem, proportionem in his eisdem inveniat. Et has  
35 proportiones omnes docebimus te invenire cum proportione

24. contingit: convenit W//Similiter: si BWH//vero: non ut vid. T//spissa  
om. AP//25. furnus: fuerit B om. T fuerit furnus H//vero om.  
BRTWHD// 26. etiam: et P om. BRTWH//in om. PBWH *transp. post*  
vasis RD// vasis: vasis cum P vasis aludel T om. WH//coaptatione:  
coaptatio ut vid. B coartatione T coartatio WH//ad furnum om. D *add. s.l.*  
D<sub>2</sub>//28. contingit: convenit W//29. *post* Rectificatio *add.* vero D//scilicet  
om. T//constituatur: construat *rell.*//30. querit: intendis T//spissus om.  
T//scilicet: furnus BH//et om. PBWHD cum R//31. a: et H//32. *post*  
furni *add.* construat BH//querit: queris T//33. mediocritatem om.  
RD//33. mediocritatem om. D//proportionalem: proportionem R//34.  
debilem: debilem minorem T//his eisdem: his eidem A eisdem BWH eis  
R eis eidem TD//Et om. BH//35. docebimus te invenire: in paragrapho  
sequenti si igitur docebimus te invenire BH in paragrapho sequenti te  
docemus invenire W in paragrapho si igitur credimus te invenire D//

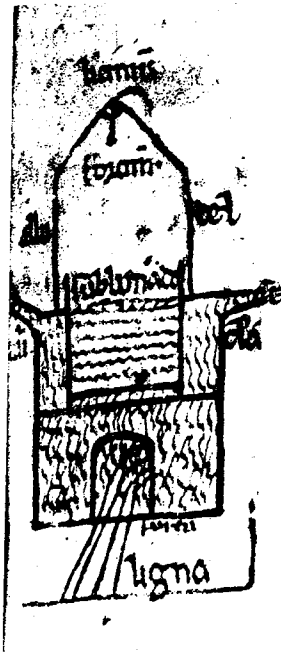
vera et experientia determinata. Si igitur volueris multam  
 sublimationis quantitatem elevare, tunc vas aludel tante  
 coaptationis invenias et capacitatis quod illam suscipiat  
 super fundum ad elevationem unius palme et ipsum ad illud  
 40 coaptas furnum, qui suscipiat aludel in medio sui cum  
 distantia parietum suorum per duos digitos. Et furno facto,  
 facias illi decem auriculas equidistantes proportione vera, ut  
 vera equalitas sit ignis ad omnes partes illius. Tunc vero  
 stipite ferreo in medio fornacis in spondilibus eius  
 45 firmato, qui a fundo fornacis distet ad extensionem unius

36. vera: sua R scilicet T//Si: Sed A//igitur: ergo D//volueris: vis  
 BRTWHD//38. coaptationis *om. rell.*//invenias: inveniatur BH//et *om.*  
*rell.*//capacitatis: concavitatis capacitatem T//39. ipsum *om.rell.*//40.  
 coaptas: coaptas T//qui: quod D//41. parietum: parietis R parietum  
 scilicet T//suorum *om. R*//per *om. D*//42. facias: fac RT//decem: *ras. P*  
 quatuor B .4. RTW .iiii. H 4<sup>or</sup> D//vera: una PRT//43. vera: una P//sit: fit  
 R//illius: ipsius T//44. stipite: cum stipite BH//eius *om. R*//

[69ra] palme cum pollice suo, et ad spissitudinem unius digiti  
 firmetur super eo vas aludel, et circumlimatur ad furnum,  
 cuius presens monstratur descriptio. Tunc vero si bene et  
 libere se expediverit de fumositatibus et flamma libere  
 5 per totum furnum transierit in circuitu aludel, tunc bene  
 proportionatus est, aliter vero male. Et tunc dilata eius  
 auriculas, et si emendatur, bene quidem, si vero non, tunc  
 necessario relinquitur quod distantia aludel a parietibus  
 parva est. Radantur ergo parietes et ampliatur distantia, et  
 10 postea tentetur. Reiteretur ergo ampliatio auricularum et  
 mensura spondilium quousque libere se absolvat a fumo et

2. eo: eum RT//circumlimatur: circumliniatur BW coniungatur RT//3.  
 cuius-descriptio *om. BH* cuius descriptio ad presens deest W cuius presens  
 demonstratur descriptio D//descriptio: hec descriptio T//monstratur:  
 demonstratur PR//4. expediverit: expedierit PTW expediunt BH//de  
 fumositatibus: a fumo BH//5. transierit: exierit B *om. RH* //6. aliter vero  
 male: si vero non non PBWHD si vero non RT/Et *om. R*//7. emendatur:  
 mundatur R emendabitur W//bene *iter. R*// vero non: non non T//9. *ante*  
 parva *add. sit in ras. A*//est s. l. A//ergo: ergo iterum W//ampliatur:  
 ampliatur BH//10. tentetur: adaptetur vel temptetur T//*ante* reiteretur  
*add. Quod si non bene B*//ampliatio: amplificatio T//11. mensura: rasura  
 P//libere *om. D*//absolvat: expediat W//a: de R//

&lt;Ref. 69ra,3&gt;



- flamma in circuitu aludel sit lucida et libere per auriculas  
 exeat. Ista est sufficiens experientia ad omnem sublimationis  
 quantitatem, de inventione magnitudinis furni et dilatationis  
 15 auricularum eius et distantie aludel a parietibus illius.  
 Inventio vero spissitudinis furni est quod si quesieris magnum  
 ignem, maior spissitudo illius sit, ad mensuram extensionis  
 palme cum pollice suo, si vero mediocrem, ad mensuram solius  
 palme, si vero minorem, ad spissitudinem duorum digitorum  
 20 formetur. Similiter vero ex lignis eliciatur proportio,  
 quoniam ligna solida fortem dant ignem, spongiosa vero

12. flamma: a flamma D//sit: si R//12-3. sit-exeat *om.* BH//13. omnem:  
 communem R// 14. quantitatem: qualitatem vel quantem quam est  
 T//de inventione: de ratione R de intentione vel invencione  
 T//magnitudinis: magni RT//furni *om.* W//dilatationis: dilatatione T  
 determinacionis D//15. distantie: distantia BTH//parietibus illius:  
 spondilibus eius W parietibus illis D//post illius *add.* De spissitudine furni  
 BWH Spissitudo furni D//16. Inventio: intentio R//vero *om.*  
 BH//quesieris: queris PBRT//17. illius *om.* T//sit: fit BR//extensionis:  
 unius BWH//18. palme: palme solius T//suo *om.* R//solius: unius B//  
 20. *post* formetur *add.* De lignorum proportione BWHD//Similiter: sic W  
 si HD//vero ex: vero et R in T//eliciatur: observetur PBWHD servetur  
 RT//21. quoniam: quia BRTWHD//dant *om.* W//vero *om.* BTWHD//

debilem, sicca magnum et cito terminabilem, viridia parvum et multum durantem. Similiter solida multum durantem, spongiosa vero multum defacili dant ignem terminabilem. Igitur  
 25 consideratione distantie aludel et magnitudinis et parvitatatis auricularum, et spissitudinis et tenuitatis furni, et lignorum diversitatis, accidit omnium ignium diversitates perquiri cum experientia sua vera. Ex conclusione vero maiore vel minore auricularum aut fenestre furni per quam ligna intromittuntur,  
 30 et administratione lignorum diversitatis, et additione et subtractione illorum, accidit inveniri determinatum spatium

---

22. debilem *om.* R//*pr.* et *om.* T//viridia: viridia autem RT virida H//23. Similiter: et similiter P *om.* W//24. vero *om.* BR//multum defacili dant *om.* R//ignem: cito R//Igitur *om.* R ergo PBTHD vero W//26. auricularum: auriculorum H//27. diversitatis: diversitas T//accidit: accidere A//diversitates: diversitatem BWH//28. Ex conclusione: exclusionem R//vera: vere naturali T//maiore vel minore: maiori vel minori T//29. aut: vel BWH//furni: ligni P//fenestre: fenestrarum BH//quam: quas BH//intromittuntur: intromittantur T//30. administratione: administrationem D//

temporis durationis ignis, scilicet ut scientia determinata sciatur quantum unusquisque ignis in suo gradu perdurare poterit in equalitate. Et hec investigatio est maxime tibi  
 35 utilis et necessaria, quoniam per eam excusaberis a multitudine laboris immensi. Exerciteris igitur in ea et in omnibus a nobis nunc novissime determinatis, quoniam qui se exercuerit invenire inveniet, qui vero non, non. Inventio vero vasis aludel est ut fingatur vas de vitro spissum. De  
 40 alia enim materia fieri non valeret nisi forte et similis esset substantie cum vitro. Solum enim vitrum et sibi simile cum poris careat potens est spiritus tenere ne fugiant et exterminentur ab igne; alia autem non, quia per poros eorum successive diminuuntur

---

32. scientia determinata *om.* B//33. sciatur: sciat A//34. in *om.* BH et WD//equalitate: qualitate W//hec: hoc B//maxime *om.* PR//35. eam: ea B//37. determinatis: dictis B//se *om.* B//38. exercuerit: excitaverit R//invenire *om.* *rell.*//vero *om.* D//*post alt.* non *add.* De forma aludel B De modo vasis aludel et de operatione ipsius vasis in sublimando sulfur et arsenicum R De forma aludel quod dicitur vas sublimationis TWHD//vero *om.* R//40. fieri *om.* *rell.*//valeret: valet BRTH//et similis *om.* B similis TH simile W//esset: esse D//41. substantie: substantia P//*post vitro add.* ut vas terreum vitrificatum ut dicitur in capitulo de sublimatione T//Solum *iter.* B//42. fugiant et: fugientes T//43. autem: autem materia BH igitur T//

[69rb] et evanescent. Neque etiam metalla in hoc valent, quoniam spiritus propter amicitiam et eorum convenientiam in illa penetrant et secum uniuntur, quare per illa transeuntes, evanescent. Quod per ea que a nobis sunt determinata aperte

5 probatur, necessario et experientia probatum est hoc nos verum dixisse. Ergo per aliquod aliud non excusamur a susceptione vitri in compositione aludel. Fingatur ergo concha vitrea rotunda, cuius fundus parve sit curvatis, et in medio spondilium eius formetur zona vitrea circumdans eam.

10 Et super illam zonam fundetur paries rotundus equidistans a conche pariete ad grossitudinem coopertorii ipsius conche,

---

1-4. Neque-evanescent *mg.* T//1. etiam: etiam et P//metalla in hoc: metallica *ut vid.* T//2. spiritus: ipsi spiritus BTWH//3. illa: ea W//4. ea: eam H//aperte *om.* B//5. probatum: repertum *rell.*//hoc: hic BH//6. aliquod aliud: aliquod AR alia T//8. cuius: eius W//fundus: fundum T//parve *om.* P//curvatis: circuitatis BWH//9. formetur: firmetur R//eam: illam W//10. fundetur: fingatur B//11. conche pariete: cooperiente BHD conche cooperiente T//coopertorii: cooperculi RTHD//ipsius: illius R//

ita quod in distantiam hanc cadat paries coopertorii large sine pressura. Altitudo vero parietis huius sit ad mensuram altitudinis parietis conche, aut parum plus, aut parum minus.

15 Formentur vero duo coopertoria ad mensuram huius concavatis duorum parietum equalia, quorum longitudo sit equalis et sit unius spanne, et figura eorum figura una scilicet pyramidalis, in quorum capitibus duo equalia sint foramina - unum videlicet in uno et alterum in alio - in quibus ambobus cadere possit

20 maior galline penna, ut in hac presenti conscriptione monstratur. Est ergo tota vasis intentio ut possit

---

12. distantiam: distantia T//hanc: hac T//13. huius *om.* W// sit: fit B//14. plus *om.* D//alt. aut parum: vel RW *om.* D//16. parietum: per latitudinem *fort.* P//17. spanne: palme RT//eorum figura *om.* D//18. videlicet *om.* BRWHD//19. alterum: aliud W//post alterum//add. vero P//alio: altero *ut vid.* B//20-1. ut-monstratur *om.* BH ut hic descriptione demonstratur que ad presens hic deficit W ut in hac presenti scriptione monstratur D//

&lt;Ref. 69rb,20&gt;



moveri secundum artificis voluntatem coopertorium illius et  
 quod iunctura sit ingeniosa, per quam sine lutatione aliqua  
 non pateat spiritibus egressio. Qui ergo in hoc magis  
 25 ingeniari potest non excuset se ab hoc per nostram  
 traditionem. Et est specialis intentio super hoc scilicet ut  
 concha inferior cum spondilibus suis usque ad medium subintret  
 coopertorium suum. Cum enim fumorum sit ascendere et non  
 descendere, per hoc invenimus inventionem prima spiritus non  
 30 habere ad consumptionem exitum, et habet preexcellere modos  
 alios quos inventionem nostra quesivimus. Et hoc experiendo,  
 vidimus verum existimasse de illa. Intentio vero et una est  
 ut sepiissime evacuetur aludel caput ne pre nimia sublimandorum

---

22. artificis: artificium sive artificis A//voluntatem: libitum vel voluntatem  
 B//23. iunctura: iunctura illius BH//lutatione: mutatione R//24.  
 spiritibus: speciebus B spiritus H//hoc: hac T//25. ingeniari: magis  
 subtiliare et ingeniari T ingeniare BWH//potest: novit *ras. add.* potest *mg.*  
 A// excuset se: excusatur P//per: propter T//26. traditionem: doctrinam  
 sive traditionem BH//est *om.* R//28-9. et non descendere *om.* PBR//29.  
 prima: bona *ras.* A vera T//30. exitum: vel exitum T extranei D//*post*  
 exitum *add.* exterminari T//habet: habent BTHD hunc R haberit  
 W//preexcellere: precellere R//31. nostra: eius R//32. vidimus: vidimus  
 nos PBTWHD videmus nos R// existimasse: estimasse PBRW dixisse  
 T//et *om.* BRTWH//33. evacuetur: vacuetur P//aludel: aluteli D//caput  
*om.* D//ne: ut D//pre nimia: per nimiam R//sublimandorum:  
 sublimatorum BH//

35 multiplicatione in illud cadant ad illius fundum et te  
 detineat multitudo reiterationis sublimationis occupatum  
 longo tempore. Est et similiter intentio altera ut semper  
 seorsum separetur quod sursum ad propinquitatem foraminis  
 40 capitis aludel ascendit in pulverem ab eo quod fusum et densum  
 in frustis et apud fundum illius pervium et clarum cum  
 40 adherentia vasis ad spondilia conscendisse invenitur, quoniam  
 hoc minus habet de adustione quam quod prope foramen reperitur  
 scandisse. Hoc autem in superioribus monstratur aperte,  
 10 ratione videlicet et experimento. Probatio vero bonitatis et  
 perfectionis sublimationis est iam dicta.

---

34. multiplicatione: multiplicitate BH multiplicationem R multitudine  
 W//in illud: ab limatura *ut vid.* B in id R//35. *post* occupatum *add.* te  
 A//36. Est *om.* H//et *om.* BWD etiam T// similiter *om.* RT//semper:  
 sepe P//37. separetur: separet R//sursum: cursum D//38. capitis *om.*  
 R//ascendit: ascenderit W//39. in: est in BH// pervium: per ...icularum B  
 purum R//40. vasis ad: ad vasis PW//conscendisse: ascendisse P quod  
 descendisse D//41. reperitur: invenitur BH inventum est RT//42.  
 monstratur: probatur *rell.*//aperte: aperta T//43. videlicet: scilicet  
 BRTWHD//experimento: experientia vel experimento B//

[69va] Et est quod invenitur clara et lucida, et non aduritur cum  
 inflammatione. Hec est ergo intentio perfectionis  
 sublimationis sulphuris videlicet et arsenici. Et si non  
 inventa est, iteretur opus super illam cum consideratione  
 5 omnium suarum intentionum quousque sic inveniatur.

**<42> Sermo in sublimatione mercurii**

Nunc vero totam intentionem argenti vivi sublimationis  
 determinemus. Est igitur completa summa illius depuratio  
 terreitatis et remotio aqueitatis illius. Excusamur  
 10 enim a labore eius adustionis remotionis, quoniam eam non  
 habet. Dicimus igitur quoniam ingenium separationis superflue

---

1. aduritur: adustum D// 2. inflammatione: flammatione B//intentio  
 perfectionis: perfectio intencionum BWH perfectio intentionis RTD//3.  
 videlicet: scilicet BRWHD *om.* T//4. *post* est *add.* sic *rell.*//iteretur:  
 reiteretur *rell.*//super illam: sublimationis R super illa BH//6. Sermo-  
 mercurii: De sublimatione mercurii et eiusdem perfectione cum causis suis  
 P De sublimatione mercurii BTH De sublimatione argenti vivi R  
 Sublimatio argenti vivi W Sublimatio mercurii D//7. vero: ergo W//8.  
 igitur: ergo P//9. et remotio: remotio et W//10. enim: ergo  
 BWH//labore: laboribus BWH// remotionis *om.* BWHD//11. *post* habet  
*add.* sed solam fugam et terreitatem superflue B sed solum fugam et  
 terreitatem superflue RHD sed solam fugam vel terreitatem  
 superfluitatem T sed solummodo fugam et terreitatem superflue  
 W//igitur: ergo H//quoniam: quod TW//



terre ipsius est ipsum commiscere cum rebus que non habent  
affinitatem cum eo, et sublimationem eius reiterare ab eis  
multotiens. Et harum talc genus est et corticum ovorum calx,  
15 et marmoris albi similiter, et vitrum minutissime tritum,  
et salis omne genus preparatum. Ab illis enim mundatur. Ab  
aliis vero cum quibus habet affinitatem - nisi sint in  
perfectione corpora - non mundatur sed potius corrumpitur, quia  
20 sulphureitatem habent omnia talium, que ascendens cum eo in  
sublimatione ipsum corrumpit. Et in hoc experientiam vides,  
quia si sublimas illud a stagno vel a plumbo, ipsum post  
sublimationem infectum videbis nigredine. Ergo melior

12. cum rebus que: rebus cum quibus *rell.*//habent: habet *rell.* //13. cum  
eo *om. rell.*//14. harum: horum BTWHD//talc: tale A// et *om. W*//15. et  
marmoris albi: marmor album T//16. illis: istis *rell.*//17. vero *om.*  
BT//habet affinitatem: convenit *rell.*//nisi: non nisi BH//sint: fuerint  
T//18. *post corpora add.* ut sol et luna sunt B ut sunt sol et luna TWD ut  
sol et luna H//non mundatur: non mundantur A *om.* BH//potius: post  
R// 19. omnia *om.* BWH//talium: talia P *om.* BWH hec R huius T//cum:  
in B//in *om.* T//20. corrumpit: corrumpitur T//Et *om.* T//in *om.*  
TD//hoc: sub D//experientiam: experientia TH//vides: vidimus D//21. si  
*om.* BWH//sublimas: sublimans BWH//illud: id R ipsum  
T//aplumbo: plumbo BTWHD//22. videbis: conspicies PBWHD  
inspicies RT//

est sublimatio per ea cum quibus non convenit. Cum quibus  
autem convenit, melior esset si sulphureitatem non haberent.  
25 Ideoque a talc melior est sublimatio quam a rebus omnibus,  
quoniam illi parum convenit et sulphureitatem non habet.  
Modus vero remotionis aqueitatis sue superflue est ut quando  
commisceatur cum calcibus a quibus sublimari deberet, teratur  
et commisceatur illis cum imbibitionibus et quousque de illo  
30 nihil appareat. Et postea super ignem lentissimum aqueitas  
imbibitionis removeatur, qua recedente et secum argenti vivi  
aqueitas recedit. Sit tamen ignis tam levis ut per eum

23. est: erat R//sublimatio: eius sublimatio PBRT//*post Cum add.*  
autem quibus A//24. esset: esset sublimatio B//haberent: habent D//25.  
Ideoque: ideo BWH//talc: tali A talco P talkis B calce W talk  
D//sublimatio: eius sublimatio P//26. *post et add.* saltem T//27. sue *om.*  
T//28. a quibus *om.* B cum quibus W// sublimari: sublimandum  
D//deberet: debet PBWHRT *om.* D//29. illis cum: cum illis B//et *om.*  
BRTWHD//illo: eo *rell.*//30. nihil: nil D//postea: post  
BRTHD//aqueitas: aquas H// 32. recedit: recedet B//tamen: enim T//

argenti vivi tota substantia non ascendat. Ex multiplici  
 igitur reiteratione imbibitionis cum contritione et leni  
 35 assatione aqueitatis illius maior pars deletur, cuius residuum  
 per sublimationis reiterationem removetur. Et cum videris  
 illud albissimum preexcellens nivem albedine sua et quasi  
 mortuum aludel spondilibus adherere, tunc super ipsum reitera  
 sublimationem suam sine fecibus, quoniam adhereret pars illius  
 40 fixa cum fecibus, et nunquam per ingeniorum genus aliquod ab  
 illis separari posset. Aut post illud, figas partem illius.  
 Et modum fixationis eius in sequentibus narratum expresse

33. multiplici: multa T//34. cum: omni D//35. aqueitatis: aqueitat(!)  
 B//post maior add. illius P//35-6. cuius-reiterationem om. A add. mg.  
 A<sup>2</sup>//removetur om. A removeatur T//37. illud: illum D//preexcellens-  
 sua: sicut nix R sicut nix preexcellens nivem albedine sua T//38. reitera  
 om. B//39. suam om. T//post quoniam add. si cum fecibus fieret  
 sublimatio tunc T//adhereret: adheret TWD//illius: sua B//40. ante  
 ingeniorum add. ingenium sive in ras. A//40-1. ab-posset: separatur ras. A  
 add. ab illis separari possit mg. A<sup>2</sup>//41. illis: eis RT//Aut: autem BH om.  
 T tunc W ut D//illud: illum D//42. narratum om. rel./

[69vb] tibi trademus. Et cum fixeris illam, tunc reitera  
 sublimationem residue partis super eam, ut illa similiter  
 figatur, et serva quod tentabis super ignem. Si fusionem  
 dederit bonam, tunc sufficienter sublimationem ad illud  
 5 reiterasti. Si vero non, adde illi de argenti vivi sublimati  
 parte aliquid, et reitera sublimationem donec fiat fusibile.  
 Quod et si lucidum albissimum habuerit colorem et purum, tunc  
 bene mundasti; si vero non, non. Igitur non sis in mundatione  
 illius que per sublimationem fit negligens, quoniam qualis  
 10 erit mundatio, talis et perfectio per illud assequetur  
 in projectione illius super unumquodque imperfectorum

1. trademus: tradidimus A//tunc om. RT//2. sublimationem residue  
 partis: sublimationem residue partis ras. R residuam partem sublimacionis  
 BTHD s.l. R//illa: ipsa T//4. sufficienter: sufficientem BWH//ad illud:  
 ad id R om. T ad illum W//5-6. argenti-parte: argenti vivi sublimati non  
 fixi partem P argento vivo sublimato partem BRTWH//6. parte: partem  
 D//aliquid: aliquam BTWH aliam R//sublimationem: sublimationem eius  
 R//fusibile om. AD//7. lucidum: lucidum et PRTWH lucidissimum et  
 B//albissimum: album T//8. si: et si B//vero om. BWHD//tert. non: ne  
 R//9. illius: eius B om. R//fit: est A//10. erit: erat B fuerit T//talis et: et  
 talis W//illud: id R illum BWHD//assequetur: sequetur BWH//

corporum et super ipsum vivum non preparatum. Unde et quosdam  
contingit ferrum, quosdam vero plumbum, et quosdam per  
illud venerem, et quosdam stagnum formare, quod  
15 contingit propter purificationis negligentiam quandoque ipsius  
soliis, quandoque et sulphuris sibi admixti vel eius  
comparis. Si igitur directe sublimaveris, mundaveris, et  
illud perfeceris, erit albedinis tinctura firma et perfecta  
cui non est par.

20 <43> Sermo in sublimatione marchasite

Sufficienter igitur sublimationis argenti vivi summa  
intentionis tradita, nunc ad ipsius sublimationem marchasite

---

12. vivum: argentum vivum R//Unde et: fort. unumquodque D//13. vero:  
et BRTWHD//et quosdam om. B//13-4. per-stagnum: vel stagnum vel  
venerem B//14. illud: id R illum WH//15. contingit: convenit W//ipsius:  
illius B//16. quandoque: iter. A quoniam D//17. directe: directo  
T//sublimaveris: sublimando PBRTHD mundando sublimando W//18.  
illud: illum BWHD id R//perfeceris: feceris T//19. par: compar A//20.  
Sermo-marchasite: De sublimatione marchasite cum omnibus illius causis  
P Sublimatio marchasite B De sublimatione marchasite RTWHD//21.  
igitur om. R ergo T//22. intentionis om. B intentione T//ipsius om. PR //  
sublimationem marchasite: marchasite A//

accedamus. Due attamen sunt illius sublimationes:  
prima quidem sine ignitione perficitur, alia vero cum  
25 ignitione. Et illud ideo, habet enim duplicem substantiam,  
unam scilicet sulphur purum in natura sua, aliam vero argentum  
vivum mortificatum. Prima utilis est sicut sulphur; secunda  
vero utilis est ut argentum vivum mortificatum et mediocriter  
preparatum. Assumamus igitur hanc ultimam quoniam per illam  
30 excusamur a susceptione argenti vivi et a laboribus  
mortificationis eius. Est igitur totus modus sublimationis  
illius ut teratur et in aludel ponatur, et sublimetur sine  
ignitione sulphur eius, semper removendo quod ex illo

---

23. post accedamus add. Marchasite sublimationes RT//attamen om.  
RT//illius sublimationes om. RT//24. alia: et alia RT//25. illud ideo: id  
ideo R hoc ideo illa W illum ideo D//habet enim: quoniam habet P quia  
habet BRTH//26. sulphur: sulphuris R//purum: puri RT//natura:  
materia D//vero om. BRTWH//26-7. argentum vivum mortificatum:  
substantiam argenti vivi mortificatam BWH argenti vivi mortificati RT  
substantiam ar. vi. mortificatum D//27-8. Prima-mortificatum om. P//28.  
vero om. BRTWHD//est ut: sicut RD ut T est sicut W// argentum vivum:  
argentum AD mercurius T//mortificatum: mortificatus T//et mediocriter:  
immediocriter D//29. preparatum: preparatus T//Assumamus: Assumes  
T//igitur om. B//per: propter W//illam: ipsam B//30. susceptione  
argenti vivi: successione mercurii T//31. modus: mundus H//32. illius om.  
W//in: ut in B//sublimetur: sublimatur D//33. sulphur: sulphureitatem T  
sulphuris W//quod: ex D//illo: ipsa T//

35 sublimatur et sepiissime per causam dictam, et augendo  
 ignis vigorem usque ad ignitionem aludel et eius, successive  
 et ordinate, quousque totum quod in ea  
 de sulphure constat exierit, quod probare poteris his  
 manifestis experimentis. Nam cum totum illius sulphur  
 fuerit elevatum, videbis colorem eius quod post illud  
 40 sublimabitur, mutari in albissimum mixto celestino  
 eidem colore clarissimo et ameno. Aliter etiam  
 quoniam quod erit de sulphuris natura comburetur et  
 10 flammam dabit ut sulphur. Quod vero secundo post illud

34. *pr. et om. rell.*//*per:* propter BRTWHD//35. *et om. D*//*eius:* eius ignis BH eius scilicet marchasite RT tunc W//36. *ordinate:* ordinare D//*post ordinate add.* augeatur BH//*totum om. R*//37. *constat:* est RT//38. *experimentis:* experienciis PBH//39. *fuerit:* fit B//*eius quod om. A add. A<sub>2</sub>*//40. *sublimabitur:* sublimatur BTH//*mutari in:* mutatum A//41-2. *Aliter-erit:* Aliud etiam quod est T//42. *quoniam om. BRH*//*erit:* exit P est T//43. *illud:* id R illum D//

[70ra] sublimatum fuerit, nec inflammabitur nec proprietates  
 sulphuris ostendet aliquas, sed vivi argenti mortificati  
 in sublimationis reiteratione. Illud ergo  
 colligamus per suum sublimationis modum, qui est  
 5 ut fiat vas terreum sollidissimum et bene coctum  
 ad longitudinem medie stature virilis, ad latitudinem  
 vero per quam manus subintrare possit, et fiat  
 fundus ei qui separari et coniungi possit ad similitudinem  
 parapsidis unius multum profunde. Et mensuretur  
 10 ab orificio illius vasis usque prope fundum ad mensuram  
 longitudinis unius manus cum digitis suis,

1. *inflammabitur:* inflammatur B//*proprietates:* in proprietates B proprietas W//2. *sulphuris:* alias sulphuris B eius sulphuris W//*ostendet:* ostendit B//*aliquas:* aliquas similitudines W// *mortificati:* mortificationem A *mortificatum ut vid. P*//3. *reiteratione:* iteratione BTWH//*illud:* illum D//*ergo:* ergo ita T//4. *suum:* solum B//*qui:* quod D//5. *coctum:* decoctum B//6. *medie:* medietatis vel medie T//*virilis:* urinalis T//7. *possit:* posset P//8. *ei om. BWHD eius R*//*qui:* quod TD//9. *unius om. R*//*profunde:* profundi BH//10. *illius:* ipsius D//*mensuram om. B*//11. *longitudinis:* longitudinem B//*suis om. W*//

et de illo loco usque ad caput eius vitrificetur vas  
interius vitrificatione spissa multum, et super caput illius  
ponatur alembic cum lato naso. In tali enim vase  
15 sublimatur illud. Coniungatur igitur fundus cum  
vase suo per lutum firme tenacitatis, et super fundum  
ipsum spargatur marchasita. Et super caput vasis  
alembic lati nasi mittatur, et ponatur in furnum de cuius  
proprietate sit fortem ignitionem dare fusionis scilicet  
20 argenti vel veneris, si artifex indiguerit, quem in summa  
nostri operis ubi diversitates omnium instrumentorum  
narrabimus tibi trademus sufficienter. Et caput illius furni

12. eius *om.* R//vas: ipsum vas W//14. alembic: alembicum BWH// 15. illud *om.* P id R//igitur: ergo T//16. per lutum: per limum A cum luto P//17. super: similiter super T//caput: ipsum caput W//18. alembic: alembis AP alembicum BWH//mittatur *om.* APRTWD ponatur *s.l.* W<sup>2</sup>//furnum: furno PR//ignitionem: ignem B//20. si artifex indiguerit PR//quem: quod PBTHD que W//summa: fine T//22. trademus: et trademus T//sufficienter: sufficientem D//

claudas cum rota habente foramen in medio sui  
ad magnitudinem vasis, per quod illud vas intrare possit.  
25 Et linias iuncturas in circuitu vasis et furni, ne  
ignis exiens impediatur te et sublimationis adherentiam,  
relictis solis quatuor fenestris parvis, que  
claudi et aperi in rota possint, per quas iniiciantur  
carbones in furnum. Et in lateribus fornacis similiter  
30 quatuor quasi sub illis intermediis, per quas et similiter  
carbones iniiciantur, et sex vel octo foraminibus ad  
magnitudinem digiti minoris que nunquam claudantur,

23. rota habente: tota nite *ut vid.* D//24. illud: id R//vas: nas B//possit: poterit W//25. linias: luta *rell.*//iuncturas: introitras A//vasis: illius vasis H//26. exiens: exeat et W//et: ad W//adherentiam: adherentia H// 27. solis: solum W//28. rota: ipsa rota W//iniiciantur: mittantur BRWH//29. similiter: sint BWH// 30. *post* quatuor *add.* fenestre BH//et *om.* BRTWHD//similiter: super R//31. iniiciantur: mittantur BRH inmittantur WD//foraminibus: foramina BH formab. foraminibus T//

ut per illa furnus de fumositatibus se libere  
 possit expedire. Et sint foramina illa in iunctura  
 35 furni cum rota sua. Furnus vero magne ignitionis  
 est furnus cuius spondilia sint ad altitudinem cubitorum  
 duorum. Et in medio sit rota minutissimis et  
 sepissimis foraminibus perforata cum luto fortiter  
 annexa. Capita foraminum superius sint stricta,  
 40 inferius vero lata, ut cinis et carbones possint  
 ex illis liberius cadere. Et relinquunt ipsa continue  
 ad susceptionem aeris libere aperta. Nam aeris

---

35. sua: scilicet R//36. furnus *om.* BWHD inferius R necessarius  
 T//altitudinem: latitudinem *rell.*//38. sepissimis: spississimis PBRH spissis  
 T *om.* W//39. annexa: annexo PBH connexa R//foraminum: vero  
 foraminum *rell.*//40. vero *om.* BRTHD//41. ex illis *om.* T//liberius *om.*  
 BH//relinquant: relinquuntur P//ipsa: ipsam D//42. libere: libera P liberi  
 BHD//aperta *om.* P//

[70rb] libera et multa susceptio per inferiora foramina est causa  
 una magne ignitionis per furnum. Exerciteris igitur in eo et  
 ipsum invenies. Causa vero longitudinis vasis est ut extra  
 ignem multa quantitas eius extenderatur et frigidetur  
 5 ut fumi sublimationis refrigerii locum inveniunt et  
 adhereant, et non inveniunt viam fuge et sue exterminationis.  
 Hoc autem novit ille qui dum sublimasset in  
 brevi aludel nihil ex sublimatione invenit, quoniam  
 propter brevitatem aludel equalis fuit per totum ipsum ignis.  
 10 Ideoque semper in fumi substantia conversum sublimandum stetit  
 et non adhesit, sed successive per poros vasis evanuit.

---

2. una *om.* B//Exerciteris: Exerti te B//igitur: ergo T//4. multa: magna  
 W//extenderatur: extendatur PBD//frigidetur: infrigidetur *rell.*//5. ut: et  
 R//5-6. et - inveniunt *om.* D//6. adhereant: adherentiam BWH//et non:  
 nec R//viam: locum W//exterminationis: exterminationis non querant  
 T//7. Hoc: Hec D//autem *om.* RTWHD//ille qui: illud quod TD//8.  
 brevi: brevibus PRTWHD//aludel: aludelis R//sublimatione: sublimato  
 PBWH sublimationibus T//invenit: habuit BWH invenerit R//9. equalis  
 fuit: fuit AT//ipsum: ipse BH *om.* W//

Vas ergo in omnibus sublimandis ad maiorem sui partem  
 in locum refrigerii extendatur. Causa autem vitrificationis  
 vasis est ne fumi ascendentes in loco sue ascensionis  
 15 porosum inveniant aludel parietem, et per illum penetrantes  
 aufugiant. Vitrificatur ergo locus ascensionis  
 illorum ut reservetur illis via fuge, fundus vero  
 aludel non, quoniam ipsius fundus in magno igne consistit,  
 qui vitrificationem illius funderet, qua fusa, et  
 20 sublimandum similiter funderetur et vitrum fieret. Est  
 enim vitri proprietas omnia vincere et ad se convertere. His

---

12. sui: sue T//15. aludel: aludellum W aludelli D//per om. P//16.  
 aufugiant: effugiant BTW//Vitrificatur om. T//ergo: vero PBWHD//17.  
 ut: ne R est ut T//reservetur: reseretur PBTH//18. non: non vitrificetur  
 R//19. qui: et D//funderet: fundetur B//fusa: fusa et fundus eius  
 rell./20. sublimandum: sublimandus R//similiter om. R//et vitrum fieret:  
 et vitrificaretur T//

igitur omnibus consideratis cum causis eorum fiat ignis sub  
 aludel fundo quousque certificatus fueris experientia  
 veridica illud totum ascendisse. Est autem experientia  
 25 intromissio baculi terrei bene cocti habentis foramen  
 parvum in capite suo usque ad medium, veniens  
 ad quantitatem digiti minoris prope ipsam rem a qua  
 fit sublimatio. Et si in foramine aliquid adhererit  
 ex sublimando, non est totum sublimatum; si vero  
 30 non, sublimatum est. Et hac eadem exercitatione  
 in sublimandis certificari poteris omnibus. Descriptio  
 vero vasis aludel de sublimatione marchasite

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22. sub om. R//23. fundo om. rell./25. intromissio: intromissi T//bene  
 cocti: uno latere T//26. medium: medium eius rell./27. minoris: minori  
 D//28. fit: fuit B//in foramine om. T//adhererit: adhesit PR adheseris  
 T//30. non: non totum P//Et om. RT ex W//eadem om. B//post eadem  
 add. ratione et in ras. A//exercitatione: fort. extractione D//31.  
 sublimandis: sublimandum D//certificari: certiorari B//poteris: potest  
 B//31-2. Descriptio-marchasite om. BWHD//32. de sublimatione:  
 sublimatos(!) P sublimationis R om. T//marchasite om. T//

SBD / FFLOH / USP

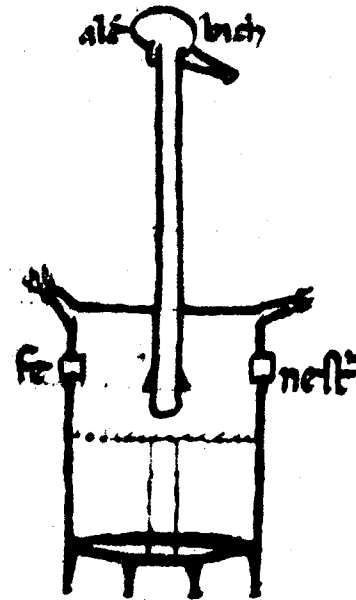
<Ref. 70rb,31>

baef



forini

<Ref. 70rb,31>





ultime et cum fornace et baculo sue experientie habebitur.

< 44 > Sermo in sublimatione magnesie et thutie

- 35 Sublimationis vero magnesie et thutie est  
eadem intentio cum intentione ultime marchasite sublimationis.  
Non enim possunt hec omnia sine ignitione sublimari. Ideoque  
omnia unam habent intentionem cum causis eisdem et  
experientiis eisdem, et habent unum ordinem generalem, quoniam  
40 sine fecibus sublimari debent. Quecunque cum ignitione  
sublimari necessarie contingit, quoniam in se ipsis feces  
habent sufficientes, immo superfluentes. Et huius

---

33. ultime-habebitur *om.* BWHD//ultime: ultimo R *om.* T//et cum: cum PRT//habebitur: hec est PRT//34. Sermo-thutie: De sublimatione magnesie et thutie cum causis ipsius P Sublimatio magnesie et thutie B De sublimatione magnesie et thutie RWH De sublimatione magnesie et thutie et corporum imperfectorum T De sublimatione magnesie et thutie. Rubricum. D//35. Sublimationis: Sublimaciones BH//vero *om.* BRWHD//est: sunt BH//36. intentio cum *om.* BH//ultime: videlicet ultime BH scilicet ultime W//37. omnia *om.* B//38. omnia: hec omnia RT// unam: eandem W//38-9. et experientiis eisdem *om.* D//39. eisdem *om.* RT//40-1. debent-sublimari *om.* BWH//40. debent: oportet R//41. necessarie: necesse *ut vid.* B necessario RT//contingit: est *ras.* A *add. mg.* contingit A<sub>2</sub>//42. immo superfluentes: uno superfluas D//huius: hoc BHD//

- [70va] signum est difficultas sue sublimationis. Sublimantur  
et similiter omnia corpora a perfectione diminuta hoc eodem  
ordine, et non cadit diversitas aliqua nisi quia ignis  
sublimationis vehementior est in corporibus quam magnesias,  
5 marchasita, vel thutia. Et non diversificantur similiter  
corpora in sublimationibus suis nisi quod quedam indigent  
admixture rei sublevantis ea, quedam vero non, ut facilius  
fiat eorum elevatio. Sed una tamen specialis consideratio  
in corporum sublimatione ex experientia reperta bona est,  
10 videlicet ut in fundo aludel non sit multa corporis  
sublimandi quantitas, quoniam multitudo sublimationem

---

1. *post sublimationis add.* De sublimatione corporum diminutorum cum experienciis suis P De sublimatione corporum a perfectione diminutorum BH De sublimatione diminutorum corporum T De sublimatione corporum W De sublimatione diminutorum corporum. Rubricum. D//2. et: *iter.* B *om.* RTW//omnia *om.* B//hoc: et hoc BW et T//4. est: debet esse BH//magnesias: in magnesias RWHD *om.* T//marchasita: in marchasita BT//5. vel: et PBW//similiter: filii P *om.* BWHD//6. nisi: videtur T//quedam: quidam B//7. sublevantis: sublimantis vel sublevantis T sublimantis W//ea: eas H//8. *post fiat non legitur* P//elevatio: elevatio sive sublevatio BH//8-9. Sed-est : sed tamen specialis una in sublimacione corporum consideratio est et experientia in re experta est bona T//9. ex: etBWH *om.* D//10. videlicet: scilicet BRWHD *om.* T//11. sublimandi *om.* W//

impedit. Et planities sit in fundo aludel sublimationis,  
 et non concavitas, ut possit equaliter et tenuiter  
 super fundum corpus sparsum et multum in suis omnibus partibus  
 15 elevari. Corpora vero indigentia admixtione rei  
 elevantis sunt scilicet venus et mars propter sue fusionis  
 tarditatem - venus utique tutia, mars vero arsenico.  
 Et cum his elevantur defacili, quoniam cum eis maxime  
 conveniunt. Fiat igitur post istorum considerationem  
 20 sublimatio ut in tutia et similibus sibi in sublimatione.  
 Et disponetur eorum sublimatio hoc eodem ordine cum causis  
 et experienciis suis.

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13. concavitas: acavitas A//equaliter: equalitas T//14. sparsum *om.* D//et  
 equaliter et PB equaliter RTH *om.* W//15. elevari: equaliter elevari  
 BWHD//admixture: admixtionem B administratione R//16. fusionis:  
 fixationis D//17. venus utique: Indiget ergo venus utique R Indiget ergo  
 venus una scilicet//arsenico *om.* D//18. his: eis BRTWH//19. istorum:  
 illorum PW istarum BH//considerationem: consideracionum B//20.  
 tutia: thucie P//similibus: similibum PT//in sublimatione *om.* B  
 sublimatione T//21. Et disponetur: diximus et disponetur T//eorum-  
 ordine: hoc de ordine ipsorum sublimatio R scilicet eodem ordine  
 ipsorum sublimatione T//eorum *om.* B earum H//post suis *add.* etc. B  
*add.* manifestis T//

### < 45 > Sermo in descensione

Narratis itaque sublimationis intentionibus cum causis  
 25 suis omnibus, restat nos descensionis modum monstrare  
 cum causis suis similiter et suo ordine determinato et  
 completo. Fuit ergo causa inventionis illius triplex, una  
 scilicet ut cum medicina aliqua est conclusa in illius vase,  
 quod vocatur descensorium vel chimina, post fusionem eius  
 30 descendat per foramen illius. Et per eius descensionem sumus  
 certi fusionem suscepisse. Alia vero causa fuit ut corpora a  
 combustione preserverentur debilia per eam post reductionem a  
 calcibus illorum. Nam cum a calcibus corpora debilia

---

23. Sermo in descensione: Sermo in divisione. Rubrica. A Sermo in  
 descensione *mg.* A<sub>2</sub> De descensione et pastillo cum causis suis P De modo  
 descensionis BH De descensione RT De descensorio W De descensione.  
 Rubricum. D//24. Narratis: Barratis H//itaque: utique W itaque *add. s.l.*  
 de D//sublimationis: sublimationum W//25. suis *om.* T//monstrare:  
 demonstrare P narrare RT//26. similiter et: ex R similiter T//suo:  
 congruo suo B//27. ergo: autem BH *om.* RT//inventionis: intentionis sive  
 inventionis BWH//illius *om.* B descensionis RT//27-8. una scilicet:  
 scilicet A//28. est conclusa: conclusa A est inclusa RTD inclusa est  
 BWH//in illius vase: et illud vas D//illius: illo BRTWH//vase: vas  
 A//29. chimina: chimia PRWH kimna T chimea B kimina D//eius *om.*  
 BWH// 30. sumus: fuimus B scimus D//31. fusionem: ipsam fusionem  
 T//vero causa fuit *om.* PRTWH scilicet causa B autem D//ut *om.* D *add.*  
*s.l.* D<sub>2</sub>// 32. per eam: scilicet per illam descensionem vel  
 conclusionem BWH per eam scilicet descensionem RT//33. calcibus:  
 talibus R//illorum: eorum BRTH suis W//

35 attemptamus reducere, non omnem illorum partem tempore uno  
 reducere possumus. Si igitur pars illa que primo in corpus  
 reducta est reductionem totius expectaret per ignem,  
 evanesceret et maior illius quantitas. Necesse igitur fuit  
 ingeniari ut cum statim reducta est pars, ab igne deponatur:  
 hoc autem per descensorium fit. Est etiam tertia causa  
 40 inventionis illius corporum depuratio ab omni re extranea.  
 Descendit enim corpus fustum mundum, et omnem rem extraneam  
 in concavitate illius dimittit. His itaque tribus  
 necessitatibus inventa descensione, determinetur modus  
 illius cum instrumento suo prius notificato cum causis suis.  
 45 Dicimus igitur quod forma eius talis sit

---

34. attemptamus: sint attentata seu attentamus A//ante non omnem  
 add. non legitur//omnem illorum partem : omnes partes illorum W//35.  
 igitur: enim BH//corpus: corpore B//36. reducta: redacta RWHD//totius  
 om. B//37. et maior: maior *rell.*//igitur: ergo P enim H//quantitas: pars  
 sive quantitas W//38. cum statim: statim cum R//reducta: redacta D//39.  
 descensorium: descensum B //etiam om. RT//40. illius om. BWH//omni  
 re: cinere R//41. enim om. T//43. determinetur: terminetur H//44. prius:  
 scilicet prius T//45. quod: quoniam PD//talis om. *rell.*//sit: est PBTW  
 om. RH fit D//

[70vb] ut fundus illius sit acutus et parietes illius equaliter  
 sine scrupulo sint terminantes in fundi acuitatem,  
 ut possit unumquodque fusibulum libere sine adherentia  
 ad fundi illius foramen descendere. Et coopertorium  
 5 eius - si necessarium fuerit - sit ad similitudinem plane  
 parapsidis, et bene conveniat illi. Et sint de bona et firma  
 terra, non defacili per ignis pressuram fundente. Mittatur  
 igitur res cuius intentio sit descendere in illud super  
 baculos rotundos ex terra factos, ut magis fundo superiori  
 10 approximet. Et cooperiatur cum eo et iunctura firmetur, et in  
 igne de carbonibus ponatur. Et super ipsum suffletur quousque

---

1. ut: quod RTWH//illius: eius B//parietes: paries A//2. sint om.  
 BH//terminantes: determinantes BWHD//5. necessarium: necesse BWD  
 necessarie H//6. de bona: bona A//sint: sit R//7. non: et non  
 BH//pressuram: impressionem RT//fundente: fusili RT//Mittatur:  
 mittantur B//8. cuius: ad cuius A de cuius BWH//intentio: intentione  
 BWH//sit: est quod RT//descendere: fundere sive descendere BH  
 descendat RT//in illud om. D//10. approximet: approximet RWD//10-  
 1. in igne: igne BD//11. de carbonibus: carbonum RT//ponatur:  
 imponatur P//suffletur: sufficitur D//

tota descendat in vas sibi suppositum. Potest tamen, si  
 res fuerit difficilis fusionis, poni super tabulam planam  
 vel parve concavitatis, a qua possit defacili  
 15 descendere inclinatione capitis descensorii parva, quoniam  
 in illa firmiter stabit et diutius ignem suscipiet. Et  
 meliorem fusionem dabit, et sepius tentari potest  
 inclinatione descensorii si fusa fuerit. Purificantur  
 per hoc corpora, sed per pastillum melius, cuius modus  
 20 purificationis est idem cum modo purificationis descensorii.  
 Et ideo per illud excusamur ab eo, tenet enim feces  
 corporum ut descensorium et melius. Et ideo narramus modum

---

12. tota: res tota PR tota res predicta BTWHD//vas: vas aliud T//13.  
 fuerit: sit B//14. a qua: et T//15. inclinatione: cum inclinatione PBWHRT  
 inclinationi D//16. firmiter: firmus H//et diutius: diutius R diu super  
 ignem et diutius T//18. descensorii: capitis descensorii BRTWH//fusa  
 fuerit: fuderint B//Purificantur: Purificantur igitur P *transp. post* melius  
 BWH//19. melius: mellum A//*post* melius *add.* purificantur PRTH *add.*  
 purificantur similiter D//cuius: similiter cuius BTWH//20. idem: eidem  
 H//21. illud: illum BWH//22. corporum: corporis R//narramus *om.* B  
 narremus WHD//

illius cum causa. Dicimus igitur quoniam accipimus corpus de  
 cuius intentione est mundari, et illud in granis minutissimis  
 25 vel in calcem - quod perfectius est - redigamus, et ei  
 commisceamus calcem aliquam, de cuius intentione non sit  
 fundi. Et postea illud fundamus, inueniemus enim per illud  
 corpora mundari multa reiteratione, sed non mundificatione  
 perfecta quam perfectionem scimus esse, sed mundificatione  
 30 utili, ut medicina suscepta perfectionis, melius et perfectius  
 per eam transformetur corpus. Est enim administratio  
 precedens eam. Omnem autem administrationem sufficienter in  
 sequentibus tibi narrabimus. Nunc vero descensorii  
 descriptionem ponamus.

---

23. causa: ea BWH//*post* causa *add.* De mundatione corporum per  
 pastillum R De mundatione que fit per pastillum que equipollet ei que fit  
 per descensorium T//24. illud: illum D//minutissimus: minutissimis vel  
 limaturis PBRWHD minutissimis similiter vel limaturis T//25. redigamus:  
 redigemus B redigimus TWH//26. commisceamus: commisceamus BW  
 commisceas R commisceamus H//calcem *om.* R//aliquam: aliam T//27.  
 fundamus: fundas R fundimus TW//inueniemus: et inueniemus A inuenies  
 R inuenimus W//*enim om. in textu, add. s.l.* A illud: illum D//28.  
 corpora: corpus TW//mundificatione: mundificationem P//29. *post* esse  
*add.* mundificationem T//sed: scilicet T//31. transformetur corpus:  
 transformetur corpora PWH transformantur corpora B omnia  
 transformentur corpora T//32. precedens eam *om.* T//autem: enim BWH  
*om.* T//33-4. Nunc-ponamus : Descensorii vero descriptio hic deest  
 W//33. vero descensorii: enim distillationis B vero distillationis RH//

&lt;Ref. 70vb,33&gt;



35

## &lt;46&gt; Sermo in distillatione

Equum est igitur ut sequentes propositum nostrum, sermonem de distillatione tradamus cum causis suis. Est igitur distillatio vaporum aqueorum in suo vase elevatio. Diversificatur utique, nam quedam est per ignem, quedam vero sine igne. Que vero per ignem fit duorum generum invenitur. Quedam est per elevationem in alembic, quedam vero per descensum chimine. Et causa generalis inventionis cuiuslibet distillationis generis est purificatio liquorosi a fecibus sue turbulencie et conservatio illius a putrefactione. Videmus enim rem distillatam quocunque distillationis genere puriorem effici et melius de putrefactione custodiri.

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35. Sermo-distillatione: De distillatione quid sit et de eius diversitate cum modis et causis eiusdem omnibus P De distillatione triplici B De distillatione cum suis causis R De distillatione triplici per alembicum per kimina et per filtrum T De distillatione W De distillatione triplici per alembicum per chimiam et feltrum H De distillatione triplici per chimiam et per filtrum. Rubrica. D//36-7. Equum-tradamus om. RT//Equum: Conveniens BWHD//37. ante Est add. Consequenter de distillatione dicendum est RT//38. aqueorum: aquaticorum ut vid. T//39. utique: utique distillatio BRTWH//nam om. A//40. igne in ras. A//Que: quedam in ras. A//fit om. A//41. alembic: alembike B alembicum W alembico H//vero om. BWHD//42. descensum: descensorium sive descensum W// chimine: in chimiam R in kiminam T kimie W//post chimine add. qua mediante oleum ex vegetabilibus elicitor PBRTH//42. Et om. RT//ante causa add. Causa quare inventa sit distillatio RT//43. generis om. BTWH//liquorosi: liquorum R liquoris T//fecibus: fecis A fece PBRTHD//44. turbulencie: turbulencia A//44-6. putrefactione-melius om. B//45. quocunque: quorumcunque T//46. effici: efficcissime D//de: a PRTWHD//

[71ra] Causa vero inventionis eius specialis que fit  
 per ascensum in alembic est scilicet inquisitio aque pure sine  
 terra, cuius experientia est quod vides aquam bis distillatam  
 nullam fecem habere. Causa vero inventionis aque pure fuit  
 5 imbibitio spirituum et medicinarum mundarum, ut si quando  
 indigeamus imbibitione, aquam puram habeamus, que fecem post  
 ipsius resolutionem non dimittat, qua medicine nostre et  
 spiritus mundati infici et corrumpi possint. Causa vero  
 inventionis eius que per descensum fit fuit olei puri in  
 10 natura sua extractio, quoniam per ascensum oleum in natura sua  
 combustibili haberi non poterat. Et huius inquisitio fuit

---

1. eius: illius PRTWD *om.* BH//2. alembic: alembike B alembichum  
 WH//3. experientia est quod: experienciam vides AD examinatio sive  
 experientia est quod T//vides: videmus B *om.* R//bis *om.* WH vel D//4.  
 vero *om.* BWH//fuit: est B//5. spirituum: pulverum BWH spirituum  
 pulverum T//et *om.* BH *trans. post* imbibitio D//si quando: sit quando A  
 scilicet quando B siquidem scilicet R si quomodo T si quando scilicet  
 WHD//6. ante aquam puram habeamus *add.* fuerit nobis indigentia  
 imbibitionis *in ras.* A//6. indigeamus-puram *in mg.* A<sub>2</sub>//indigeamus:  
 indigemus BWH//aquam puram *ras.* A//7. ipsius: illius PBW//  
 resolutionem: resolutionem et residentiam R residentiam T//dimittat:  
 habeat vel dimittat W//*post* qua *add.* fece BTWHD//medicine: medicina  
 T//nostre *om.* RT//8. mundati: mundari R//9. inventionis: intentionis  
 P//10. oleum: olei *ras.* oleum *s.l.* A<sub>2</sub>//11. combustibili: combustibilis A  
 combustibile RT combustum D//haberi: habere T//huius: eius RT//*post*  
 inquisitio *add.* non D//

scilicet ut color eius qui cum substantia sua permixtus est  
 habeatur. Hic enim iuvare potest in casu. Distillationis  
 vero que per filtrum fit sine igne causa inventionis fuit aque  
 15 sola serenitas. Dicamus ergo omnium distillationum modum  
 cum causis suis. Eius itaque que per ascensum fit est duplex  
 modus. Alia enim fictili olla cineribus plena perficitur, alia  
 vero cum aqua in vase suo cum graminibus vel lanositate  
 ordine suo disposita, ne cucurbita vel distillationis  
 20 alembic rumpatur, ad perfectionem deducitur. Ea vero que cum  
 cineribus maiori et fortiori et acutiori perficitur igne, que  
 autem cum aqua, mansueto mulcebrum et equali. Aqua enim  
 acuitatem ignitionis non suscipit quemadmodum cineres.

---

12. ut *om.* R//sua *om.* T//13. habeatur: haberetur T//Hic: hoc  
 PBT//enim: enim eum B//14. vero: eius BH//*que om.* D//fit: perficitur  
*rell.*//15. sola: *iter.* D//ergo omnium: igitur omnem B igitur omnium  
 RTWD//16. suis *om.* W//17. Alia enim: una que B Alia est que W Alia  
 que H Alia est D//fictili: subtili R in fictili T//18. vero *om.*  
 BRTWHD//graminibus: straminibus BTH//suo: suo scilicet T//20. ad:  
 antequam ad B et nunquam ad H//deducitur: reducatur R reducitur  
 T//Ea: causa B//21. maiori: fit maiori BH//et acutiori *om.* R//que:  
 quod D//22. mulcebrum: et miscibili BR miscibili WH//et equali: et  
 equaliigne perficitur BH//23. ignitionis: ignis et ignitionis BH ignis  
 W//cineres: et cineres WD//

25 Ideoque per eam que cum cineribus fit, colores et grossiores  
 30 terreas partes elevari contingit, cum ea vero que cum aqua  
 fit, subtiliores et sine colore, et ad naturam aqueitatis  
 simplicis approximantes magis. Subtilior ergo separatio per  
 eam que aqua perficitur eliciatur. Experientia hoc novit  
 35 verum esse qui cum distillasset oleum per cineres oleum vix  
 alteratum suscepit in recipientem. Volens vero partes eius  
 separare, ad illud necessitate pervenit, ut contingeret per  
 aquam distillare. Et tunc per huius reiterationem separavit  
 oleum in partes suas elementales, ut abissimam et  
 serenissimam aquam ex rubicundissimo extrassisset oleo,  
 35 remanente in fundo alembic totaliter

---

24. colores: calores B//26. fit *om.* A//27. magis: scilicet per eas elevari  
 contingit magis D//Subtilior ergo: Subtilica ergo subtiliatio P sunt  
 subtilior est BH Subtilior est ergo T//27-8. per eam *om.* T//28. eliciatur  
*om.* BH elicitur RWD//hoc: vero hoc B//29. qui: quod D//*pr.* oleum:  
 vinum D//30. recipientem: recipiente PBWH//vero: igitur B ergo  
 WH//31. illud: id R//pervenit: pervenire D//32. distillare: distillari  
 BWH//huius: unam T//separavit: separabit BH//33. oleum: naturam et  
 oleum BH naturam D//suas: scilicet *ut vid.* T//elementales: elementares  
 BHD//34. extrassisset: extraximur D//35. totaliter: totali BWH//

illius rubore. Per hoc igitur magisterium ad omnem  
 rei vegetabilis, et eius que ex vegetabili processit  
 in esse, et omnis rei consimilis, omnium determinatam  
 elementorum separationem pervenire necesse est; per eam vero  
 40 que per descensum, ad cuiuslibet rei oleum perveniri  
 determinate potest, videlicet vegetabilium omnium et eorum  
 consimilium; per eam vero que per filtrum fit, ad cuiuslibet  
 liquorosi serenitatem. Hec autem omnia minime scientibus  
 sunt manifesta et nota. Qui vero hoc ignorat nihil ex hoc  
 45 novit magisterio. Exercitatus igitur defacili ea  
 investigabit. Dispositio igitur eius que per cineres

---

36. *post igitur add.* manifestum *in ras.* A//omnem: omnis BRWH//37.  
 eius: enim R//*ex:* a W//37-8. processit in esse: est A//40. per *om.* D//*ad:*  
 fit ad BTWH//oleum: omnium D//perveniri: pervenire BT//41.  
 determinate: determinante A *om.* BH determinare R//videlicet: scilicet  
 RT ut W//42. consimilium: similium T//filtrum: factum D//fit: est W  
*om.* D//43. liquorosi: liquoris BRH rei liquoris T//*post serenitatem add.*  
 perveniri potest BRTWH scilicet pervenire potest D//minime: minima P  
*non legitur R om.* T//*post minime add.* idem parvum B et parum W idest  
 parum HD//44. sunt: fiant B fiunt W fuerit *ut vid.* H//*alt.* hoc *om.* W//45.  
 Exercitatus: Exercitetur *rell.*//igitur: igitur et PBRTWD//*ea:* eam  
 PRT//46. igitur *om.* BRTH//

[71rb] fit est ut sumatur olla fortis ex terra et coaptetur in  
furno simili sublimationis furno, cum eadem sui distantia  
a furni spondilibus, per eandem investigationem, et  
similibus auriculis, super cuius fundo ponantur cineres  
5 cribellati ad digiti spissitudinem. Et super ipsos cineres  
ponatur vas distillationis, et cooperiatur in circuitu eius  
cum eisdem usque prope collum alembic. Postea vero in illud  
infundatur res de cuius intentione sit sic distillari. Ultimo  
vero cooperiatur illud cum alembic cuius collum suscipiat  
10 collum cucurbite inferioris intra se usque ad curvatem  
canalis ipsius alembic, ne viam fuge inveniatur  
distillandum. Et postea lutetur alembic cum cucurbita sua

1. ex terra *om.* R de terra T//coaptetur: coactetur R collocetur T//2. *post*  
furno *add.* sub D//sui *om.* D//3. *post* similibus *add.* de D//a furni: a W  
//4. cuius: eius BRWH//fundo: fundum *rell.*//5. cribellati: cribellate A  
cribellatas D//Et super ipsos cineres: super quos autem BHD super quos  
RW super quam *ut vid.* T//7. eisdem: eisdem cineribus PRTWH cineribus  
B//alembic: alembici BT//postea vero: post BRTHD postea W//in illud:  
in illum BHD in id R illud T *om.* W//8. de-distillari: quam tendis distillare  
RT//sit: fit H//9. vero *om.* BRTWH//cum *om.* W//alembic: alembico  
B//collum: collum singillatim B sigillatim WHnominatum D//10. collum:  
collum actancini D//curvatem: concavitatem BRTWHD//11-2. ne -  
alembic *om.* BWH//12. Et postea: post RTD//sua: scilicet sua T//

ut firmetur eorum iunctura, et subponatur ignis quousque  
distillet. Alembic vero et eius cucurbita de vitro sint.  
15 Ignis vero illius augeatur ei secundum exigentiam  
distillationis quousque videatur totum distillandum cum magna  
expressione ignis distillatum esse. Secunde vero intentionis  
distillationis dispositio que per aquam fit est similis huic  
in vase et alembic. Differt autem ab ea in hoc - quod sumitur  
20 in hac olla ferrea vel erea, et coaptatur ad furnum ut dictum  
est. Et postea super fundum illius olle stratum de graminibus  
vel lana vel re consimili construitur ad spissitudinem

13. ut: et T//eorum: earum BRHD//subponatur: supponetur H//14.  
Alembic: Alembicum D//sint: fiant W//15. vero *om.* BRTWHD//illius:  
eius T//16. distillandum: distillatum W//17. esse *om.* BH illud esse T  
distillandum W//Secunde: Sciencie *ut vid.* B//intentionis: inventionis  
W//18. distillationis: sublimationis A *om.* RW//que: est que R//19.  
alembic: alembico B//autem: tamen T//sumitur: sumatur B//20. in hac:  
una BWH//ereae: enea WD//coaptatur: coaptatura P coaptetur  
BRTH//furnum: dictum furnum W//21. Et postea: post BRD et post  
TWH//illius *om.* BWH ipsius R//graminibus: straminibus BTH//22. *pr.*  
vel: et BR//lana vel re consimili: lane vel rei consimilis BRH lana vel rei  
consimilis T//*post* consimili *add.* alia W//construitur: construat BWH  
et construitur T construitur D//*ad om.* B ex eo T//spissitudinem *om.*  
B//



trium digitorum, ne cucurbita frangatur. Et eisdem graminibus  
 vel rebus consimilibus cooperiatur in circuitu cucurbita usque  
 25 prope collum alembic. Et super ipsa stramina virge subtiles  
 supersparguntur, et super virgas ponantur lapides ponderosi,  
 qui suo pondere cucurbitam et alembic et ipsa stramina  
 deprimant, et depressa firmiter et stabiliter teneant super  
 olle fundo, ne natent levigata per ipsam aquam. Et sit  
 30 levigatio hec causa fracture vasis et distillande rei  
 perditio. Postea vero inter stramina fundatur aqua usque ad  
 olle plenitudinem, et subponatur ignis quousque distillet

trium-frangatur *om.* B//graminibus: straminibus BTH//25. alembic:  
 alembici B//26. supersparguntur: spargantur BWH sparguntur  
 RT//ponantur: ponuntur P//27. cucurbitam: cucurbita D//28. depressa:  
 pressa T//firmiter: firment W//29. olle: olli B//fundo: fundum  
*rell.*//natent: natet B//aquam *om.* W//sit: sic BWH//30. hec *om.* *add.*  
 per ipsum et sic levigatio *ras.* W//causa: esset causa BWH//fracture:  
 fractionis BH//31. vero *om.* BRTWHD//inter: intra T//fundatur *iter.*  
 P//32. subponatur: imponatur T//

totum. Dispositio vero eius que per descensum fit est ut fiat  
 descensorium vitreum cum coopertorio eius, et lutetur  
 35 utrumque. Et intromittatur quod sic distillari intenditur, et  
 fiat super caput illius ignis, descendet enim distillatio  
 eius. Dispositio vero eius que per filtrum fit est ut ponatur  
 distillandus in concam lapideam liquor, et filtri bene abluti  
 et madidi ponatur pars latior in dictum liquorem usque ad  
 40 fundum conche. Pendeat vero exilior pars eius ab orificio  
 conche extra. Et sub capite illius filtri ponatur vas  
 recipiens distillationem. Cum igitur incipiet distillare  
 ipsum filtrum, prius aqua distillabit, qua madidum

35. utrumque: utrumlibet P//distillari intenditur: distillare intendis RT  
 distillari debet vel intenditur H//36. fiat: fiet W fiet igitur D//ignis *om.*  
 D//descendet: et descendet BH//enim: sic BH// distillatio: stillatio  
 H//37. *pr.* eius: illius BH//vero *om.* H//*alt.* eius *om.* B distillationis  
 RT//38. distallandus: distillatio BWH distillandum RT//liquor *om.*  
 BRTWHD//*post* filtri *add.* liquorosi seu *in ras.* A//38-9. bene abluti et  
 madidi: madidi bene abluti et A//39. dictum liquorem: dicto liquore RW  
 dictam liquorem D//*ad om.* D//40. exilior: ex alia D//41. illius *om.*  
 W//vas *om.* BTWHD//42. distillationem: distillati BWH//igitur: ergo  
 PRTH//incipiet: incipiat B//43. prius: primo *rell.*//aqua: aquam W//qua:  
 que fuit D//madidum: madida HD//

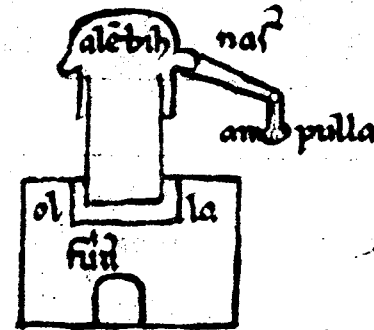
[71va] fuit, qua cessante, succedet illi liquor distillandus,  
 qui si non serenus fuerit, totiens ad concham convertatur  
 quousque serenissimus distilletur. Hec autem quia  
 facilia sunt omnia magis probatione non indigent. Ideoque  
 5 eorum probationem siluimus. Descriptio vero omnium vasorum  
 distillationis cuiuslibet a nobis nunc tradatur.

<47> Sermo de calcinatione. Rubrica

Post igitur distillationis narrationem, sermonem nostrum  
 tradamus in calcinatione. Est ergo calcinatio rei per ignem  
 10 pulverizatio ex privatione humiditatis partes consolidantis.  
 Causa inventionis eius est ut sulphureitas adustiva corrumpens  
 et defedans per ignem deleatur.

1. succedet: succedit W//illi: ille T//distillandus: distillando D//2. qui:  
 quod D//non: vero D//post serenus *add.* liquor protinus T//fuerit: fuit  
 T//convertatur: revertatur BR//3. autem: Nam BH//4. omnia *om.*  
 R//magis: magna BTWH//ideoque: ideo RTWHD//5. eorum: earum  
 D//siluimus: silemus RT fluimus *ras.* H//5-6. Descriptio-tradatur *om.* BH  
 Descriptiones enim omnium vasorum cuiuslibet distillationis hic deficiunt  
 W Descriptio vero omnium vasorum distillationis hec est RT Descriptio  
 omnium vasorum distillationum cuiuslibet a nobis nunc tradatur D//7.  
 Sermo-Rubrica: De calcinatione quid sit et de diversitate et modis et  
 causis suis P De calcinatione ad quid sit inventa B Et decalcinatione Iovis  
 et Saturni cum solo igne R De calcinationibus T De calcinatione WH De  
 calcinatione. Rubricum. D//8-9. Post-calcinatione *om.* RT//8. nostrum  
*om.* BWH//9. in: de BWH//ergo: igitur BW *om.* RT//rei: cuiuslibet rei  
 T//10. pulverizatio: pulverizatio vel purificatio RT purificatio D//11-2.  
 Causa-deleatur *om.* APD//

<Ref. 71va,5>



uas distillatois cu ambz 7 e idz ai  
 eo quo hui ambz distillat n qz sb  
 illo ponit stramia 7 ai aqua di  
 stillat.

uas distillatois p dicitur.



uas di stillatois p fil.

uas distillatois p fil ut capi

Diversificatur vero secundum diversitatem rerum calcinandarum.  
 Calcinantur igitur corpora et calcinantur spiritus et res alie  
 15 extranee a natura horum, diversa vero intentione. Quia igitur  
 sunt corpora imperfecta duorum scilicet generum, dura  
 videlicet venus et mars, mollia vero ut iupiter et saturnus,  
 que omnia calcinantur, necesse est illa diversa intentione  
 calcinari speciali. Generali attamen una intentione  
 20 calcinantur, et est ut sulphureitas illa corrumpens et  
 defedens deleatur. Per ignem enim comburitur ex quacunq[ue] re  
 sulphureitas adustiva, que sine calcinatione deleri non

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13. vero: enim B//14. igitur: enim BRTWD vero H//15. horum: harum  
 BH//diversa vero: diversarum B//17. videlicet: fort. videlicet vero A  
 videlicet ut BHD scilicet ut RT ut W//18. est: fuit BRTWH//illa: scire illa  
 BRTWH//19. speciali. Generali: modo speciali. Et generali BH generali  
 scilicet et speciali R speciali scilicet et generali T speciali et generali.  
 W//attamen una intentione: intentione una autem generalis intentio est T  
 Attamen una intentio communis W//post intentione add. Quare BHT  
 qualiter R quia W//20. et est: est BRWH om. T//ut mg. A//illa: adustiva  
 illa PBWH adustiva T//21. enim: vero B//ex: omnis ex PBRW omnis  
 extranea ex T omnis et H//

potest, quoniam ipsum corpus solidum est. Et propter  
 soliditatem et latitationem sulphureitatis in continuitate  
 25 substantie argenti vivi, defenditur per illud ab adustione.  
 Ideoque necesse fuit continuitatem eius separari, ut ignis  
 liberius ad quamcunque minimam eius partem perveniens  
 sulphureitatem ex eo comburere possit et non defendat ipsum  
 continuitas argenti vivi in illo. Et est communis intentio  
 30 similiter in illa depuratio terreitatis. Inventum est enim  
 quod per reiterationem corporum calcinationis et reductionis  
 mundantur corpora, ut monstrabitur in sequentibus. Specialis  
 vero corporum mollium est ut cum his duabus intentionibus

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23. quoniam: quia T//24. soliditatem: solidationem W// sulphureitatis:  
 occultantis BWHD sulfuris R//in: et H//25. illud: illum Dab adustione:  
 ab ustione T a combustionem W//26. ideoque: ideo BRTWHD//separari:  
 separare: *rell.*//27. quamcunque: quamlibet T//29. Et om. T//30. in om.  
 D//illa: ipso T//31. reiterationem: reiterationum H//32. mundantur:  
 mundificantur BH mundentur R//monstrabitur: monstrabimus BWH//in  
 sequentibus om. P in sequenti BRTWHD//33. duabus: duobus P//post  
 intentionibus add. scilicet calcinatio et reductio R//

35 sit intentio per eam illa indurare et ignire, ad quod  
 pervenitur cum ingeniosa reiteratione calcinationis  
 super illa, de qua in sequenti traditione determinare nos  
 expedit. Invenimus igitur per illud ingenium manifeste  
 ipsa indurari, sed manifestius iupiter citius induratur.  
 Causa vero inventionis calcinationis spirituum est ut ipsi  
 40 scilicet melius figantur et facilius solvantur in aqua,  
 quoniam omne calcinati genus fixius est quam non calcinati et  
 facilioris solutionis, quia partes calcinati magis subtilitate  
 per ignem facilius cum aquis commiscantur et in aquam

---

34. sit: fit H//eam: eam calcinationem BTWHD//illa: ea W//36. illa:  
 illam A//37. igitur: enim BRTWHD//38. ipsa: illa T//sed: et  
 W//manifestius: manifestive D//iupiter: iupiter et BTWH iuperum *ut vid.*  
 D//39. inventionis: intentionis BD *om.* T//40. scilicet *om. rel.*//solvantur:  
 sublimantur D//aqua: aquam PBRW//41. est *om.* R//42. quia: qua  
 H//calcinati: calcinate BWHD illuminati T//subtilitate: subtilitate H//43.  
 cum aquis: per aquam vel cum aquis A//commiscantur: commiscuntur  
 T//in aquam: cum aqua R//

[71vb] convertuntur. Et hoc si expertus fueris,  
 invenies se habere. Calcinatio vero aliarum rerum fuit  
 preparationis spirituum ad exigentiam et corporum, de qua  
 latius a nobis determinabitur in sequentibus. Non autem est  
 5 de perfectione horum aliquid talium. Modus igitur ipsius est  
 calcinationis diversus propter diversitatem calcinandorum.  
 Calcinantur enim corpora aliter quam spiritus vel alie res.  
 Et corpora ad se invicem diversa similiter diversimodo  
 calcinantur. Corpora enim mollia unum habent modum generalem  
 10 ad calcinationis intentionem, scilicet quod et ambo per solum  
 possunt calcinari ignem et per salis acuitatem preparati vel  
 non preparati ambo similiter. Primus igitur modus

---

1. et *om.* BRTWHD//1-2. si-habere: scit qui expertus est BRTHD//2.  
 vero *om.* BH//fuit: fuerit B fit W//3. ad: secundum D//4. a nobis  
 determinabitur: determinabimus BRTWHD//in sequentibus: in sequenti  
 BRTWHD//autem: enim W//5. horum: eorum RT *om.* W//est: fuit et  
 est A//7. Calcinantur enim corpora: calcinatur autem corpus R calcinatur  
 enim corpus T//aliter quam: antequam B//8. ad: a BRWHD//diversa: et  
 diversa P//similiter: similiter intencione BT *om.* RT//diversimodo:  
 diversimode BRTWH//10. et ambo: ambo BRTWHD//11. per *om.*D//  
 11-2. preparati vel non preparati: preparari BWH//12. ambo *om.*  
 P//igitur: qui T//modus *om.* BWH//post modus *add.* est A//

- per ignem solum sic perficitur, ut sumatur vas ferreum vel terreum ad similitudinem parapsidis formatum, cuius structura sit firma, et coaptetur ad furnum calcinationis horum taliter quod sub illo possint carbones proici et sufflari. Proiciatur vero in fundum vasis illius plumbum vel stagnum, quod super tripodem ferreum vel super tres lapideas columnas sedeat firmiter. Et ad furni sui parietes similiter firmetur quatuor vel tribus lapidibus coartantibus illud ad eos, ne vas moveri possit. Furni vero figura eadem sit cum forma furni magne ignitionis, de quo narratum est iam, et

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13. per-perficitur: est A per ignem solummodo perficitur sic ut BWH sic perficitur R per ignem solum fit sic perficitur T// 14. structura: iunctura vel structura T//15. et *om.* D//furnum: foramen furni T//16. illo: ipso B isto T//possint: possunt TD//sufflari: folliari BWH//17. Proiciatur: proiciantur H//vero: verum R tunc T//18. ferreum: terreum P//super tres: trium BTWH tres PRD//lapideas: lapidum BTWH lapides R//columnas: vel columnas R//19. parietes: parietem T//similiter: et similiter A//Et-firmetur *om.* W//20. illud: illum D//ne vas *om.* H//21. cum: cum natura sive W//forma *om.* R//

- narrabitur similiter sermone completiori. Accendatur igitur in illo ignis sub calcificationis vase ad ipsius calcificandi corporis fusionem potens. Et cum ipsum corpus cutem nigram super se creaverit ignis calore, supertrahatur ab eo cum pala ferrea vel lapide que se non permittat aduri ad infectionem calcis. Hec autem tamdiu continuetur excoariatio quousque ipsum corpus in pulverem reducatur. Quod si saturnus fuerit, ad maiorem ponatur ignem quousque in citrinissimum mutetur colorem calx eius. Si vero iupiter, similiter exponatur et dimittatur quousque in albedinem mutetur completam.

---

similiter sermone completiori *om.* B//igitur: ergo RT//24. illo: illo furno BTHD furno W//calcificationis: calcinationis *rell.*//calcificandi: calcinandi D//25. ipsum: fusum BH ipsum fusum RTWD//cutem: autem D//26. supertrahatur subtrahatur BRTWH//27. lapide: lapidea *rell.*//que: qui A//que-aduri: non aduratur RT//28. continuetur: continuentur A//excoariatio: excoriari A//29. ipsum corpus: ipsa A primi *in ras.* D//reducatur: reducantur A convertatur PRTWH revertatur B//30. ponatur: exponatur PBTWHD componatur R//ignem *om.* A//citrinissimum: citrinum W//mutetur: convertatur RTW//32. dimittatur: mittatur D//post quousque *add.* calx eius *rell.*//mutetur: commutetur RT//completam: completa R//

In hoc tamen sollicitum reddimus artificem quoniam saturnus defacili a calce sua redit, iupiter vero difficillime.

- 35 Ideoque etiam non contingat illum errare in expositione saturni post primam eius calcinationem ad maiorem ignem, ne prius redeat quam perficiatur illius calx, quoniam temperantia ignis indiget et successione augmenti illius paulativa cum cautela quousque in calce firmetur sua, ne
- 40 defacili redeat, ut possit illi maior ignis administrari ad sue calcis perfectionem. Neque contingat similiter errare propter difficilem

---

33. In hoc tamen: In hoc autem R At T//reddimus: reddamus D//34. redit: reddit A reditur *ut vid.* P//35. Ideoque etiam non: Ideoque non PR Ideoque ne BTH Ideo ne W//illum: illis A ipsum BTH//36. calcinationem: pulverizationem *rell.*//ad: scilicet ad BWHD//maiorem: temperatum BWH minorem R temperatum et minorem T temperatum ad (*ad in ras.*) maiorem D//ignem: ignem ponatur B ignem exponatur TH//37. illius: eius T//38. successione: successive B//39. paulativa: paulatim BWHD//40. defacili: faciliter R de fictili faciliter T//redeat: reddeat A//41. administrari: administrare T//*post* administrari *add.* in reductione A//neque: Nec P Ne BWH//42. similiter: ei quod non reducat seu *in ras.* A//difficilem: difficiliorem W//

[72ra] iovis reductionem ut siquando posuerit in reductionem

- calcem eius eveniat ei quod non reducat, sed inveniant eam prioris dispositionis aut in vitrum redactam, et estiment reductionem eius impossibilem. Dicimus enim quod si in iovis
- 5 reductione non adhibuerit magnum ignem, non reducet. Si vero magnum, non necesse illum reducere contingit, sed possibile est in vitrificationem illum adducere. Et illud ideo, quoniam iupiter in profundo sue nature argenti vivi fugitivam inclusam
- 10 habet substantiam, que si longam in igne contraxerit moram, fugiet et corpus privatum humiditate relinquet, quod potius aptum ad vitrificationem erit quam ad corporis metallici

---

1. posuerit: posueris T//in reductionem *om.* A *add. in mg.* A<sub>2</sub> reductione PBRWH//2. eveniat: eveniet T//sed: aut T//inveniant: inveniat BWHD inveniet T//eam: eum T//3. redactam: redactum RT//estiment: ideo estimant T//4. eius: eius esse W//quod: quoniam PRTD//5. adhibuerit: adhibueris TW//magnum *mg.* AP//reducet: reduces W//6. magnum: nimium T//non: in D//necesse: necessario BWH *om.* R//illum: illud D//7. est *om.* AD//illum: illum non D//adducere: reducere vel adducere B reducere W//8. sue *om.* B//9. que: quod BWH//in igne: in ignem A ab igne W//contraxerit: trahit B//11. aptum ad: ad BWHD ad actum T//vitrificationem: -em *in ras.* -is *add. s.l.* A<sub>2</sub> vitrificationis *in textu rell.*//erit *om.* PBTWHD est R//*alt.* ad *om.* D//

fusionem. Omne enim propria privatum humiditate nullam nisi  
vitrificatoriam dat fusionem. Ideoque necessario relinquitur  
quod ignis impetu maximi veloci reducere celeriter festinet,  
15 aliter enim non reducitur. Exercitetur igitur ad illud et  
scietur. Modus vero calcinationis horum duorum corporum que a  
salis acuitate perficitur est ut proiciatur super faciem  
illorum quantitas salis post quantitatem sepissime in fusione  
sua et permisceantur agitatione multa per baculum ferreum  
20 super ignem quousque per salis mixtionem in cinerem  
vertantur. Et postea per eundem modum perfectionis  
perficiatur illorum calx cum suis considerationibus.  
Sed in hoc est etiam differentia in horum duorum

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12. *post fusionem add. converti reperietur. rell.//12-3. Omne- fusionem om. A add. in mg. A<sub>2</sub>//13. Ideoque: Ideo B//14. ignis: cum ignis PBRTHD//maximi: maximo RW om. T//veloci: veloce P velociter BRTWH//reducere: reducat BWH reduceretur D//celeriter: et celeriter BWH om. RT//festinet: festines W//15. igitur: ergo rell.//Exercitetur: Exerciteris W//15-6. et scietur om. BH et sciet RTD et invenies sicut prediximus W//16. ante modus add. De modo calcinationis B De calcinatione Iovis et Saturni cum sale R De calcinatione iovis et saturni que fit a salibus T Calciniatio perfecta Iovis et Saturni mg. W<sup>2</sup> De calcinatione a salis acuitate H De calcinatione que sit cum salibus rubrica. D//horum: eorum idest horum W//16. a om. D//17. faciem: facies B//18. sepissime: salis sepissime W//19. sua om. T//et om. W//permisceantur: permisceatur BTWH//agitatione: et agitetur agitatione W//20. mixtionem: commixtionem T mixturam W//21. vertantur: convertatur PT vertatur BH revertantur R//Et om. T//per: ad T//22. perficiatur: perfruatur D//illorum: eorum BWH//23. etiam om. BH quod D//in horum: horum A//*

corporum calcinatione, quoniam plumbum ex  
25 primis calcinationis laboribus ad pulverem convertitur  
facilius quam iupiter. Non autem perficitur illius calx  
facilius quam iovis. Dependet autem huius causa ex eo - quod  
saturnus immunditatem habet magis quam iupiter fixam, et  
maiolem terreitatis quantitatem quam iupiter. Veneris  
30 vero et martis est idem modus, diversus tamen a primis, et  
illud propter liquefactionis eorum difficultatem. Et est ut  
laminati ponantur ad fortem ignitionem de cuius intentione non  
sit fundere. Propter enim eorum multam terreitatis quantitatem

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24. *corporum om. W//25. primis: prime BH//calcinationis: calcinationum RT//convertitur: redigitur T //28. immunditatem: im- s.l. munditatem in textu A humiditatem BRTWHD//28-9. fixam-iupiter om. R//29. terreitatis quantitatem: terreitatem BWHD//post iupiter add. De calcinatione veneris et martis et spirituum et aliarum rerum R De calcinatione veneris et martis T//30. vero: tamen W//modus: modus calcinationis T//primis: predictis W//31. eorum: illorum R illorum duorum T//33. eorum: illorum PW//multam: admixtam W//terreitatis: terreitatis in illis PBRH terreitatem W//quantitatem: etiam W//*

et sulphureitatis adustive et fugientis mensuram,  
 35 defacili hoc modo adducuntur in calcem. Et illud ideo,  
 quoniam ex multa terreitate argenti vivi substantie intermixta  
 turbatur argenti vivi continuatio, et ideo porositas in  
 eis creatur, per quam et sulphureitas transiens evolare  
 potest. Et ignis ex causa illa ad eam accedens comburere  
 40 et elevare potest illam. Per hoc igitur derelinquitur  
 et partes rariores fieri et in cinerem per discontinuitatem  
 raritatis converti. Manifesta igitur experientia huius  
 est quoniam exposita veneris ad ignitionem laminā flammam  
 dabit sulphuream et squamam in superficie sua creabit

---

34. *pr.* et: illis et W//sulphureitatis: multam sulphureitatis RHD multam sulphuris T multam sulphureitatem W//adustive: adustionem RT adustivam W//35. hoc: in hoc PBTWH//adducuntur: adducitur W//Et *om.* T//36. ex: in eis est W//terreitate: terreitatis W//intermixta: intermistum R//36-7. argenti-vivi *om.* W//37. turbatur *om.* D//38. et *om.* T//evolare: elevare H//39-40. Et-illam *om.* BW// 40. illam: eam PRTHD//Per: Propter W//igitur: ideo T// derelinquitur: et relinquitur P relinquitur BRTWHD//41. et partes: partes BRH//et in: in BH//rariores: priores R ampliores et rariores T minores D//42. raritatis: caritatis *ut vid.* R *om.* T//igitur: ergo P *om.* T//43. est: habemus *in ras.* A//quoniam: et quoniam P//lamina: laminus *ut vid.* B//43-4. flammam dabit: flammabit W//44. sulphuream et: et sulphuream W//

[72rb] pulverizabilem. Et illud ideo, ex propinrioribus  
 enim partibus faciliorem sulphuris necesse est combustionem  
 fieri. Modus vero furni huius calcinationis est idem cum  
 modo furni distillationis nisi quod solummodo unum magnum  
 5 foramen habere debet in capite suo, unde a fumositatibus  
 libere se absolvat. Et situatio calcinandorum in  
 medio furni sit, ut in circuitu libere ignem suscipiat.  
 Vas vero eius sit terreum ad formam parapsidis  
 factum. Modus vero calcinationis spirituum est ut eis  
 10 administretur ignis successive et paulative illum augendo,  
 ne fugiant ad fixationem comproximantibus quousque

---

1. ex: quia ex P quoniam ex W//2. enim *om.* PW//3. vero: autem //4. modo: illo modo T//magnum *om.* R//5. habere debet: habet W//in capite suo: super caput suum BRTWHD//6. situatio: trituratio W alius situatio *s.l.* W<sup>2</sup>//7. medio: medium A//suscipiat: recipiat RTW suscipiat vel concipiat H//7-8. ut - sit *om.* D//8. eius *om.* W//terreum: terreum vitreatum T//ad: ab D//formam: modum PRTW forma D//9. vero: itaque BWH utrumque et utraque D//eis: cum eis W//10. illum: scilicet illum ignem T//10-1. *transp.* administretur-fugiant *post* ad fixationem comproximantibus *rell.*//paulative: paulacione D//11. fugiant: fugiatur D//comproximantibus: approximantibus *rell.*//



maximum eos ignem tollerare contingat. Et vas  
eorum sit rotundum undique clausum, et furnus idem cum  
novissime dicto. Cum simili autem furno et cum simili vase  
15 omnis alia res calcinatur. Excusamur tamen a maiori  
labore qui adhibetur in custodia fuge, quoniam alia  
res non fugit nisi spiritus et quod spirituum nature  
approximat. Descriptio vero omnium que narrata sunt novissime  
est hec.

20

<48> Sermo in solutione. Rubrica

De solutione sermo noster ampliatus innuit solutionem rei  
sicce in aquam esse redactionem. Dicimus igitur quoniam omnis

12. eos: eis BWHD//13. sit *om.* D//14. Cum simili: Consimili  
BTH//autem *om.* W//*alt.* cum *om.* PBWHD//15. omnis alia: omnes alie  
BT similiter omnis alia R similiter omnes W similiter omnes alie H omnis  
similiter alia D//calcinatur: calcinantur BTWH//16. qui: quem P quam  
qui BWD//adhibetur: adhibemus P//custodia: custodiam D//fuge: fuge  
spirituum BRTWH//alia: alie BH//17. fugit: fugiunt BH//quod: que  
BWH qui TD//18. approximat: approximant BTWHD approximanti *ut*  
*vid.* R//omnium: omnium vasorum R//novissime *om.* R//18-9.  
Descriptio-hec *om.* BWH//19. hec: hoc D// 20. Sermo-Rubrica: De  
solutione quid sit cum causis et modis ipsius P De solutione BTH  
Desolutione in igne R De solutione sermo W De solutione Rubricum  
D//21. De-innuit: Consequenter sermonem conficientes dicimus T De  
solutione noster sit sermo ampliatus. Dicimus autem W//solutione:  
dissolutione D//22. aquam: aqua *ut vid.* H//redactionem: reductionem  
PBWHRT rductionem D//Dicimus *om.* W//igitur quoniam: quoniam  
BWHD quod T//

&lt;Ref. 72rb,18&gt;

pala



pala



furni

quo calanar' lat' n' p'ma  
up'is



furni i quo calanar' up'is i lat' n'  
pot calanatione p'ma mag' i ut  
ip'is i via sua calanar' p'p'is

25 solutionis perfectio adducitur cum aquis subtilibus et maxime acutis et acribus et ponticibus, nullam fecem habentibus, sicut est acetum distillatum et acerba uva et pruna acerba et pira multe acredinis et mala granata similiter distillata, et his similia. Fuit autem causa inventionis eius subtiliatio eorum que nec fusionem nec ingressionem habent, de quibus utilitas magna amittebatur spirituum fixorum videlicet et 30 eorum que sue nature sunt. Nam omne quod solvitur necesse est salis aut aluminis vel eorum consimilium naturam habere. Est autem natura eorum quoniam fusionem dant ante illorum

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24. et acribus: acribus T//ponticibus: ponticis RW//fecem: quam fecem R que fecem T//25. sicut: ut BRTWHD//uva: urina BH et pruna acerba om. TD//26. acredinis: acritudinis BH acritudinis vel acredinis T//27. inventionis: intentionis W// 29. magna: maior BWH magis D//amittebatur: inveniebatur B//spirituum: ut spirituum T//videlicet om. RT//31. aut: et aut A vel BRWHD//aluminis: aluminibus H//vel: aut BRTWHD//32. quoniam: quod T//ante illorum: aque eorum T//

35 vitrificationem; ergo et spiritus soluti fusionem similiter prestabunt similem. Cum ergo multum ex natura sua corporibus et sibi invicem convenient, habita fusione, necesse est per illam corpora penetrare, et penetrando ea transmutare. Ad hoc vero sine magisterio non pervenitur, quod est scilicet ut post solutionem et coagulationem illius administretur illi aliquis ex spiritibus purificatus non fixus, et totiens ab 40 illo sublimetur quousque secum maneat, et illi velociorem prestat fusionem, et ipsum in fusione a vitrificatione conservet. De natura enim spirituum et corporum non est vitrificari et a vitrificatione commixtum

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34. similem: similiter vel similem A sibi similem P//ex: in in ras. A//35. et sibi: sibi T//fusione: scilicet spirituum fusione T//35-6. per illam: illos T//36. ea: eas P om. BWHD// transmutare: mutare P//37. post vero add. quod penetrent et transmutent *rell.*//scilicet om. W//38. illius: illorum BH eorum W//illi: illis BTWHD ei R//39. purificatus: purificatus idest mundatus BHD//totiens: totien H//40. sublimetur: sublevetur BWD sublevatur H//maneat: maneat in fusione T//41. ipsum: ipsos BH//

[72va] salvare donec in eo fuerint. Spiritus ergo qui magis naturam servavit spiritus magis a vitrificatione defendet. Magis autem servavit spiritus solummodo purificatus quam purificatus, fixus, calcinatus, atque solutus. Ideoque  
 5 necesse est illi admisceri. Resultat enim ex eis bona fusio et ingressio et fixio stans. Ex operibus autem nature probare possumus sola salium et aluminum et similium naturam servantia solubilia esse. Non enim ex operibus illius omnibus considerantes invenimus alia separari et solvi  
 10 preter illa. Igitur quecunque solvuuntur necesse est per illorum naturam solvi. Sed quia videmus omnia vere calcinata solvi per reiterationem calcinationis et solutionis, ideoque probamus per illud omnia calcinata ad

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1. in eo fuerint: in ea fuerint A secum fuerit in commixto BH in eo scilicet commisto fuerit R in eo scilicet commisto fuerint T in eo fuerit W fuerint scilicet in commixto D//2. servavit: servit A servabit BRTWHD//2-3. magis-spiritus om. P//3. servavit: servabit BRTWHD//post spiritus add. magis defendet a vitrificatione magis autem servabit spiritus T//quam purificatus: non fixus permixtus quam purificatus T qua W//5. post illi add. administrari seu in ras. A//eis: his W//6. pr. et om. B//6-8. Ex-esse om. W//7. possumus: possumus D//sola: solam AB quod sola R//similium: consimilium BHD//8. servantia: servantiam B//esse: sunt R//enim: eam autem T//ex: in rell./operibus: operacionibus W//9. considerantes: considerantis A//alia: illa W//separari et om. rell./11. illorum: eorum BWH//12-3. solvi-calcinata om. W//13. ideoque: et ideo BH//probamus: probavimus D//illud: illum D//

salium vel aluminium naturam approximare: ideoque sese in  
 15 proprietatibus necesse est commitari. Modus ergo solutionis est duplex, scilicet per fimum calidum et per ferventem aquam, quorum una est intentio et unus effectus. Modus ergo per fimum est ut ponatur calcinatum in ampullam vitream, et super illud fundatur scilicet quantitas aceti distillati vel  
 20 consimilis dupli eius. Et obturetur caput suum bene, ne respiret, et sub fimo tepido triduo dimittatur. Et postea per distillationem filtri solutum removeatur, non solutum vero iterato calcinetur. Et post calcinationem iterato similiter solvatur donec per reiterationem operis super illud totum  
 25 solvatur. Modus vero qui per ebullientem aquam fit velocior est. Et est ut ponatur calcinatum similiter in ampulla cum

---

14. vel: et BH//15. commitari: concommitari PTWH commutari B//ergo: autem T vero W//16. fimum: fumum D//ferventem: bullientem W//17. post effectus add. De solutione per fimum RT//18. ampullam vitream: ampulla vitrea BRTWHD//19. scilicet om. rell./quantitas: quantitatis W//20. consimilis: consimilium BWH similis T consimili D//dupli: duplum BRTWHD//suum: eius RT//bene om. BH//ne: ut non T//21. fimo: fumo D//23. calcinetur: similiter calcinetur B//ante alt. iterato add. vero T//similiter om. RT//24. solvatur: solvetur BH//24-5. donec-solvatur om. A add. mg. A<sub>2</sub> donec per iterationem operis illud similiter opus solvatur R//25. post solvatur add. De solutione per aquam ebullientem RT//vero: autem T om. W ergo D//qui om. A//ebullientem: bullientem BWH ebullacionem T//aquam: aque T//fit: facis in ras. A//26. Et est: idest B//ponatur om. PRTWD//similiter in ampulla: post ampulla add. in mg. ordinetur A<sub>2</sub> in ampulla similiter ordinetur P in ampulla vitreata exordinetur B similiter ordinetur RT similiter in ampulla ordinetur W in ampulla vitrea et ordinetur H//

30 aceto obturato foramine ne respiret, que in caldario pleno aqua et straminibus sepeliatur, ut in distillationis per aquam preceptum attulimus ordine. Et postea succendatur sub eo ignis donec aqua per horam ferveat. Post hoc vero solutum per filtrum distilletur et seorsum servetur, non solutum vero iterato recalcinetur et iterato eodem ordine solvatur, donec per reiterationes totum solvatur. Descriptio vero eius quod nunc diximus est hec.

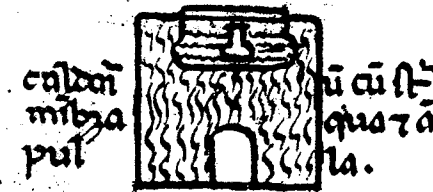
27. obturato-respiret *om.* A obturato ampulle foramine ne respiret R//pleno: plene B//28. straminibus: stramine BRTWHD//in: in modo BWH modo D//post distillationis *transp.* ordine PRT//29. preceptum *om.* B//ordine: per ordinem BWH ordinem D//attulimus: precepimus RT//postea: post R//succendatur: accendatur T succenditur D//29-30. sub eo: ab ea B sub ea TWD//Post hoc: postea BWH post T//31. per filtrum *om.* A//distilletur: distillatur D//non: pars non P//32. recalcinetur: calcinetur PBWH//post solvatur *add.* et per filtrum ut supra distillatur vel reservetur in fiola insimul mixte solutiones ut pocius fiat una sola distillatio B et per filtrum ut supra distilletur vel reservetur insimul mixte ille solutiones ut pocius fiat una distillatio sola T et per filtrum distilletur ut supra vel servetur insimul mixte iste solutiones ut post fiat una bona distillatio W per filtrum ut supra distilletur vel reservetur in fiola insimul mixte iste solutiones ut pocius fiat una sola distillatio H qua per filtrum ut supra vel reserventur in simul mixte solutiones ut pocius una fiat sola distillatio D//33. reiterationes: iterationem calcinationis R reiterationem calcinationum TWH D reiterationis calcinationis B//33-4. Descriptio-hec *om.* BRTWH Descriptio eius quod nunc dictum est. D//post hec *add.* est P//

<Réf. 72va,33>



A dōc pūmūroq̄ q̄r sup illud  
twa. soluar

ordinatur



- 35                    <49> **Sermo in coagulatione. Rubrica**  
                       Coagulatio est itaque rei liquorose ad solidam  
 substantiam per humidi privationem reductio. Est ergo duplex  
 causa inventionis illius - una argenti vivi scilicet induratio.  
 Altera vero inventionis causa est medicinarum solutarum ab  
 40 aqueitate illius admixta absolutio. Diversificatur ergo  
 secundum ipsorum coagulandorum multipliciter. Alia enim  
 argentum vivum coagulatione indiget, alia vero soluta. Est et  
 tamen ipsius argenti vivi duplex coagulatio - una quidem per  
 ablationem ab illo totius humidi innati, alia per  
 45 inspissationem ipsius humidi quousque induretur. Coagulare

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35. Sermo-Rubrica: De coagulatione quid sit et de diversitate et causis et modis ipsius P De coagulatione ad quid sit inventum B De coagulatione mercurii et rerum solutarum in genere R De coagulatione TW De coagulatione mercurii et rerum solutarum H De coagulatione mercurii et rerum solutarum. Rubricum. D//36. itaque: utique BH *om.* W//37. humidi: huiusmodi *ut vid.* R//ergo: autem R//37-8. Est-illius: Ratio autem inventionis eius est duplex T//38. una *om.* APBRWHD//scilicet: videlicet W//39. causa: illius causa T//medicinarum: materiarum *ut vid.* W//40. illius: illis D//admixa: admixtam A//ergo *om.* W//42. vero: enim B//soluta: soluta idest solute medicine BHD res soluta R soluta medicina T solute medicine W//42-3. Est et tamen: Est enim BTD et tamen R Est et enim WH//43. coagulatio: est coagulatio R//una quidem: unaquoque A unam quidem B//44. ablationem: ablutionem D//ab illo *om.* RT//humidi innati: humiditatis innate T//per: vero per PBTW//

- attamen illud difficillime et laboriose accidit,  
 cum profunditate perspicacis industrie: et nos  
 [72vb] narrabimus omne ingenium coagulationis illius.  
 Ingenium ergo coagulationis illius cogitaverunt quidam fore  
 per conservationem illius in igne temperato, qui illud  
 putantes coagulasse post remotionem eius ab igne invenerunt  
 5 illud fluere sicut prius. Per hoc ergo in stuporem adducti et  
 in admirationem sunt vehementer, arguentes ad hoc perveniri  
 non posse. Alii vero necessario ex principiis naturalibus  
 supponentes humidum quodlibet ab ignis calore in siccitatem  
 converti conati sunt cum perseverantie instantia continuare  
 10 illius conservationem in igne. Et per hanc continuationem

---

46. et: atque PBWHRT ad quod D//laboriose: laboriosissime BWH//accidet: artificem accidit BWH artificem accidit T//47. profunditate *om.* P//perspicacis: perspicuitatis R perspicacitatis W//2. ergo: vero PRW quoque T//illius *om.* BH//cogitaverunt: excogitaverunt P//3. conservationem: observacionem BH//in *om.* D//illud: cum illud *rell.*//4. putantes: putassent PBTWHD *non legitur* R//eius: illius W//5. illud: ipsum P//fluere: facere D//ergo: enim BH *om.* RT igitur WD//6. in *om.* W//vehementer: vehementem BRWH//perveniri: pervenire T//7. necessario: necessarie T//8. supponentes: supponentes posse T//9. converti: converti posse BH//conati: cogniti T//perseverantie: perseverantia et R perservacione H//continuationem: a re T//10. conservationem: conservacioni T//igne: ignem T//

ad hoc pervenerunt - ut ex eis aliqui in album,  
aliqui vero in rubeum lapidem converterent, aliqui  
vero in citrinum, cui non fuit fusio neque ingressio. Et  
horum diversitatis causam non potuerunt estimare: ideoque  
15 illud abiecerunt. Alii vero cum medicinis illud coagulare  
conati sunt et ad hoc non pervenerunt. Sed accidit eis  
illusio, aut quia non coagulaverunt, aut quia insensibiliter  
ab eis exterminatum est, aut quod coagulatio eorum non fuit in  
forma corporis alicuius, sed in forma argenti vivi cum plumbo  
20 mixti. Et horum diversitatis causam similiter ignoraverunt.  
Alii vero medicinas artificiosas componentes, illud in  
projectione coagulaverunt, sed eorum non fuit coagulatio

---

12. vero *om.* BRTH//lapidem: in lapidem B//converterent: converterunt  
BRTWH//12-3. aliqui - in citrinum *transp. post* album BH//13. vero *om.*  
BH//cui: cuius BRTWH//14. estimare: excogitare BH//ideoque: ideo  
D//15. coagulare: coagulaverunt vel coagulare T//16. conati sunt: contere  
*ut vid. in ras.* A *mg. non legitur* A<sub>2</sub>//et *om.* AD//pervenerunt: potuerunt  
pervenire BH//17. illusio: conclusio R//aut quia non coagulaverunt *om.*  
T//18. exterminatum: extennatum *ut vid.* D//quod: quia RTW//eorum:  
ipsorum T// fuit: fuerit P//19-20. sed-mixti *om.* A//20. Et horum: quorum  
T// similiter: singuli A//ignoraverunt: ignoravera D//21. illud: illum  
BWHD//22. projectione: proportione W//

utilis, quoniam ad imperfectum corpus illud converterunt; et  
causam huius similiter videre non potuerunt. Horum igitur nos  
25 narrare causas expedit, ut ad coagulationis magisterium illius  
artifex perveniat. Ut iam a nobis sufficienter narratum est,  
uniformis est substantia argenti vivi, quare non est  
possibile in brevi spatio temporis per conservationem in igne  
illius aqueitatem suam remove. Nimia igitur festinatio  
30 causa fuit primi erroris. Cum vero subtilis sit substantie,  
ab igne recedit. Ignis igitur excessus est causa erroris  
illorum a quibus fugit. Commiscetur cum sulphure et arsenico  
et marchasita defacili propter communitatem in natura sua.  
Ideoque per illa apparet coagulatum non in forma corporis, sed

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23. quoniam: quia BH//24. similiter *om.* BHD//nos: errorum nos W//25.  
causas: causas erroresque corrigere T//expedit: expediunt *ut vid.* H//ad  
*om.* BWHD//coagulationis magisterium: coagulationem magisterii R  
coagulationum magisterium T//26. perveniat: inveniat  
BTWHD//narratum est: narratur B//27. substantia argenti vivi:  
substantie argentum vivum A//28. brevi: tam brevi T//29. illius: eius  
W//igitur festinatio: festinancia T ergo festinacio W//31. est: fuit T//32.  
fugit: extenuatum est BT fugit et extenuatum est W fugit idest extenuatum  
est H//33. communitatem: affinitatem T//sua *om.* H// 34. Ideoque:  
Ideoque qua B Ideo quod D//illa: illam B//corporis: corporis alicuius  
B//

- 35 argenti vivi cum plumbo mixti. Non enim hec cum fugitiva sint  
possunt illud in ignis pugna tenere quousque ad corporis  
naturam perveniat, sed fugiunt secum per ignis intensionem.  
Et illud est causa erroris eorum qui sic coagulant. Habet  
utique argentum vivum similiter humiditatem sibi multum  
40 unitam, quam ab illo separari non est possibile nisi per ignis  
cautam violentiam, vel per conservationem eius in suo igne.  
Et est suus quem illi administremus augmentando secundum  
exigentiam sue tollerantie illius humiditatem tollens, qua  
remota non funditur. Et hec est causa erroris illorum qui in  
45 lapidem illud coagulant non fusibilem. Habet similiter  
sulphuris naturaliter sibi partes admixtas,

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36. corporis: corporis alicuius B//37. intensionem: intencionem  
BHD//38. est: vero est BHD//eorum: illorum W// coagulant:  
coagulantur B//39. utique: itaque B *om.* W//41. cautam: magnam BTH  
*add. s.l.* cautelam W<sup>2</sup>//per *om.* BR//42. est: eius *ras.* T//suus: suus ignis  
BTWH//quem: que P quoniam *ut vid.* R//administremus *om.* APRWD  
administramus T//43. tollens: tollit APRTWD//44. funditur: funderetur  
R//hec: hoc B//45. illud: illum BTWH//coagulant: coagulaverunt  
RT//fusibilem: fusile B//similiter: igitur B//46. sulphuris: sulphur R//

- [73ra] quoddam tamen plus, quoddam vero minus, quas remove per  
artificium contingere est possibile. Cum igitur sit  
sulphuris proprietas cum argento vivo rubeum vel citrinum per  
mensuram sue quantitatis creare, eius ablatione proprietas  
5 argenti vivi erit albedinem dare per ignem. Hec igitur est  
causa varietatis colorum illius post coagulationem eius in  
lapidem. Habet et similiter terreitatem sulphuream et  
admixtam, quibus infici omnes sui coagulationes necesse est.  
Et hec est causa erroris illorum qui illud in corpus  
10 imperfectum coagulant. Ex diversitate igitur medicinarum  
illius coagulationis accidit diversa coagulatione creati

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1. *pr.* quoddam: quasdam W quidam D//tamen: vero P//*alt.* quoddam:  
quasdam W quidam D//quas: quam A quoniam *ut vid.* D//2. contingere  
*om.* P contingeretur T//igitur: ergo W//sit *om.* A *add. mg.* A<sub>2</sub>//3. vel: seu  
H//per: secundum *rell.*//4. creare: creare colorem W//ablatione:  
ablationis PBTWH *non legitur* R//*post* proprietas *add. in ras.* illius scilicet  
A//5. argenti vivi: argento vivo BH//per ignem *om.* W//5-6. Hec -  
varietatis *om.* D//igitur: enim R//6. eius: illius B//7. et *om.*  
RTW//sulphuream: sulphuri P sulphuris BTWHD sulfur R//7-8. et  
admixtam: admixtam PBTHD admistum R sibi admixtam W//8. omnes:  
omnem RT//sui: suas BWH sue D//coagulationes: coagulationem  
RT//9. hec: hoc D//10. coagulant: coagulanti D//medicinarum *non*  
*legitur* W//11. coagulatione: in coagulatione PBRT//

corpora. Et ex illius diversitate similiter quod coagulandum  
 est. Nam si medicina vel illud habuerit sulphur non fixum,  
 necesse est corpus molle ex illo creari; si vero fixum,  
 15 necesse est durum; et si album, album; si vero rubeum, rubeum;  
 et si remissum ab albo vel rubeo, remissum similiter necesse  
 est fieri; et si terreum, infectum; si vero non, non. Et  
 omne similiter non fixum lividum creat; fixum vero non,  
 quantum in illo est. Pura vero illius substantia purum creat  
 20 corpus; non pura vero econverso. Accidit autem et similiter  
 in solo argento vivo absque sulphuris commixtione diversitas  
 eadem, propter diversitatem mundationis et preparationis  
 illius in medicinis. Ideoque contingit ex

---

12. similiter *om.* B//quod *om.* R//13. habuerit: habuerint A//14. necesse  
 H//illo: eo W//15. necesse est: necessarie W *om.* BH//si vero: et si  
 PT//16. ab albo vel rubeo *om.* A *add. mg.* A<sub>2</sub> ab albo et rubeo R ab albo  
 vel rubeum D//17. et si: si A et BD//terreum: *iter. in ras.* A terreum  
 fuscum vel T//infectum *iter.* B//18. similiter *om.* BH//fixum: colorem  
 fixum BH//18-9. non quantum: nunquam W//19. illo: se BH//vero: ergo  
 BWHD//creat: generat W//20. pura: pura in purum B//vero econverso  
*om.* B econverso H vero corpora D//autem: idem T //et similiter *om.*  
 BH similiter RTW//21. in: ex W//22. et preparationis: in preparacione  
 B//23. in: cum RT//

25 medicine diversitate illius quandoque in coagulatione illius  
 per eam plumbum, quandoque vero iupiter, quandoque vero mars,  
 et quandoque venus - quod propter impuritatem accidit - fieri,  
 quandoque vero sol, quandoque luna - quod ex puritate evenire  
 necesse est et consideratione colorum. Coagulatur enim ex  
 frequenti illius precipitatione cum violentia ad ignis  
 30 asperitatem. Asperitas enim ignis aqueitatem illius defacili  
 removet. Et fit per vas cuius figura sit multe longitudinis,  
 in quo inveniens refrigerium, locum adherentie inveniat et  
 quietis in eius spondilibus propter suam longitudinem et  
 non viam fuge, quousque iterata vice ad illius fundum  
 35 precipitetur, multe caliditatis ignitionis cum reiteratione

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24. medicine diversitate: medicinis et diversitate medicinarum B//25. *pr.*  
 vero: autem P *om.* BRTH et W//*alt. vero om.* BRTWHD //26. quod:  
 quia D//27. vero *om. rell.*//*ex:* propter T //puritate: puritatem T //28. et:  
 et in P in T et ex W//consideratione colorum: consideratione eorum que  
 fit per precipitationem T//*post* colorum *add.* Qualiter sit coagulatio B De  
 coagulatione mercurii per precipitationem et aliarum rerum per ampullam  
 R De coagulatione mercurii TH De coagulatione mercurii per  
 precipitationem Capitulum sexta(!) W De coagulatione mercurii per  
 precipitationem D//enim: igitur *rell.*// 29. illius *om.* T//30. defacili  
 H//31. fit: hoc fit BRTWHD//vas: vas multe longitudinis T//sit: est  
 T//32. locum: et locum BT//refrigerium: refrigerii W//inveniat: inveniet  
 B *om.* W//33. propter suam longitudinem *om.* B propter sui longitudinem  
 W//34. quousque *om.* TW//35. *post* caliditatis *add.* et *in ras.* A //



multa quousque fiat fixum. Coagulatur similiter ex diuturna reiteratione in suo igne cum vase vitreo cuius collum sit multe longitudinis, et in ventre figuram ampulle habeat cum continua colli eius apertione, ut per eam possit illius  
 40 humiditas evanescere. Coagulatur vero per medicinam illi convenientem. Et nos illam tibi narrabimus in sequentibus apertius; hic vero et similiter ut intentionem nostram super illo narremus completam, secundum quod per nostrum invenimus experimentum. Et est medicina illa que maxime illi adheret  
 45 in profundo eius et ei per minima commiscetur ante illius fugam. Ex rebus ergo sibi convenientibus necesse est illam colligere. Sunt autem huiusmodi corpora omnia

36. similiter: vero T//37. reiteratione: retentione RW eius conservatione et retentione T//38. ventre: vente B//figuram: fugam T//habet: habens T//40. per: et per W//41. sequentibus: sequenti BRTWHD//42. et om. BRTWHD//ut: *transp. post* intentionem nostram A om. BRWH *ras.* T//42-3. super illo: super illa BWH sicut et in illo T//43. illo: illa D//secundum quod: quod secundum B//44. Et om. D//illa: illi conveniens RT//45. in: et in R//eius: est R//ei: ei idest mercurio BWH idest cucurio D//46. ergo: igitur R om. T//necesse: necessario T//illam: illa B//47. huiusmodi: huius BRWHD//corpora: corpora metallica T//

[73rb] et sulphur vel arsenicum. Sed quia non videmus corporum aliquod in natura sua illud coagulare sed ab eis ipsum fugere, quantecunque fuerit sue convenientie, ideoque consideravimus nullum corpus illi in profundo adherere. Subtilioris igitur  
 5 substantie et liquidioris fusionis necesse est medicinam illam esse quam ipsa corpora. Ex spiritibus etiam non videmus illis in natura sua manentibus firmam et stabilem coagulationem fieri illius, sed fugitivam et multe infectionis, quod quidem contingit alterum per spirituum fugam, alterum vero ex teree  
 10 et adustibilis substantie illorum commixtione. Ideoque ex hoc manifeste relinquitur ex quocunque medicina illius eliciatur

1. et om. BT//vel: et T//Sed: medicina sed T//quia om. T//non: nullum R//corporum: corpus PBWHD om. T//2. aliquod om. RT//sed: oportet R//3. quantecunque: quantumcunque PBTWH//fuerit: fuerint T//convenientie: convenienter B nature T//ideoque: igitur T//consideravimus: consideramus R//4. illi: ei *rell.*//igitur: ergo T//5. substantie om. W *add. s.l. W<sup>2</sup>*//medicinam: medicinam esse B//6. *post ipsa add. in ras.* ante A//7. stabilem: igitur stabilem *ut vid.* W//8. *post fugitivam add. immundam* quia sunt fugitivi T//quidem: quoque A//9. *pr. alterum:* alterum idest fugam BH *in mg.*D alterum scilicet fuga T om. W *add. s.l. W<sup>2</sup>* //per: propter BWH *in mg.* D//spirituum - alterum: *in mg.* D//fugam: fugam et B fugam infectione T//*post alt.* alterum *add.* scilicet infectionem BWHD//vero om. T//10. adustibilis: adustibili BH//illorum: eorum T//11. ex quocunque: Et quecunque A ex quocunque PBH ex quacunque re R ex quacunque TWD//medicina om. BH//

ipsam debere esse substantie subtilissime et purissime, illi  
 adherentis ex natura sua et facillime liquefactionis et  
 tenuissime ad modum aque, et fixe super ignis pugnam. Hic  
 15 enim ipsum coagulabit et in naturam solarem vel lunarem  
 convertet. Modos ingeniorum medicine tibi dedimus, ad quam  
 per illos pervenire potes, et ipsam sermonem sibi proprio  
 determinavimus. Sollicite igitur ad illam exerciteris, et eam  
 20 invenies. Sed ut nos increpare non possis ex eius  
 insufficientia, dicimus quoniam ex ipsis corporibus metallicis  
 cum suo sulphure vel arsenico preparatis hec medicina  
 elicitor. Et in solis similiter sulphure vel arsenico  
 preparatis, et ex solis similiter corporibus elici potest.

12. ante ipsam *add.* in D//13. et facillime: facillime et T//liquefactionis et:  
 et liquefactionis A liquefactionis D//15. vel: et R et etiam T atque W//16.  
 Modos: Modos vero P//medicine tibi *om.* A//dedimus: trademus R  
 tradidimus T//ad quam: ad aquam H//17. sibi *om.* T//proprio: primo  
 R//18. determinavimus: determinemus B determinabimus R declaravimus  
 T//igitur: ergo BWD//eam: illam BH//19. possis: possit R//ex: de  
 W//eius: ipsius RT//20. quoniam: quod T// metallicis: metallorum  
 BH//21. hec: hoc D//22. Et in: Ex PBRT *om.* W et D//22-3. solis-  
 potest *om.* W *add.* mg. W<sup>2</sup>//solis: solo BTH//23. preparatis *om.* P  
 preparato *ut vid.* H//elici potest: elicitor BH//

Ex solo vero argento vivo facilius et propinquius et  
 25 perfectius invenitur, quoniam naturam propriam natura  
 amplectitur amabilius, et ea gaudet magis quam extranea.  
 Et est in ipso facilitas extractionis illius substantie  
 subtilis, cum iam in actu subtilem habeat substantiam. Modi  
 vero inventionis huius sunt per sublimationem, ut a nobis  
 30 narratum est sufficienter. Modus vero fixationis illius in  
 capitulo suo et fusionis in suo similiter narratum est.  
 Coagulationis vero solutorum modus est per ampullam in  
 cineribus usque ad collum cum temperato igne quousque aqueitas  
 evanescat. Descriptio vero longorum vasorum et eorum  
 35 in quibus fit omnis coagulatio est hec.

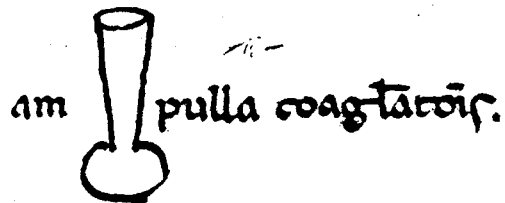
25. naturam propriam naturam: natura secundum naturam R//27. est:  
 cum D//facilitas: felicitas D//28. in actu subtilem: subtilissimam BTH  
 subtilissimam actu W subtilime in actu D// Modi: Modos BH//29. vero:  
 autem W//inventionis: intentionis R//huius: huius medicine scilicet  
 mercurii BD medicine mercurii huius RT huius medicine mercurii  
 WH//sunt: est BH//31. *pr.* suo: sue T//et fusionis in suo similiter *om.* B  
 et fixationis similiter R fixationis et fusionis similiter T et solutionis in suo  
 similiter W//*post alt.* suo *add.* capitulo H//narratum: narratus W//*post*  
 est *add.* De coagulatione solutorum T//32-5. Coagulationis-hec *om.*  
 B//33. cum: in RTWH//34. evanescat: evanescit D//vero *om.* RTD//

&lt;Ref. 73rb,34&gt;

Uasī cūq̄ | p̄at̄ ad fundū.



Uasī | quo aḡ unū coaglat̄ p̄



## &lt; 50 &gt; Sermo in fixione

Fixio est rei fugientis ad ignem conveniens adaptatio.

Causa vero inventionis ipsius fixationis est ut omnis tinctura  
omnisque alteratio perpetuetur in alterato et non mutetur.

- 40 Diversificatur vero et ipsa similiter secundum rerum  
figendarum multipliciter, que sunt videlicet corpora quedam  
a perfectione diminuta sicut saturnus, iupiter, et venus, et  
secundum diversitatem ipsorum spirituum, qui sunt scilicet  
sulphur et arsenicum in gradu uno, et argentum vivum in alio,  
45 in tertio vero marchasita, magnesia, et tutia, et horum  
similia. Figuntur igitur corpora a perfectione diminuta

36. Sermo in fixione: De fixatione quid sit et de diversitate et causis et modis ipsius P De fixatione B De fixatione sulphuris, arsenico, mercurio et aliarum rerum R De fixatione capitulum T De fixatione WH Quod est fixio rubrica D//37. Fixio: Fixatio T//est: vero est P//38. ipsius: illius P om. T//fixionis om. B//39. alterato: alterando BWH alterato vel alterando T//40. ante Diversificatur add. cum D//vero om. T//41. figendarum: figendarum B//quedam om. B//42. sicut: ut BRTWHD//post saturnus add. et A//43. ipsorum om. W//scilicet: videlicet P om. BWH//44. et arsenicum: arsenicum B//uno et: uno T//45. post tutia add. que omnia predicta solvuntur coagulantur et fixantur BRTWHD// horum: eorum RT//46. corpora: corpora hec BRH corpora hoc D//

[73va] per suam calcinationem, quoniam absolvuntur per  
 eam a sulphureitate volativa et corrumpente;  
 et hanc sufficienter in sua narravimus oratione. Figuntur  
 igitur sulphur et arsenicum duobis modis, scilicet per  
 5 reiterationem sublimationis super illa in vase aludel  
 quousque stent. Est igitur ex hoc intentio festinationis  
 illorum fixationis ut ingenieris adinventionem multiplicis  
 sublimationis reiterationis in brevi tempore, quod per duo fit  
 aludel cum duplicibus suis coopertoriis hoc ordine, scilicet  
 10 ut nunquam ab actu sublimationis desistant donec fixa  
 fuerint. Proiciantur ergo cum aludel uno ascenderint in aliud

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3. hanc: hanc calcinationem BRTWHD//oratione: oratione scilicet in  
 capitulo de calcinationibus BRTWH occasione scilicet in capitulo de  
 calcinationibus D//4. igitur: vero BRHD *om.* TW//post igitur *add.*  
 corpora hec scilicet A//5. *transp.* scilicet *post* reiterationem  
 BRTWH//sublimationis: solutionis RT//6. igitur ex hoc: hec ergo ex  
 B//intentio: intentione B//7. fixationis: fixationis A fixationum P fixationis  
 B//ut: et R// multiplicis: multiplicem T//8. in *om.* B//9. suis *om.*  
 D//coopertoriis: cooperculis *rell.*//hoc: hec B//10. sublimationis:  
 sublimationum D//11. ergo *om.* B//aludel: in *rell.*//uno: uno cohoperculo  
 RT//aliud: alio RT//

aludel, et sic alternata vice fiat, et nunquam otiosa permittantur  
 aludel spondilibus adherere, quin in continua sint ignis  
 elevatione quousque cesset illorum elevatio.

15 Quanto enim poteris multiplices reiterationes sublimationis  
 in breviori temporis spatio multiplicare,  
 tanto celerius continget ipsius fixationis tempus abbreviare.  
 Ideoque fuit secundus fixationis modus inventus, qui est per  
 ipsius sublimandi precipitationem ad calorem, ut continue  
 20 in illo sit donec figatur. Et hoc fit per longum vas vitreum,

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12. fiat: fiant RT//permittantur: permittatur P//13. quin: quoniam B//14.  
 elevatione: elevationis motore *in ras.* A//illorum: eorum BRTWH //15.  
 Quanto enim: Quotocunque BTHD Et quantumcunque RW// *post* enim  
*add. in mg.* in breviori A<sub>2</sub>//reiterationes sublimationis: sublimaciones  
 reiterare B sublimationis iterationes W sublimationis reiterationis H//16.  
 breviori: brevi PH//temporis: tempore BRTWH//spatio *om.*  
 BRTWHD//17. celerius: scellerius H//fixionis: fixationis A//abbreviare:  
 abbreviant D//18. secundus *om.* RT//modus: motus T//qui: que B *om.*  
 T//est *om.* T//19. ipsius: illius B//calorem: calorem ignis B//continue:  
 continuo W//20. illo: eo T//

cui fundus sit terreus et non vitreus, quoniam scinderetur in partes; et sit illi artificialiter cum clausura bona connexus. Et per spatulam ferream vel lapideam cum ad spondilia eius adhererit, deiiciatur ad ima caloris continue  
 25 per alternas vices quousque figatur. Fixionis vero modus argenti vivi est idem cum modo sulphuris et arsenici, et non diversificantur inter se nisi in hoc - quod non possunt sulphur vel arsenicum figi nisi prius eorum partes inflammabiles, tenuissime, subtili divisionis artificio ab  
 30 eis separentur per hunc ultimum modum fixationis. Argentum vero vivum hanc considerationem non habet. Et ad hoc

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21. cui: cuius *rell.*//21-2. quoniam-partes *om.* BHD//in *om.* W//22. partes *om.* W//et sit illi: illius A illi BRWHD//23. connexus: annexus BWH connexa T//vel lapideam *om.* PR//25. alternas: alternatas T//figatur: figatur R//Fixionis: fixio BH//vero *om.* T//modus *om.* BH//26. idem: eadem BH//modo: modo fixationis PBWH fixationem RT modus fixationis D//27. *post* possunt *add.* scilicet B//28. vel: et BRTH//29. divisionis: divisione T//artificio: in artificio T//30. separentur: separantur T//30-1. Argentum vero vivum: Argentum vivum BWH mercurius T//31. ad hoc: non enim habet partes inflammabiles BWH non enim habet partes inflammabiles adhuc D//

similiter temperatiore calore quam argentum vivum indigent. Et hoc modo et in longiori figuntur tempore quam argentum vivum in eo similiter. Quoniam altius elevantur propter suam  
 35 raritatem quam argentum vivum, longiori vase indigent quam argentum vivum in eo similiter ad suam fixationem. Fixio vero marchasite, magnesie, et thucie est ut cum post primam sui sublimationem aquisiverimus quod ex eis volumus, abiectis illorum fecibus, reiteremus super ea  
 40 sublimationem totiens convertendo quod superius ascendit ad illud quod inferius remansit ex unoquoque illorum, quousque

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32. similiter: fideliter similiter T//temperatiore: temperatiore D//33. *pr.* Et: in BTWHD *om.* R//modo: modo similiter diversificantur quia PBH modo quia RT modo diversificantur quia W modo diu repetere diversificantur quia D//et in *om.* PBRWH in T//34-6. in eo similiter - argentum vivum *om.* D//34. Quoniam *om.* BH quia T//36. in eo similiter *om.* *rell.*//37. magnesie: et magnesie R//38. sui *om.* P sui aliud B sui aliquid W//sublimationem: subulationem(!) H//aquisiverimus: acquisiverimus D//39. illorum: eorum BWHD//super ea *om.* P super eis BH super eo R super eos TW//40. quod: illud quod BH//superius *om.* BH//ascendit: ascendet W//41. illud: id PRWHD//remansit: est B//ex-illorum: *transp. ante 73vb,1*, horum T//quousque: donec W//*post* quousque *add.* Sermo in fixationem marchasite, magnesie, et thucie *ad inserendum in 38 A*//

[73vb] figantur. Horum vero descriptio vasorum iam tradita est.

< 51 > Sermo in ceratione. Rubrica

Ceratio est igitur dure rei non fusibilis mollificatio ad  
liquefactionem. Ex hoc igitur manifestum est quod causa  
5 illius inventionis fuit ut et quod ingressionem ex privatione  
sue liquefactionis non habebat in corpus ad alterationem  
mollificaretur, ut flueret et ingressionem haberet.  
Putaverunt ideo aliqui cerationem debere ex oleis, liquidis,  
et aqueis fieri: sed erroneum est illud a principiis huius  
10 magisterii semotum penitus, et ex manifestis nature operibus  
reprobatum. Naturam enim non videmus in ipsis corporibus

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1. Horum vero *om.* BRTWHD//descriptio-est *om.* BH//2. Sermo-  
Rubrica: De ceratione quid sit et de causa illius et modo P *om.* B De  
inceratione R De ceratione TWH De ceratione Rubrica D//3. est *om.*  
D//igitur *om.* PBWHRT//5. et *om.* BRTWH//ingressioem: ingressum  
B//*transp.* 6 non habebat *ante* ingressioem PRTW//6. liquefactionis:  
humiditatis liquefactionis BH//non: *mg.* A *om.* H//corpus: corpora  
TD//ad alterationem *om.* W//7. et ingressioem haberet *om.* B// ut:  
non D//8. ideo: ideoque W//aliqui: aliqui antiqui W//9. aqueis: ignis  
D//*post* illud *add.* et D//a: et a PBRH//*ante* huius *add.* quoque *in ras.*  
A//9-10. huius magisterii: huius magisterii naturalis P naturalibus huius  
magisterii BWH huius magisterii naturalibus RTD//10. semotum:  
remotum PB//et *om.* T//nature: vero T//

metallicis humiditatem cito terminabilem ad illorum fusionis  
et mollificationis necessitatem posuisse. Si enim talem illis  
posuisset, relinqueretur necessario ut citissime scilicet  
15 ignitione una corpora totaliter humiditate privari  
contingeret, quare ex illo sequeretur post unam ignitionem  
corpus quodlibet nec malleari nec fundi posse. Quamobrem  
igitur imitantes nature opera in quibus possumus, necesse est  
nos modum nature in cerando sequi. Cerat autem ipsa in radice  
20 creationis fusibulum, humiditate que super omnes humiditates  
expectat ignis calorem. Igitur et nos cum simili

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12. terminabilem: terminabilem imo diu durabilem ut patet per  
iterationem *ut vid.* subsequentem BHD terminabilem imo diu durabilem  
W//12-3. fusionis et mollificationis: fusionem et mollificationem T fusionis  
ex mollificationis D//13. illis: eis BW ei H//14. ut citissime: cum  
citissime D//15. una: una habita *ut vid.* T//17. corpus quodlibet: forma  
quolibet T//malleari: malleat D//18. quibus: quo B//19. in cerando *om.*  
T//Cerat: ceracio est B//20. creationis: cerationis BRWHD sue creationis  
*ut vid.* T// humiditate: fit humiditate B//21. expectat: est expectans  
*rell.*//Igitur: et igitur P Igni D//cum simili: consimili BRTWH et simili  
D//

cerare humiditate necessarie expedit. In nullis autem  
 rebus melius et possibilis et propinquius hec humiditas  
 cerativa invenitur quam in his - videlicet sulphure  
 25 et arsenico propinque - propinquius autem in argento vivo et  
 melius. Horum enim humiditatem non videmus terram  
 relinquere propter fortem unionem quam in opere mixtionis  
 naturali habuerint. In omnibus autem aliis rebus humiditatem  
 habentibus experimento invenies eam a terrea sua substantia  
 30 separari, et post illius separationem omni humiditate  
 privari. In spiritibus autem predictis hoc contingit minime.  
 Ideoque non est aliud per quod ab illorum  
 in ceratione acceptione excusari possimus. Modus vero  
 cerationis est per illos ut totiens super rem cerandam

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22. necessarie: necessario *rell.*//23. hec: huius *T*//24. cerativa: serativa  
*B*//videlicet: scilicet *BRTWHD*//25. propinque *om.* *B*//autem: autem et  
 levius *R*//26. melius: melius et lenius non tamen perfectius *T*//enim:  
 tamen *T* autem *W* igitur *BHD*// terram *iter.* *R*//*post* terram *add.* illorum  
*D*//27. fortem: fortem eorum *W*//28. naturali *om.* *P* nature  
*BRTHD*//habuerint: habuerat *B* habundat *T*//aliis: his *H*//29. eam: eam  
 in resolutione *rell.*//30. separationem: solutionem vel separationem  
*A*//omni: eius *D*//31. hoc: hec *D*//minime: non *B*//ab illorum *om.*  
*D*//33. in ceratione acceptione: ceratione ac inceptione *A* incerationis  
 acceptione *BWH* in ceratione *R* acceptione in inceratione *T* abscerationis  
 acceptione *D*//possimus: possumus *PD*//vero: ergo *BTD*//34. *post* illos  
*add.* spiritus *W*<sup>2</sup>//rem cerandam: re ceranda *D*//

35 multiplicetur eorum sublimatio quousque in illam cum  
 humiditate sua manentes, fusionem bonam prestant. Hoc autem  
 non fiat ante illorum perfectam mundationem ab omni re  
 corruptente.

40 < 52 > Liber tertius, et divisus a secundo. Et est pars illius  
 sermo generalis in perfectione et in his que ad  
 perfectionem spectant

Principiorum itaque huius magisterii discussione tradita,  
 necesse est ex promissione nostra intentum huius nostre artis  
 complete prosequi sermone illi conveniente. Et est scilicet

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35. multiplicetur: multiplicatur *W*//eorum: illorum *BH*//illam: illa *W*//  
 36. sua *om.* *H*//manentes: manente *R*//prestant: prestant et facile *T*//37.  
 fiat: fiet *R* fit *T*//*post* corruptente *add.* tractione brevis et levis *D*//39-41.  
 Liber-spectant: Explicit liber 4. Incipit 5. Prohemium ad summam  
 intentionis huius libri 5 que est de cognitione naturarum spirituum cum  
 corporibus ex quibus videlicet creata sint, et que sint cause corruptionis vel  
 perfectionis illorum cum probationibus manifestis *P* Explicit liber tertius.  
 Incipit liber quartus de consideratione rerum omnium ex quibus fit  
 perfectio *B* Incipit sexta pars que est secunda quinte partis principaliter de  
 consideratione rei per quam fit perfectio et rei perficientis et artificium per  
 quam cognoscitur perfectio in genere *R* De consideratione rei per quam  
 fit perfectio et rei perficientis *T* De consideratione rerum omnium ex  
 quibus fit perfectio *W* Incipit liber quartus de consideratione rerum  
 omnium ex quibus fit perfectio *H* De consideracione *D*//42. itaque *om.*  
*RT*//magisterii: magisteriis *R*//44. complete: complere *B*//Et *om.*  
*RT*//scilicet: igitur *R*//

[74ra] consideratio omnis rei per quam perfectio huius operis  
 apertius ostendatur, et consideratio necessitatis perficientis  
 medicine scilicet ut discutiatur ex qua re melius et  
 propinquius eliciatur illa ad omnem imperfecti perfectionem,  
 5 et consideratio similiter illius artificiorum magisterii per  
 que cognoscamus an perfectio sit completa. His itaque  
 traditis, et tota erit perfectionis tradita cognitio secundum  
 nostre artis exigentiam.

<53> Sermo generalis in cognitione principiorum  
 corporum, similiter in naturis suis

10

Cognoscere vero non est possibile transmutationem

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1. omnis: illius T//2. ostendatur: ostenditur TW// perficientis: perfectioris  
 W perfectionis H//4. illa om. T// imperfecti: imperfecta P//5.  
 consideratio: consideratio tertia ut vid. T//illius om. PBTWH//magisterii  
 om. RTHD//6. cognoscamus: cognoscimus W//7. et tota: tota T//9-10.  
 Sermo-suis om. P De principiis corporum que sunt sulphur arsenicum et  
 argentum vivum quid sunt quidve boni malive in se contineant. Postea vero  
 ipsorum corporum omnium naturas cum suis omnibus monstrabimus  
 proprietatibus que videlicet sunt cause corruptionis eorum cum suis  
 experienciis. De sulphure et arsenico quid boni malive contineant B De  
 principiis corporum que sunt sulfur et arsenicum et argentum vivum quid  
 sint quidve boni malive in se contineant R De principiis corporum que  
 sunt sulphur et arsenicum et mercurium quid sunt quidve boni quidve mali  
 in se contineant. Sermo vero in sulphure et arsenico TWH Sermo est  
 sulfuris et arsenici et mercurii D//11. vero om. T autem  
 W//transmutationem: transmutationes BH//

corporum vel ipsius argenti vivi nisi super mentem artificis  
 deveniat vera cognitio illorum nature secundum suas radices.  
 Prius igitur corporum principia notificabimus, quid videlicet  
 15 sint secundum causas suas, et quid boni malive in se  
 contineant. Postea vero ipsorum omnium corporum naturas cum  
 suis omnibus monstrabimus proprietatibus, que videlicet sint  
 cause corruptionis illorum cum suis experienciis approbantes.  
 <54> Sermo particularis in cognitione vera sulphuris et arsenici  
 20 Ergo inprimis spirituum naturam que ipsorum sunt corporum  
 principia afferamus, que sunt videlicet sulphur et argentum  
 vivum et suum compar. Dicimus igitur quoniam sulphur et

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12. argenti vivi: mercurii T//mentem: mentem ipsius BH//  
 13. illorum nature iter. P//suas: duas H//14. igitur om. R//principia:  
 radices et principia R//videlicet: scilicet RT//15. suas om. T//malive: et  
 mali P//17. monstrabimus: narrabimus RW non legitur et monstrabimus  
 T//proprietatibus: causis et proprietatibus W//18. cause: essencie  
 R//illorum: eorum BWHD//approbantes: comprobantes BRTHD//19.  
 Sermo-arsenici om. rel.//20. Ergo: Igitur W//que: quam D//21. que  
 sunt: ut sint R// videlicet: scilicet BRHD om. TW//21-2. argentum vivum:  
 mercurius T//et om. BRTD//22. suum: suus BRTWHD//post compar  
 add. De cognitione naturarum sulphuris et arsenici P//22-3. Dicimus-  
 arsenicum om. H//Dicimus: Dicamus B// igitur: ergo T//quoniam: quod  
 T//



arsenicum sunt pinguedo terre, ut a nobis narratum est, cuius  
 probationem per experientiam manifestam elicias per illius  
 25 facilem inflammationem et facilem eius liquefactionem per  
 calidum. Non enim inflammatur nisi oleaginum, neque liquescit  
 per calidum facile nisi et quod illius naturam habet. Sulphur  
 itaque et illius compar causam corruptionis habent -  
 inflammabilem scilicet substantiam et terream feculentiam.  
 30 Causam vero perficientem habent mediam inter hanc videlicet et  
 illam. Est igitur causa corruptionis in illo terreitas per  
 hoc - quod neque fusionem neque ingressione[m] habet. Causa vero  
 corruptionis est similiter inflammabilis substantia quia neque

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23. arsenicum: suus compar BWD//a nobis narratum: supra narratur in  
 libro tertio capitulo de sulphure B iam narravimus RW iam narravimus  
 supra in libro secundo capitulo de sulphure T iam narravimus supra in  
 libro secundo de sulphure H iam narravimus supra in libro 3. capitulo de  
 sulphure D//24. probationem per experientiam manifestam: experientia  
 manifestam probationem BRWH experientie manifestam probationem T  
 experientiam per probationem manifestam H experientiam manifesta  
 probatione D//elicias: allicias A//illius: alius B//26-7. Non-calidum om.  
 H//26. nisi: nisi scilicet T//oleaginum: quod oleaginum est PBRT quod  
 oleaginosum est W quod oleagineum est D//ante neque add. idest pingue  
 BD et pingue W//liquescit: liquescat B liquefit W//27. et quod: quod  
 BTHD quod et RW//Sulphur: sulphuris BH//28. habent: habet ut vid.  
 B//30. vero: autem R vero non D//habent: habet ut vid. BW//videlicet  
 om. BTH scilicet RWD//31. post illam add. Et in ras. A//31-2. per hoc  
 quod: que W quod D//33. est: et A//inflammabilis: flammabilis B// quia:  
 que BTW quod H//

stat neque stare facit, et quod nigredinem ex omni genere eius  
 35 prestat. Causa igitur perfectionis in illis est mediocris  
 illorum substantia, quia propter terreitatem non turbatur ab  
 ingressione que per fusionem bonam perficitur, et per illius  
 subtilitatem non removetur eius impressio defacili propter  
 fugam. Non est autem mediocris illorum substantia  
 40 perfectionis corporum vel argenti vivi causa nisi figatur,  
 quia cum non fixa sit, licet illius impressio non moveatur  
 defacili, non tamen stabiliter perpetuatur. Ex his itaque  
 elicitor illius substantiam mediocre[m] dividere artificem  
 necesse esse. Dividere autem putaverunt quidam impossibile  
 45 esse propter fortem illius mixtionem, et illi quidem suis  
 operibus manifestis adversi sunt. Nam et ipsum sulphur

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34. nigredinem: ingredi est A//eius om. R//35. prestat: facit B//igitur:  
 vero BH//36. quia: que T//propter: propter illius PT per illius BRH//38.  
 subtilitatem: sulphureitatem T//40. nisi: ubi D//figatur: figantur A//41.  
 quia: que BRTWH//pr. non: vero T om. W//sit: est P//moveatur:  
 removeatur RT//42. defacili non tamen stabiliter: non tamen defacili  
 stabiliter BWHD non tamen stabiliter R non defacili instabiliter T//43.  
 illius: quod illius T//44. esse: om. BWH est omnino T//45. mixtionem:  
 commixtionem BWHD//illi: illud A//suis: in suis BRTWH//46. adversi:  
 adversati W//ipsum: ipsi BWHD//

[74rb] calcinaverunt, et licet non multum, quod nullam fusionem nec inflammationem dedit. Sed illud per divisionem necesse est evenisse, quoniam sulphur in sua naturali commixtione permanens necesse est inflammari et comburi. Ergo per divisionem diversarum substantiarum in illo relinquitur partem magis in ipso inflammabilem a partibus non inflammabilibus seorsum in artificio separari. Nam si possibile est per calcinationem ad remotionem omnium inflammabilium in illo pervenire, necesse est ex eorum naturalibus operibus eos confiteri ad omnem partium divisionem pervenire. Sed quia hoc dependet ex subtilissimo artificio, cogitaverunt fore impossibile. Patet itaque ex premissis in capitulo suo non esse sulphur

1. nullam: tamen nullam W//ante fusionem add. fixationem in ras. A//nec om. H//3. sua: sui BWH//6. in om. RT//7-8. ad remotionem omnium: earum partium BH omnium R ad remotionem earum partium W causarum D//8. post pervenire add. divisionem B//9. eorum: illorum BWH//eos: illos RT//omnem: omnium BTH//10. divisionem: divisionem in eo T//hoc: hec D//Sed: posse sed T//ex: per D//12. itaque iter. P//in capitulo om. W//non esse: quod non est T//

de veritate nostre artis, sed pars eius. Et nos iam deduximus te in cognitionem artificii per quod ad illius divisionem possibile est devenire. In arsenico vero quia in radice sue minere per actionem nature resolute sunt multe illius partes inflammabiles, ideo artificium separationis eius est facile. Sed ipsum est albedinis tinctura, sulphur vero rubedinis. In igitur sulphuris divisione magnam adhibere cautelam necesse est.

< 55 > Sermo in cognitione nature mercurii

In argento vivo et similiter est superflua demere. Habet enim corruptionis causas, videlicet terream et adustibilis absque inflammatione aqueitatis substantiam a quibus in sublimando purgatur. Putaverunt attamen aliqui non superfluum habere terram vel immunditiam illius. Sed vanum est quod

13. veritate: veritate vel substantia T//14. te om. T//15. devenire: pervenire W//16. minere: minerie H//nature om. A add. s.l. A<sub>2</sub>//17. ideo: ideoque T ideo per W//separationis: separatio W//19. necesse: necessarium BRTWHD//21. Sermo-mercurii: De cognitione nature mercurii P De mercurio quid in se boni malive contineat B De argento vivo quid in se boni malive contineat RD De argento vivo quid in se boni et mali contineat T Sermo in argento vivo W Sermo in argento vivo quid in se boni et mali contineat H//22. et om. BRTWH//23. causas: causam BWH//videlicet: scilicet BRWHTD//adustibilis: adustiva P adustibilem BRTWH//24. a om. D//24-5. a-purgatur om. A transp. post 23 causas RT//25. attamen: tamen BWH//26. terram: terream A terreitatem T//vel: sed T om. W//immunditiam: mundiciam A//illius: illud PRW om. BTH//

30 cogitatum ab eis est, videmus enim ipsum multe lividitatis et non albedinis. Et preterea similiter per leve artificium ex illo videmus terram nigram et feculentam emanare, per lavationem videlicet, cuius modum narrabimus. Sed quia duplex est per illud elicere perfectionem et illud perficere, ideoque necesse est ipsum duplici mundationis gradu preparare. Si

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27. cogitatum ab eis est: cogitaverunt BRTWHD//ipsum *om.* B//28. Et *alt. om.* T//similiter *om.* BH//29. illo: eo T//nigram: magnam B//feculentam: feculentiam BH//30. lavationem: levationem B//videlicet: scilicet BRTWHD//*ante* cuius *add.* natura *ut vid.* D//*post* narrabimus *add.* secundum *Secundus vero* et iam in capitulo de mercurii lavatione. Et diximus similiter in capitulo de sublimatione mercurii. Modum habes similiter de sublimatione mercurii. Modum habes similiter de solutione mercurii. *Modus est ergo.* BH s.i.e.s. secundus et ita in capitulo de mercurii lavacro et diximus supra in capitulo de sublimatione mercurii s. modus ergo D//duplex: duplicem D//31. est: eius T//elicere: exercere T//perfectionem: per illud videlicet perfectionem P perfectionem per illud scilicet et B perfectionem per illud videlicet RT perfectionem scilicet medicinam per illud creare W perfectionem per illud H scilicet D//illud: id D//32. necesse *om.* A//duplici: duplicis APRT duplicem D//gradu: gradum B//*post* preparare *add.* Sunt vero due mundationes mercurii necessarie una per sublimacionem ad medicinam nam et hoc innuitur alia per lavacrum ad coagulationem et illa invenitur in paragrafo *secundus vero* BH Sunt enim due mundationes necessarie una per sublimacionem ad medicinam alia per lavacrum ad coagulationem. W Sunt enim due mundationes mercurii necessarie una per sublimacionem ad medicinam et hoc hic innuitur alia per lavacrum ad coagulationem et illa innuitur in s. secundus vero D//

enim volumus medicinam ex illo creare, tunc necesse est a feculentia sue terreitatis mundare, ne lividum in  
35 proiectione creet colorem et ipsius aqueitatem fugitivam delere, ne et totam medicinam fugitivam in proiectione faciat, et mediocrem illius substantiam salvare, de cuius est proprietate et natura non aduri et ab adustione defendere, et que non fugit fixumque facit. Probamus itaque  
40 perfectivum esse illud manifestis experienciis. Nam videmus argentum vivum argento vivo magis adherere et eidem magis amicari, post illud vero aurum et post hoc argentum. Ideo ex hoc relinquitur ipsa esse sue nature magis. Alia vero videmus non ad illud tantam conformitatem habere; ideo et ipsa  
45 veridice innuimus minus sua natura participare. Et quecunque

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33. enim: ergo BH//tunc *om.* R//34. terreitatis: terreitatis per sublimacionem BTWHD//35. creet: creat T//aqueitatem: humiditatem P//36. delere: delere necesse est BWH delere sed necesse est D//*et om.* BH//*medicinam:* materiam A naturam R//37. mediocrem: mediocrem materiam R//salvare: salvare per medicinam BWHD//38. *post* cuius *add.* enim D//*proprietate:* proprietate A//*et natura om.* *rell./aduri:* adurere T//39. *fixumque:* et fixum PBRWH et non fixum T et fixio D//*facit:* facit fixum T//*itaque:* utique D//40. *perfectivum:* perfectum W//*manifestis:* ex manifestis T//41. *post alt.* magis *add.* commixeri et *in ras.* A//42. *amicari:* commitari A//*hoc om.* BRTWHD//*Ideo:* ideoque BRTH//43. *ipsa:* solem et lunam BTWH solam et lunam D//44. *non:* corpora non BTWHD//*conformitatem:* affinitatem T//*et:* enim BWHD//45. *minus om.* BHD//

[74va] videmus plus ab adustione salvari, illa consideravimus plus suam naturam possidere. Ideoque relinquitur ipsum argentum vivum esse perfectivum et adustionis salvativum, quod est perfectionis ultimum. Secundus vero mundationis illius gradus est ad ipsius coagulationem, et est ut sufficiat illi solummodo lavatio sue terreitatis per unam diem, cuius modus hic est. Sumatur patella terrea et in eam mittatur argentum vivum, super quod fundatur aceti fortissimi parva quantitas, vel alterius rei consimilis, que sufficiat ad cooperiendum illud; postea mittatur ad ignem lentum ne ferveat, et agitur continue cum digitis super fundum patelle, ut dividatur argentum vivum in similitudine pulveris albi, donec

1. salvari: salvare A//consideravimus: consideramus BTWH consideremus R//3. argentum vivum: mercurium T//perfectivum: perfectionum D//salvativum: conservativum T//3-4. quod-ultimum *om.* W//5. est *om.* A//6. unam diem: mundationem PBWHRT modicum per mundationem D//7. hic est: hic est ut PBRTH est ut W hec est ut D//terrea: vitrea vel terrea BRTWHD terrea vel *ras.* vitrea P//eam: ea BRTHD illam W//mittatur: mittitur D//8. quantitas: quantitatis A//aceti fortissimi: robes BRT aceti W robe H rabes D//10. illud *om.* B illum T//postea: post APTD//igne: igne D//ne: ut A//11. cum *om.* T//ut: ne A//12. similitudine: similitudinem RT//argentum vivum: mercurius T//post pulveris *add.* subtilissimi D//

totum acetum evaporaverit et ipsum argentum vivum redeat. Postea vero quod feculentum et nigrum videris ex illo emanasse, lava et abiice. Et hoc iterata vice multiplica quousque videbis colorem sue terreitatis in clarum mixtum albo et celestino colori perfecte mutari. Signum autem perfecte lavationis est hoc. Cum igitur pervenerit ad illud, proiciatur super ipsum medicina sue coagulationis et coagulabitur in solificum vel lunificum, secundum quod ipsa preparata extiterit. Et ipsius narrationem in sequentibus ponemus. Ex iam igitur dictis patet et similiter argentum vivum non esse perfectivum in natura sua

13. ipsum argentum vivum: ipse mercurius T//redeat: reddat A//14. et: est et A//videris *om.* A *add.* mg. A<sub>2</sub>//*ex:* de in *ras.* *add.* s.l. ex A<sub>2</sub>//15. emanasse: emanatum *ras.* *add.* emanasse s.l. A<sub>2</sub>//hoc: hec B//16. videbis: videris *rell.*//clarum: claris B//17. colori: colore BRT//perfecte: perfectione R//17-8. Signum-hoc: quod perfecte lavacionis est signum PBWHRT et perfecte lavacionis est signum D//18. pervenerit: perveneris T//illud: id RD//19. ipsum: illum B ipsam D//medicina: medicinam D//20. vel: et W//lunificum: lunificum verum B//21. ipsa *om.* BRTWHD//preparata: preparatum T//22. sequentibus: sequenti BRTWHD//Ex: Ex his B//igitur: ergo P//et *om.* BT//post ponemus *add.* et supra capitulo de coagulatione mercurii B//

25 nec in natura ad quam reducit illud minera sua, sed ad quam perducit ipsum artificium nostrum. Et similiter in sulphure et eius compari est inducere. Non igitur est in his possibile naturaliter naturam sequi, sed per nostrum artificium naturale.

< 56 > Sermo in cognitione naturarum marchasite, magnesie, et tutie

30 De aliis igitur spiritibus naturalem necesse est traditionem nos facere, qui sunt videlicet marchasita, magnesia, et tutia, impressionem in corporibus magnam facientes. Et ergo dicamus quid sint cum probationibus manifestis in capitulo. Dicimus igitur quoniam marchasita

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24. nec in natura om. BWHD//reducit: reduxit W//illud: illud in A om. BWHD//25. perducit ipsum: perducitur A reducit ipsum B perducit RT//artificium nostrum: artificium ipsum RT magisterium nostrum W//26. pr. est om. D//in his om. B//28. naturale: naturalem D//29. Sermo-tutie: De essentia et procreatione marchasite magnesie et thucie P De marchasita magnesia et tuchia BWH De natura marchasite magnesie et tutie RT De marcassita et magnesia et tutia. Rubrica D//30. De: Ex T//31. videlicet: scilicet BRTWHD//32. magnam: magicas D//33. ergo: ideo D//sint: sunt BD//cum: in D//34. manifestis om. BH scilicet RT suis D//in: suis in PBTH//capitulo: isto capitulo B capitulo uno T//igitur: enim D//quoniam: quod BWH//

35 duplicem habet in sui creatione substantiam - argenti vivi videlicet mortificati et ad fixationem approximantis, et sulphuris adurentis. Ipsam ergo habere sulphureitatem comperimus manifesta experientia. Nam cum sublimatur, ex illa emanat substantia sulphurea manifesta comburens. Et 40 sine sublimatione similiter perpenditur illius sulphur. Nam si ponatur ad ignitionem, non suscipit illam prius quam inflammatione sulphuris inflammetur et ardeat. Ipsam vero argenti vivi substantiam habere manifestatur sensibiliter, nam albedinem prestat veneri meri argenti, quemadmodum ipsum 45 argentum vivum. Et colorem in illius sublimatione celestinum

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35. duplicem habet om. W add. s.l. W<sup>2</sup>//creatione: creationem H//36. videlicet: scilicet BRTWHD//approximantis: proximantis R//37. ipsam: Ipsum A//38. manifesta om. T//Nam: scilicet marchasita nam T//39. sulphurea: sulphuris R//39-40. Et sine sublimatione: nec sine inflammatione W//40. sine mg. A//similiter: si hec R//illius: eius BWH//sulphur: sulphureitas *rell.*//41. ponatur: ponitur RTD//ad ignitionem: in ignitione RT//42. ardeat: ardescit D//vero: que BH//44. prestat: prestans D//meri argenti om. BH//ipsum: et ipsum TW//45. illius: ipsius BW//sublimatione: sublevationem *ut vid.* H//

[74vb] prestare et luciditatem manifestam metallicam habere videmus, que certum reddunt artificem illam has substantias continere in radice sua. Magnesiam vero et sulphur plus turbidum et argentum vivum magis terreum et feculentum, et  
 5 ipsum sulphur similiter magis fixum et minus inflammabilem habere per eandem probare experientiam manifeste poteris, et ipsam similiter magis nature approximare martis. Tutia vero est fumus ipsorum corporum alborum. Et hoc manifesta probatione perpenditur, nam proiecto fumo mixtionis iouis et veneris,  
 20 adherente in spondilibus fabrorum fabrice, eandem impressionem

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1. prestare: prestat BH prestant D//2. certum: circum B//reddunt: reddit A//3. Magnesiam: Magnesia APBRTH//et om. *rell.*//4. terreum: turbidum terreum BRTH terreum et turbidum W//*alt.* et om. R//5. ipsum sulphur: ipsius sulphuris T//similiter om. R//fixum: spissum R//inflammabilem: inflammabile H//6. eandem: easdem *rell.*//experientiam: experientias *rell.*//poteris om. R//7. ipsam: ipsum T//nature: ad naturam B naturam H//9. proiecto: proiecta D//10. impressionem: impressione D//

facit cum ea, et quod fumus metallicus non redit, nec ipsa similiter sine alicuius corporis admixtione. Ideoque cum fumus ipsa sit alborum corporum alba non citrinat corpora, sed  
 15 rubea. Nam citrinitas non est aliud quam rubei et albi determinata proportio. Ideoque ipsa propter sui subtilitatem magis ad profundum penetrat, et ideo magis alterat quam suum corpus, et magis adheret in examine pauco artificio, quod iam tibi narratum est. Quecunque igitur alterantur per argenti  
 20 vivi virtutem vel sulphuris aut horum similium necesse est alterare, quoniam sola hec communicant in natura ad ipsa corpora.

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12. fumus: fumus alius BH//quod-redit *iter.* H//redit: reddit D//nec: in D//ipsa: illa corpora B illa WHD//13. admixtione: commixtione BWHD//14. sit: fit H//14-15. corpora sed rubea: corpora sed rubeum A sed rubea corpora BH//*ante* Nam *add.* Quid sit citrinitas D//17. profundum: profundum corporis *rell.*//alterat: alterant A//18. quod: et D//19. narratum est: narratur D//igitur: enim BWD ergo R//alterantur: alteratur B alterantur vel T//20. horum similium: horum consimilium R consimilium W//necesse: necessarie T//21. alterare: alterari BWH//in natura ad: ad natura in B//

## &lt;57&gt; Sermo in cognitione corporum et primo solis

De corporibus igitur ampliato sermone eorum intimam  
 25 narremus essentiam, et primo de sole, et postea de luna,  
 ultimo vero de aliis, secundum quod videbitur expedire cum  
 suis probationibus que per experimentum habentur. Est igitur  
 sol creatus ex subtilissima substantia argenti vivi fixa et  
 clarissima, et ex substantia pauca sulphuris mundi et parve  
 30 rubedinis fixi et a natura sua mutati, tingentis illud. Et  
 ideo quia contingit diversitas in coloribus ipsius sulphuris,  
 necesse est et auri citrinitatem diversitatem habere  
 similiter. Et est quoddam magis, quoddam vero minus in  
 citrinitate intensum. Quod ipsum enim ex subtilissima sit

23. Sermo-solis: De essentia et procreatione corporum et primo solis P De  
 essentia et procreatione solis B De essentia et procreatione corporum et  
 primo de sole RTWH De procreatione solis D//24. igitur om.  
 D//ampliato sermone om. T//eorum om. RT//intimam: intime  
 BWHD//25. essentiam: substantiam BH de procreatione et essentia  
 WD//post essentiam add. scilicet de procreatione et essentia corporum  
 BH//alt. et om. RT//luna: argento T//27. habentur: videntur T//28.  
 creatus: procreatus W//substantia om. D//fixa: et fixa P om.  
 BRTWHD//et om. D//29. mundi: munda W//parve: pure BRW prius  
 T//30. rubedinis om. T//fixi: fixi clari PBWHD fixi et clari RT//a: ex  
 T//mutati: unita W//illud: illum scilicet mercurium BWD illum TH//alt.  
 Et: quod P om. T//31. ideo quia: ideoque B ideoque quia T//32. necesse:  
 necessario W//est om. A//33. Et est: Est enim rell./vero om. D//34.  
 citrinitate: citrinitatem BW//ipsum: aurum T//enim om. P//sit om.  
 A//subtilissima: subtilissimis A materia subtili RT//sit: fit H//

35 argenti vivi substantia perpenditur quia ipsum argentum vivum  
 defacili illud suscipit. Non enim argentum vivum aliud quam  
 sue nature suscipit. Quod vero claram et mundam illam  
 habuerit per splendentem eius fulgorem et radiantem  
 manifestatur, non solum in die verum et in tenebris se  
 40 manifestantem. Quod vero fixam et sine sulphureitate  
 comburente substantiam habeat patet per omnem operationem  
 illius ad ignem. Nam nec minuitur nec inflammatur. Quod vero  
 ipsum sulphur sit tingens patet per hoc - quod admixtum argento  
 vivo ipsum in colorem transformare videamus rubeum, et quod  
 45 etiam sublimatum forti ignitione de corporibus ita quod  
 illorum ascendat subtilitas cum eo citrinissimum creat colorem.

35. argenti vivi om. R ipsius T//substantia: substantiis A//quia: quod et  
 AP quia et BD om. W//35-6. ipsum-suscipit om. W//36. illud: aurum  
 T//36-7. Non-suscipit om. T//argentum om. D//37. claram et mundam:  
 clarum et mundum T//illam: illam substantiam BTWHD//38.  
 splendentem eius fulgorem: splendorem A splendensitatem ut vid. eius  
 fulgorem P//39. manifestatur: manifestat A//et: etiam P etiam et  
 B//tenebris: umbra T//40. fixam: claram et fixam B//sulphureitate:  
 sulphure P//et om. RT//41. comburente: comburentem PBRT om.  
 W//substantiam om. AD//42. Nam: quod R//43. post sit add. contingens  
 vel in ras. A//43-4. argento vivo: mercurio T//44. transformare videamus:  
 transformat rell./45. etiam om. rell./sublimatum: sublimatum fuerit  
 B//ignitione: igne sine ignitione W//ita quod: itaque W//46. eo: eo vel  
 cum ea T ea WD//citrinissimum: subtilissimum W//creat: dat T//

[75ra] Patet igitur quod cum pura, purum colorem generat, cum non  
 pura vero, impurum. Qui vero probationis sue citrinitatis  
 ostensione indiget sensum non habet, qui per visum perficitur.  
 Subtilissima igitur argenti vivi substantia ad fixationem  
 5 deducta et puritas eiusdem et subtilissima sulphuris materia  
 fixa non adurens tota ipsius materia auri est essentialis.  
 Maior vero argenti vivi quam sulphuris in illo probatur  
 quantitas propter facilem argenti vivi ingressionem  
 in illud. Igitur quecumque volueris alterare ad  
 10 huius exemplar altera ut ipsa ad equalitatem eius perducas; et  
 modum ad illud iam dedimus. Et quia subtiles habuit et fixas

1. igitur: ergo R etiam W et H//pura: pura eius substantia P pura eius  
 substantia scilicet argenti vivi BWHD pura est substantia R sit pura eius  
 substantia T//generat: generat sulphur BTWHD//2. vero om.  
 RTWD//impurum: substantia impurum T//probationis sue: probatione  
 BRTWH//3. sensum: censum B necessarie T//qui: quod APBH//4.  
 argenti vivi: mercurii T// substantia om. P//6. non: et non *rell.*//adurens:  
 adurent *ut vid.* H//7. argenti vivi: mercurii T//8. *post* vivi *add.* fusionem et  
 A//10. huius exemplar: eius exemplum BWH huius exemplum RT eius  
 huius exemplum D//eius perducas: huius producas W//11. modum: nos  
 modum BH//illud: ista P id WH//iam: iam nos TD//

partes, ideo potuerunt partes eius multum densari; et hec fuit  
 causa sui magni ponderis. Per multam vero temperatam a  
 natura decoctionem facta est ex illo paulatina resolutio et  
 15 inspissatio bona et ultima mistio, ut cum ignitione liquescat.  
 Ex precedentibus patet ergo quoniam multa quantitas argenti  
 vivi est causa perfectionis, sulphuris vero multa quantitas  
 causa corruptionis est. Et uniformitas in substantia est  
 causa perfectionis que per mixtionem fit in decoctione  
 20 naturali, diversitas vero causa corruptionis. Et  
 induratio et inspissatio que per longam perficitur et  
 temperatam decoctionem, est causa perfectionis,

12. densari: depressari T//13. magni: magis A//vero: vero et BH autem  
 T//temperatam: temperantiam A//14. decoctionem: decoctionis A//est  
 om. D//15. ultima: ultimo P multa W//*post* ultima *add.* vero A//*ut* om.  
 A//liquescat: liquefiat T//16. ergo: igitur BRTWHD//17. perfectionis:  
 spissationis *ras. add. mg.* perfectionis P//*post* perfectionis *add.* que per  
 mixtionem eius est A//vero om. RT//multa om. H//quantitas: qualitas A  
 om. PBWHRTD//18. causa corruptionis om. H//est om. RWH //20.  
 naturali om. W//causa: in substantia causa BTWD in substantia scilicet H  
 causa scilicet B//corruptionis: corruptionis est T//Et om. W//21.  
 induratio: induracionis D//22. perfectionis: perficiens RT//



- oppositum vero corruptionis. Igitur si ceciderit super ipsum  
 25 argentum vivum sulphur non debite, necesse est secundum  
 diversitatem illius diversas corruptiones adduci. Potest enim  
 sulphur quod super illud cadit fixum non adustibile esse  
 totum aut totum adustibile et fugiens in natura sulphuris,  
 aut partem fugientis partem vero fixi tenere, aut in parte  
 naturam sulphuris tenere in parte vero non, aut totum mundum  
 30 aut immundum aut medium, aut multe quantitatis superans in  
 commixto aut pauce quantitatis superatum in illo aut nec  
 superans nec superatum, aut album aut rubeum aut mediocre.

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23. ipsum *om.* T//25. adduci: perducere W//26. quod: qui D//non: et non  
 R//27. in: etiam in B//*post* sulphuris *add.* aut fugiens et non in natura  
 sulphuris D//28. *pr.* partem *ex parte in ras.* H//*alt.* aut: sed et D//28-9.  
 tenere-parte: tenens et partem naturam sulphuris tenentem partem A  
 tenere aut in parte naturam sulphuris retinere in parte P tenere vel in  
 partem naturam sulphuris tenere in parte BH tenere sed in parte naturam  
 sulphuris tenere in parte R tenere sed in parte naturam sulphuris tenere in  
 parte W// 30-1. aut-quantitatis *om.* B aut multe quantitatis aut parum aut  
 superans in commixto aut pauce quantitatis H aut multe quantitatis aut  
 pauce superans in commixto aut pauce quantitatis aut multe D//31.  
 superatum: aut multum superatum BH//in: ab W//32. aut rubeum *om.*  
 H//mediocre: mediocre B//

- Ex his itaque omnibus diversitatibus necesse fuit in natura  
 diversa creari corpora et his similia, quas omnes oportet nos  
 35 narrare cum probationibus manifestis.

**< 58 > Sermo in cognitione nature lunaris, vel sermo in  
 principiis componentibus lunam secundum naturam**

- Iam ergo patet ex precedentibus quod si ceciderit sulphur  
 mundum, fixum, rubeum, clarum, super substantiam argenti vivi  
 40 puram, mundam, fixam, claram, non superans immo pauce  
 quantitatis et superatum, creatur ex hoc aurum purum.  
 Si vero fuerit quod ceciderit sulphur mundum, fixum,  
 album, clarum, super substantiam argenti vivi mundam,

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33. Ex: Et W//omnibus *om.* RTWD//34. creari: creare T//34. omnes:  
 omnes diversitates H//35. cum: in R inde T//36-7. Sermo-naturam *om.* P  
 De essentia et procreatione lune BRWH De procreatione aliorum  
 metallorum in speciali et primo de sole et luna T De procreatione lune  
 D//38. *ex om.* D//precedentibus: predictis BRTWH *om.* D//cecidit:  
 cecidit A//quod *om.* W//39. clarum *om.* W//40. mundam *om.* AP//fixam  
*om.* A//claram *om.* AW//non: enim D//41. et *om.* RT//

[75rb] fixam, claram, fit argentum purum, si in quantitate non superet. Diminutam tamen habet puritatem ab auri puritate, et spissitudinem grossiorem quam aurum, cuius signum est quod non densantur partes eius in tantum quod auro  
 5 componderet; nec ita fixam substantiam habet ut illud. Et huius signum est hec - scilicet diminutio eius per ignem - et sulphur eius quod non est fixum neque incombustibile est causa illius. Et quod sulphur in illo huius sit dispositionis per illius paululam inflammationem probatur. Idem autem fixum  
 10 et non fixum, ad aliud quoque et ad aliud relatum esse impossibile non est auctumandum. Lune enim sulphureitas

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1. fixam claram *om.* A//argentum purum: luna pura BRTWHD//si in quantitate: in quantitate si A sed in quantitate D//2. superet: superat PT//ab auri: a solis T//4. est *om.* D//densantur: condensantur BRTWHD//5. componderet: preponderet et componderet A apponderet T//Et *om. rel.*//6. huius: cuius *rell.*//hec scilicet *om. rel.*//7. incombustibile: combustibile T//8. sulphur: figitur T//huius: huiusmodi R//sit: fit TH//9. paululam: perambulam BRWHD perambulans T//Idem: Illud *rell.*//post Idem *add.* scilicet sulphur BRTWH//autem *om.* BH aut T//10. et non: non H aut non T//aliud: alium D//quoque: quidem PBWHRT idest putandum quidem D//et ad: ad B et non ad W//aliud: alium D//11. auctumandum: estimandum BWH//

ad auri sulphureitatem relata, non fixa et comburens est, ad aliorum vero sulphur corporum, fixa et non comburens.

< 59 > Sermo in cognitione nature martis

15 Si vero fuerit sulphur fixum, terreum, argento vivo terreo commixtum, et huiusmodi ambo non pure albedinis sed albedinis livide fuerint, cuius superantie quantitas sit sulphuris summa, fit ex his ferrum, quoniam superantia sulphuris fixi fusionem prohibet. Ideoque ex hoc relinquitur  
 20 sulphur velocius liquefactionis festinantiam per opus fixationis perdere quam argentum vivum. Non fixum vero videmus citius quam argentum vivum liquescere. Ex his ergo manifestum est id

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12. non: vero D//post est *add.* et A//13. sulphur: relata BRTWHD//fixa: fixa est W//comburens: comburens est PBRTHD//14. Sermo-martis: De essentia martis et procreatione illius P De essentia et procreatione martis BRTWD De essentia etprocreatione mercurii H//15. vero: enim B//16. commixtum: mixtum BRTWHD//huiusmodi: huius ABRTWHD//ambo: ambe B//albedinis *om. rel.*//17. fuerint: fuerit BW fueri *ut vid.* H//superantie: substantie W//quantitas: quantitatis H//18. sulphuris: sulphuris fixi BRTWHD//fit: fiet P//his: eis BRTH//quoniam: quod in T//19. ex: per W//relinquitur: sequitur W//20. festinantiam: festinationem W//21. argentum vivum: mercurius vivus T//vero: vero scilicet sulphur T//21-2. citius quam: cuiusquam idest cuiuscunque generis scilicet fixi et non fixi T//liquescere: liquescere fixum vero non T//22. ergo *om.* BRTWHD//manifestum est: manifestatur *rell.*//id *om. rel.*//

quod est causa velocitatis fusionis et tarditatis in unoquoque  
 corporum. Nam quod plus de fixo habet sulphure tardius, quod  
 25 vero plus de adurente facilius et citius fusionem suscipit,  
 quod satis aperte relinquitur a nobis fore monstratum. Quod  
 igitur ipsum fixum tardiozem faciat fusionem manifestatur per  
 hoc - quod ipsum nunquam nisi calcinetur figitur, et calcinatum  
 nullam dat fusionem. Ergo in omnibus illam impedire debet.  
 30 Quod vero nisi calcinetur non figatur patet experimento illius  
 qui illud figit, quoniam ipsum invenit semper fugere donec in  
 terram vertatur, cuius similitudo similitudo est calcis vere.

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23. quod est *om. rell.*//fusionis *om. A* *add. mg. A<sub>2</sub>*//24. quod: quam  
 D//26. satis: facit D//monstratum: de demonstratum T//27. ipsum:  
 sulphur *rell.*//28. quod *om. H*//calcinetur: calcinatur BH//figitur: figatur  
 T//29. omnibus: omnibus corporibus BRTWH//30. illius: illi P//31. figit:  
 figat D//quoniam: non calcinatum BH non calcinatum quoniam RWD per  
 calcinationem quoniam an T//31. invenit: inveniet B//semper: proprie  
 W//32. *alt. similitudo om. BRTWHD*//vere: nature BWH *om. RT*//

Hoc autem minime in argento vivo contingit, quoniam figi  
 potest absque hoc - quod in terram vertatur - et figi similiter  
 35 cum conversione illius ad terram. Nam per festinationem ad  
 eius fixationem que per precipitationem perficitur, figitur et  
 in terram mutatur. Per successivam vero illius iterata vice  
 sublimationem figitur similiter et non in terram vertitur,  
 immo fusionem dat metallicam. Hoc autem manifestum est et  
 40 illi probatum qui utrasque fixationes illius expertus est usque  
 in illius consummationem. Vidit enim et invenit sicut a  
 nobis scriptum suscepit. Et illud ideo, quoniam viscosam  
 habet et densam substantiam, cuius signum est contritio illius  
 cum imbibitione et mixtione cum rebus aliis. Sentitur enim in

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33. contingit *om. B*//argento vivo: mercurio T//34. terra: terram H//35.  
 illius: ipsius BH//per: propter R// festinationem: festinantiam T//36. per  
 precipitationem: precipitationem WD//39. fusionem: et fusionem T//39-40.  
 manifestum - illi: multum est illis T//40. probatum: probatur P probatura  
 T//fixiones: fixationem R//expertus est: experti sunt T//41. in *om.*  
 BTH//consummationem: consummationem festinam per precipitationem  
 et tardam per successivas sublimationes BTH festinam scilicet per  
 precipitationem et tardam per successivas sublimationes W festinando  
 precipitationem et tardam per successivas sublimationes D//sicut: ut  
 BWH//42. viscosam: mercurius viscosam T//43. densam: depressam  
 T//contritio: in contritione BH//44. imbibitione: bibitione W//mixtione:  
 mixtione illius W//enim *om. D*//

[75va] illo manifeste viscositas illius per multam adherentiam.

Densam autem substantiam illud habere manifeste videt  
 monocus per illius aspectum et preponderationem sui immensi  
 ponderis. Auro enim preponderat cum in natura est, et est  
 5 similiter fortissime compositionis, ut narratum est. His  
 igitur relinquitur ipsum posse figi sine illius humiditatis  
 consumptione et in terram conversione. Propter enim bonam  
 partium adherentiam et fortitudinem sue mixtionis - si quoquo  
 modo partes illius inspissentur per ignem--ulterius non  
 10 permittit se corrumpi nec per ingressione fumose flamme in  
 illud se in fumum ulterius elevari permittit, quoniam

---

1. *post manifeste add.* non est sufficiens ista probacio hoc idem faceret  
 sabulum vel quelibet alia res D//2. Densam: densitatem T//substantiam:  
 summam T//manifeste: manifestum R//2-3. videt monocus: monstratur  
 BWH//3. preponderationem: ponderacione BD ponderationem H//4.  
 auro: aurum D//*pr.* est: sua D//*et om.* B//5. compositionis: positionis  
 D//5-6. His igitur relinquitur: Ex his igitur relinquitur P Ergo relinquitur  
 ex his T//6. illius: ipsius BRTHD sue W//humiditatis: humiditates R  
 humiditatis confusione et absque T//7. et: et absque RW eius T et sine  
 absque D//conversione: sui conversione W//8. mixtionis: immixtionis A  
 commixtionis BRWH//si quoquo: si quo A sed quoquo B//

rarefactionem sui non patitur propter sui densitatem et  
 carentiam adustionis, quam per sulphureitatem perfici  
 cognoscimus. Per hoc igitur inventum est inventione veridica  
 15 duorum secretorum genus mirabile unum triplex - scilicet  
 causa corruptionis uniuscuiusque metallorum per ignem - quarum  
 una inclusio est adurentis sulphureitatis in illorum  
 substantia per inflammationem illa diminuentis et  
 exterminantis in fumum consumptione ultima, quantumcunque in  
 20 illis argentum vivum bone fixationis extiterit. Alia vero est  
 multiplicatio flamme exterioris super illa penetrantis et ea  
 secum resolventis in fumum, cuiuscunque fixationis fuerit illud.

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13-4. *quam-cognoscimus:* que per sulphureitatem quam non habet  
 perficitur *rell.*//14. *Per:* et D//15. *unum triplex scilicet:* duplex scilicet  
 unum AD unum triplex fieri R unum triplex est T triplex unum scilicet  
 W//16. *causa om.* H causam *ut vid.* R//17. *adurentis:* ad comburentis  
 D//sulphureitatis: sulphuris BWH//18. *per:* per illorum BH//illa: ignis  
 illa R//19. *fumum:* fumi W//20. *bone:* vere RT//vero *om.*  
 BRTWHD//21. *ea om. rell.*//22. *in:* non D//fixionis: fusionis P//fuerit  
 illud: in eis ipsum sit BRTHD ipsum sit R in eis extiterit W//

25 Tertia vero est rarificatio eorum per calcinationem. Tunc  
 enim flamma vel ignis sine illa in ea penetrare potest et ipsa  
 exterminare. Si omnes corruptionis cause conveniant, maxime  
 corpora corrumpi necesse est. Si vero non, omnis remittitur  
 corruptionis velocitas uniuscuiusque corporum secundum  
 remissionem illarum. Secundum genus est bonitas que per ipsum  
 consideratur in corporibus. Quia igitur argentum vivum  
 30 propter nullas causas exterminationis se in partes  
 compositionis illius dividi permittit, quia aut cum tota  
 substantia sui ex igne recedit, aut cum tota in illo permanet  
 stans, notatur in eo necessaria perfectionis causa. Laudetur

23. est *om.* D// 24. sine illa in ea: in illa BH sine illa in illa R sine illa in  
 eo T sine illa W in ea *s.l.* W<sup>2</sup>//25. omnes: igitur omnes *rell.*//maxime:  
 magis W//26. corpora: corpus BRTWH//27. corporum: corporis  
 BWHD//28. remissionem: remissiones RD//28-9. Secundum-corporibus  
*om.* AD secundum est bonitas que per ipsum consideratur in corporibus  
*add. mg.* A<sub>2</sub>//30. nullas: multas D//31. illius: illi BH//aut *om.* B//32.  
 ex: in B//recedit: evolat R//tota: tota sua substantia R//illo: igne RT  
 illud D//33. notatur: natura D//in eo: ideo in eo T// necessaria:  
 necessario BRTWHD//*post* causa *add.* et bonitas que per ipsum  
 consideratur in corporibus *in ras.* A//

35 igitur benedictus et gloriosus deus altissimus qui creavit  
 illud et dedit illi substantiam et substantie proprietates  
 quas non contingit ullam ex rebus in natura possidere, ut in  
 illa possit inveniri hoc signum perfectionis per artificium  
 aliquod quod in illo invenimus potentia propinqua. Ipsum enim  
 est quod ignem superat et ab eo non superatur sed in illo  
 40 amicabiliter quiescit, eo gaudens.

< 60 > Sermo in principiis componentibus venerem secundum naturam

Redeutes igitur ad propositum, dicimus quod si fuerit  
 sulphur immundum, grossum, fixum, secundum sui maiorem partem,  
 secundum vero sui minorem non fixum, rubeum, lividum, secundum  
 45 totum vero non superans nec superatum, et ceciderit super substantiam

36. ullam: illam D//ex rebus: erranciam A//37. inveniri: invenire D//hoc  
 signum: huius AW has BH hoc RD//perfectionis: perfectionis naturas sive  
 proprietates BH perfectionis W *add.* causa *s.l.* W<sup>2</sup>//38. quod: quam A  
 quas BH//39. quod: qui D//*post* ignem *add.* superasse videtur et *in ras.*  
 A//sed: si P//eo: igne W//illo: eo BRTWH//40. eo: cum eo T *om.*  
 D//gaudens *om.* D//41. Sermo- naturam: De essentia veneris et ex quibus  
 procreatur P De essentia et procreatione veneris BRH De veneris essentia  
 et procreatione eius T De venere W Unde et qualiter venus D//42.  
 Redeutes: Sedeutes A//igitur *om.* BH//fuerit *om.* BTH//44. sui *om.*  
 B//non *om.* D//lividum: humidum lividum T//45. totum: totam P//non  
*om.* A//superans: frangens A//superatum: frantum A//substantiam *om.*  
*rell.*//

[75vb] argentum vivum grossum, ex eo es creari necesse est. Horum  
 itaque omnium probationem adducere per data ex natura sua  
 contingit. Nam cum illud ad inflammationem deponitur, flammam  
 ex eo sulphuream discernere poteris, que sulphuris non fixi  
 5 est signum, et deperditio sue quantitatis per exalationem.  
 Sulphur fixum in illo significatur per frequentem eius  
 combustionem. Nam ex ea fit sue fusionis retardatio et  
 induratio sue substantie, que signa sunt sue multitudinis fixi  
 sulphuris. Illud autem esse rubeum, immundum, adiunctum  
 10 argento vivo immundo significatur per sensum, unde alia  
 probatione non indiget. Experimento itaque elicias secretum.

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1. argentum: mercureum T//grossum: immundum R//eo: ea A// creari:  
 dari R//2. itaque: utique R//omnium *om.* W//3. illud: id *ras.* illa *ut vid.*  
*s.l.* A//deponitur: ponitur BTWH//flammam: summam A//4.  
 sulphuream: suffuceam A//que: quod H//5. *post et add.* est signum  
 T//exalationem: exaltationem W alius exalationem *s.l.* W<sup>2</sup>//6. sulphur  
 fixum in illo significatur: sulphuris fixi in illa significatur A sulphur fixum in  
 illa significatur PT sulphur vero in eo significatur fixum BH sulphur fixum  
 in ea significatur W sulphur fixum in illa signatur D//7. ea: eo  
 BIRTH//fusionis: fixationis W//8. *alt.* sue *om.* W//9. Illud autem esse:  
 Quod autem illud sit BWH Illud autem est D//11. Experimento:  
 experimenta D//elicias: eligeas D//

Vides enim omnem rem caloris actione in terram mutatam cum  
 facilitate solvi et ad aque naturam redigi. Hoc autem  
 contingit propter partium subtiliationem ab igne. Res igitur  
 15 magis subtilis in natura propria ad hanc terream naturam  
 reducta magis subtiliatur; igitur magis solvitur. Itaque et  
 que maxime, maxime. Ex his igitur patet causa corruptionis et  
 infectionis horum duorum, quoniam est per sulphur multe  
 quantitatis fixum et non fixum paucè in venere, minime vero in  
 20 marte. Cum igitur sulphur fixum in fixationem devenerit per  
 calorem ignis, eiusque partium subtiliationem per illum, quare  
 in aptitudinem solutionis sue substantie devenerit, cuius

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12. enim: quod D//actione: actionem T//13. ad *om.* W *add. s.l.* W<sup>2</sup>//14.  
 igne: igne facta T//15. terream *om.* W//16. reducta: redacta PBTWH  
 inducta R//igitur: ergo TWHD//Itaque *om.* B Ita WD//16-7. et que: est  
 cuiuslibet rei ad quancunquē T//17. *alt. maxime om.* RD//igitur *om.*  
 W//causa *iter.* H//18. infectionis: infixionis T//duorum: duorum scilicet  
 martis et veneris BWH duorum corporum scilicet martis et veneris  
 T//quoniam: que BH//est: cum A//19. et non fixum *om.* D//in venere:  
 inventio A//minime vero: non R//20. fixum *om.* P//in fixationem:  
 infectionem B in fixationem W//21. eiusque: eius PD talis R que T//quare:  
 quere B querunt T//per *non legitur* T//22. in aptitudinem: aptitudinem  
 BH//devenerit *om.* PRTBHD//

- signum est expositio horum duorum corporum ad vaporem aceti,  
nam per illud floret in superficie sua sulphuris eorum
- 25 aluminositas per calorem in illo creata subtiliativum. Et si  
posueris hec duo corpora in liquorem ponticum, solventur  
defacili per ebullitionem in illum multe illorum partes. Et  
si respexeris in mineris horum duorum, manifestam invenies ex  
eis solutam substantiam aluminositatis stillare et illis
- 30 adherere, que aluminositas per ponticitatem et facilem  
solutionem in aquam probatur. Non enim ponticum et facile  
solubile reperitur aliud quam alumen et quod sue nature est.

24. illud: illum R//floret: superest W//sulphuris eorum *om.* W//25.  
aluminositas: albaminositas A//illo: illud A illum WH//26. hec: hoc  
D//corpora: corporis D//solventur: solvuntur R//27. partes: artes D//28.  
si *om.* D//mineris: mineram B minerium *ut vid.* H//horum: eorum  
W//manifestam: manifeste T//29. aluminositatis: aluminositate  
A//stillare: distillare H// illis: in illo B in illis TWHD//30. *post per add.*  
pontificationem seu *in ras.* A//31. probatur: mutari probatur BH//et *om.*  
T//

- Nigredo vero in unoquoque horum duorum corporum ad ignem  
creatur per sulphur non fixum quod in illis concluditur,
- 35 multum quidem in venere, parum vero in marte, et ad naturam  
fixi approximans. Ideoque non defacili talem impressionem a  
marte remove est possibile. Quare igitur patuit ex sulphure  
non fixo fusionem fieri et fusionem adiuvari, ex fixo vero  
fusionem non fieri et fusionem impediri. Ex argento vivo fixo
- 40 non est necesse fusionem non fieri nec fusionem impediri.  
Illud scit necessario verum esse qui utrumque fixit, quoniam

33. vero: enim W//corporum: corpora D//horum *om.* WH//34. per:  
propter PBTWHD//in illis: in eis BWH nullis D//35. quidem:  
quemadmodum BH//36. approximans: approximant R approximat  
T//Ideoque: Ideo W//defacili: de facilitate R//37. Quare: Nam T iam  
PBRWHD//igitur: ergo P//patuit *om.* B patet H//38. non-ex *om.*  
W//fusionem fieri: fieri et fusionem P//ex: et B//vero *om.* W//39.  
argento vivo: mercurio vero T//vivo: vivo vero W vero vivo RH//40. nec  
*om.* A//impediri: necessariam W alius impediri *s.l.* W<sup>2</sup>//41. Illud: illum  
D//scit: scitur A sit B *om.* D//necessario: necessarium ABTHD *om.*  
W//verum: et verum B//qui *om.* AD//utrumque fixit *om.*  
ABRTWHD//quoniam: quod A *om.* BTWHD//

[76ra] nullo ingeniorum fixationis sulphur potuit in fusione  
 conservare post illius fixationem. Argentum vero vivum  
 fixit per frequentem sublimationis reiterationem ad  
 illud, eo bonam fusionem suscipiente. Ex hoc itaque  
 5 manifestum est corpora maioris esse perfectionis que plus  
 argenti vivi sunt continentia, et que minus,  
 minoris sunt perfectionis. Studeas igitur  
 in tuis omnibus operibus argentum vivum in commixtione  
 superare. Et si per solum argentum vivum perficere poteris,  
 10 preciosissime perfectionis indagator eris, et eius que nature  
 vincit opus. Mundare enim

---

1. nullo: quod nullo A in ullo W//fixionis: fixationis modo B fusionis modo  
 H fusionis D//fusionem: fusionem A//2. fixationem: fusionem A//3. fixit:  
 figit BH fixum R//4. eo: ea BH in eo T// suscipiente: suscipientem A  
 suscepit T//5. *post est add.* scilicet sunt continentia D//6. minus: minus  
 scilicet sunt continentia AD minus sunt continentia BH//7. *post minoris*  
*add.* effectus W<sup>2</sup>//sunt perfectionis *om.* R//8. omnibus *om.*  
 RT//operibus: operationibus R//*alt.* in *om.* H//10. indagator: indagatur  
 H//eius: eius perfectionis BD eius perfectionis super quem T eius  
 perfectionis scilicet WH//nature: natura P//que: supra quam B super  
 quem T//11. opus: opus et eius que nature sunt T//

poteris intime ad quod natura non pervenit. Probatio vero  
 eius - quod ea que maioris partis argenti vivi sunt continentia  
 maioris sunt perfectionis est scilicet facilis susceptio  
 15 argenti vivi. Videmus enim corpora perfectionis amicabiliter  
 argentum vivum suscipere. Ex precedentibus itaque sermonibus,  
 relinquitur duplicem fore in corporibus sulphureitatem, unam  
 quidem in profunditate argenti vivi conclusam in principio sue  
 mixtionis, alteram vero supervenientem, quarum alteram cum  
 20 labore tolli, alteram vero nullo artificiorum  
 ingenio est possibile, quod igne perficitur, ad quod possit  
 nostra operatio congrue ac utiliter pervenire, cum iam secum

---

12. *intime:* optime W//13. eius: huius D//maioris: maiorem W maiore  
 H//partis: quantitatis PRTH *om.* BD quantitatem W//argenti vivi *om.*  
 P//14. scilicet facilis: scilicet facillima B scilicet facillima WH//17-8. in-  
 conclusam *om.* H//18. quidem *om.* T//19. *ante mixtionis add.* adustione  
*in ras.* W//20. tolli: necesse est tolli W//alteram: altera B//nullo: ullo  
 PD//21. *post ingenio add.* non *mg.* A *in textu* PD// quod igne perficitur ad  
*om.* A scilicet tolli quod per ignem perficitur ad BH quod per ignem  
 perficitur ad TW//



ab eiusdem creatione unitum factum est. Et hoc experimento  
 probatur quod sulphureitatem adustibilem videmus per ignem  
 25 deleri, sulphureitatem vero fixam minime. Si igitur diximus  
 corpora calcinatione mundari, intelligas utique a  
 terrea substantia que non in radice sue nature unita est,  
 quoniam unitam mundare per ignis ingenium non est possibile  
 nisi adveniat argenti vivi medicina occultans et contemperans  
 30 illam, aut illam de commixto separans. Separatio autem terre  
 substantie in radice nature metallo unite eius de commixto fit  
 aut per elevationem cum rebus substantiam argenti vivi  
 elevantibus et sulphureitatem dimittentibus propter

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23. ab eiusdem creatione: ad eiusdem creatorem A ad eundem  
 creacionis BWH aliquid eiusdem creacionis T ad eiusdem creationem  
 D//Et: ex *rell.*//24. probatur: proba A//quod: quoniam BRTWHD//24-  
 5. adustibilem - fixam *om.* D//adustibilem: combustibilem BWH//  
 videmus: invenimus W//25. igitur: ergo B// diximus: dixerimus P dicimus  
 T//26. calcinatione: calcinationem H//intelligas: intelligamus  
 BH//utique: itaque BWH//28. per ignis *om.* A//*post* possibile *add.* per  
 ignem A//29. contemperans: temperans BRT//30. commixto:  
 commixtione R// autem *om.* BH//31. substantie *om.* W//unite: unite que  
 B unito que *ut vid.* H mixte D//eius: ei et R *om.* T aut eius W//fit *om.*  
 R//32. aut: dupliciter aut T *om.* W autem H//33. sulphureitatem: sulphur  
 terreum *rell.*//

convenientiam cum eis, ut est tutia et marchasita, quoniam  
 35 fumi sunt quorum maior pars argenti vivi est quantitas quam  
 sulphuris. Et huius experientiam vides, quoniam siquando  
 forti et subita fusione has coniunxeris cum corporibus,  
 spiritus secum adducent corpora in fuga sua. Ideoque cum eis  
 elevare poteris, aut cum lavatione per argenti vivi  
 40 commixtionem, quam narravimus. Argentum enim vivum tenet quod  
 sue nature est, alterum vero respuit.

<61> De essentia iovis et procreatione ipsius

Hac igitur investigatione proposita, nostrum propositum  
 sequentes, inuimus quod si fuerit sulphur in radice  
 45 commixtionis fixatione pauca participans,

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34. ut est: ut est eis B idest D//et *om.* BWHD//36. siquando: si *rell.*//37.  
 has: hos RD hec T//coniunxeris: commiscueris T//38. fuga: figura  
 W//39. lavatione: collocatione D// 40. Argentum: similiter argentum  
 W//enim: vero BWHD//vivum: viva D//quod: cum W//42. De-ipsius  
*om.* A De essentia et procreatione iovis BRWH De essentia iovis et  
 procreatione eius T De iovis procreatione Rubrica D//43. igitur *om.*  
 BWH// *post* igitur *add.* auctor in *ras.* A//44. fuerit *om.* W *add.* *s.l.*  
 W<sup>2</sup>//inuimus: invenimus RT//45. ante commixtionis *add.* sue PW<sup>2</sup>//

[76rb] album albedine non pura, non superans sed superatum,  
 cum argento vivo secundum partem fixo, secundum partem vero  
 non fixo, albo non pure commixtum, sequetur ex eo stagnum.  
 Et horum probationem invenies, quoniam si stagnum  
 5 calcinaveris, senties ex illo sulphuris fetorem, quod signum  
 est sulphuris non fixi. Et quia flammam non dat, non putes  
 illud fixum, quoniam non propter fusionem et fixationem sed  
 propter superantiam argenti vivi in commixtione salvantis a  
 combustionem flammam non dat. Probatur itaque duplex in stagno  
 10 sulphureitas, duplexque argenti vivi substantia, una quidem  
 sulphureitas per primam probatur rationis experientiam, altera

1. sed: nec A//2. cum: s.l. W<sup>2</sup>//pr. partem: sui partem W//3. pure: puro  
 BT//commixtum: commixtioni A commixto BWH//sequetur: sequeretur  
 B sequitur W//4. probationem: propositionem D//5. illo: eo RT//6.  
 sulphuris: sulphuris vero B//fixi: fixia H//dat: dat etiam P//flammam:  
 flammam D//putes: putas H//7. illud: ipsum P ideo eum T//fixum: esse  
 sulphur non fixum BH//fusionem et om. relt.//8. superantiam:  
 superhabundantiam T//post argenti vivi add. nonne in quolibet corpore  
 exsuperat ar. vi. et tamen non salvat a flammea combustionem  
 D//commixtione: mixtione D//a: et D//10. sulphureitas: sulfuris R  
 sulphur T// duplexque: duplex PR et duplex T duplex quia D//una: unam  
 D//post sulphureitas add. que est que cum calcinatur fetet ut sulphur B  
 que est quia cum calcinatur fetet ut sulfur RWH est scilicet cum calcinatur  
 fetet ut sulphur T que est quia cum calcinatur fetet ut sulphur D//primam:  
 prima D//

per continuationem illius in calce sua ad ignem quam habet,  
 quia magis fixa non fetet. Probatur vero duplex argenti  
 vivi substantia in illo - una quarum est non fixa, altera fixa  
 15 - quoniam ante illius calcinationem stridet, post vero illius  
 duplicem calcinationem non stridet, quod est quia eius  
 argenti vivi fugitiva substantia stridorem faciens, evolavit.  
 Quod vero argenti vivi substantia fugitiva stridorem adducet  
 probatur per lavationem plumbi cum argento vivo, quoniam si  
 20 cum argento vivo plumbum post lavacrum eius per illud  
 fuderis, cum igne non superante sue fusionis ignem,  
 remanebit cum eo argenti vivi pars que plumbo stridorem  
 adducet et illud in stagnum convertet. Econverso

12. per: vero per P//quam habet: quem habet P qua habenti R//14. una:  
 unam P//est om. W//altera fixa om. A altera vero fixa W//15-6. stridet-  
 calcinationem om. R//alt. illius om. BH//16. duplicem: duplicem vel  
 triplicem P triplicem BRTWH add. alius duplicem s.l. W<sup>2</sup>//quod: quia  
 D//eius: ipsius P om. R//17. argenti vivi: argentum vivum R//fugitiva:  
 fugitivi AD ex fugitiva R//evolavit: evolat R evolaverit T evolat W add. s.l.  
 vit W<sup>2</sup>//18. vero om. PR//fugitiva: fugitivi A sit fugitiva BTWH sit  
 substantia fugitiva D//stridorem adducet om. ABRWHD stridorem  
 faciens T//20. plumbum: plumbum laveris BH//post: plus D//lavacrum:  
 lavationem PRTW//per illud: per illum AD in illud B si illud H//21.  
 fusionis: fixationis A//post ignem add. non A//22. cum: in W//plumbo:  
 cum plumbo T//23. illud: illum A//

25 vero per mutationem stagni in plumbum illud  
 considerare potes. Nam per multiplicem reiterationem  
 calcinationis ad illud et magis illi ignis convenientis ad  
 reductionem administrationem, in plumbum vertitur. Maxime  
 vero cum per subtractionem sui scorii cum magno  
 30 calcinatur igne. Et harum substantiarum diversitatibus  
 certificari poteris per ingenia conservationis illarum cum  
 instrumentis propriis et ignis modo eas dividendis, ad quam  
 nos pervenimus cum instantia, et vidimus cum certificatione  
 nostra nos verum per illud estimasse. Quid igitur sit quod

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25. considerare: considerari T//potes: potest RT//post per *add.*  
 multitudinem et *in ras.* A//26-7. magis-administrationem: ignem illi  
 convenientem ad reductionis administrationem BH magis illi ignis  
 conveniens ad reductionem administretur R magis illi conveniens ad  
 reductionem administretur T magni ignis illi convenientis ad reductionis  
 administrationem W//27. vertitur: convertitur *rell.*//28. vero *om.* BH non  
 D//*pr.* cum: est A//per *om.* BH//subtractionem: subtractione BH//*alt.*  
 cum: et cum T//29. harum: de harum B//Et: Ex W//30. illarum: illorum  
 R//cum: vel A//31. dividendis: dividens A//32. instantia: instantia ignis  
 W//et: que D//33. nostra: nota P *om.* RT//per illud: illud per A illum  
 D//estimasse: existimasse H//Quid igitur: Qui T quod D//sit *om.* BH  
 scit T//

35 post remotionem duorum non fixorum ex iove, scilicet sulphuris  
 et argenti vivi remansit, te certum reddere nos expedit, ut  
 complete cognoscas ipsius iovis compositionem. Est igitur  
 lividum, ponderosum, ut plumbum, maiori tamen albedine plumbo  
 participans. Est igitur plumbum purissimum, et est in ipso  
 equalitas fixationis duorum componentium, argenti vivi scilicet  
 40 et sulphuris. Non autem equalitas quantitatis, quoniam in  
 commixtione vincit argentum vivum, cuius signum est facilitas  
 ingressionis in illud argenti vivi in natura sua. Si non  
 igitur maioris argentum vivum in illo esset quantitatis,  
 non adhereret illi in natura sua sumptum defacili.

---

35. remansit: remanserit B//te: re A//36. complete: perfecte P complete  
 te B//37. lividum: humidum W illud lividum D//maiori tamen: maior cum  
 H//albedine: in albedine T//38. plumbum: illud plumbum B//  
 purissimum: prossimum(!) W//39. fixationis: fixationis aut compositionis BH  
 spissitudinis R fixationis et spissitudinis ponderis T fixationis vel compositionis  
 W//40. et: ut H//ante equalitas *add.* que ut *vid.* D//41. vincit: vicit  
 H//42. argenti vivi: argentum vivum A//43. maioris: maior BRTWH  
 //argentum vivum: argento vivo A argenti vivi BRTWH//quantitatis:  
 quantitas BRTWH//44. adhereret: adheret TW//illi in: illum  
 D//sumptum: ne sumptum T *om.* H//

[76va] Ideoque non adheret marti nisi subtilissimo ingenio neque veneri propter paucitatem argenti vivi in illis in commixtione sua. Ex hoc igitur patet quia difficillime marti adheret veneri vero facilius propter  
 5 maiorem copiam argenti vivi in ea, cuius signum est fusio illius facilis, martis vero difficillima. Fixio vero harum duarum substantiarum ad firmam approximat fixationem: non autem firma est perpetua. Et huius est probatio ipsius corporis calcinatio et post calcinationem ad fortissimum ignem  
 10 expositio, nam per eum non fiet divisio, sed tota ascendet

---

3. illis: illo BH//sua: sui T//quia: quod BRTW//3-6. Ex-difficillima om. H//5. ea: eo BD//6. difficillima: difficilis RT//Fixio: Fusio A//7. approximat: approximant ARD//fixionem: fusionem A fixationem BH// non autem: namque BH//8. firma est: fixare A fixa est BHD firma aut fixa est T fixationem W//9. fortissimum: fortem WH//10. fiet: fieret BRTH//tota: si tota T//ascendet: ascenderet BRTH//

substantia purificata, tamen magis. Videmus igitur substantiam sulphuris in stagno adurentem facilius separari quam in plumbo. Et huius experimentum vides per facilem iovis indurationem, calcinationem, et meliorationem sui fulgoris.  
 15 Ideoque consideravimus hec corrumpentia in radice sua non fuisse, sed ei postea advenerunt. Et quia in prima commixtione non fuerunt illi multum coniuncta, et ideo defacili possunt separari. Ideoque alterationes in eo sunt velocis operis, mundificatio videlicet, induratio, et illius  
 20 fixio. Et harum causas per iam a nobis tradita manifeste

---

12. adurentem: adherentem RHD//13. vides: est quod vides BH//14. calcinationem: in calcinatione T calcinationis H//meliorationem: meliorationis H//15. consideravimus: consideramus BRWH//hec: huius RW//corrumpentia non legitur T//16. advenerunt: advenit B adveniunt H//17. commixtione: ipsa commixtione B//fuerunt: fuerit H//et om. BTWH//18. defacili: facile RTWHD//Ideoque: Ideo BT//19. velocis: velocioris P veloces D//videlicet: scilicet RT om. H//induratio: et induratio T//20. harum: horum APTW//per iam: iam per AD//tradita: dicta T//

considerare potes, et quia post has operationes,  
 calcinationem videlicet et reductionem, consideravimus in fumo  
 suo per magnam ignis expressionem elevato, et vidimus illum ad  
 citrinitatem pertinere, cum hoc sit de proprietate sulphuris  
 25 calcinati, estimavimus estimatione vera in qua sumus  
 certificati ipsum sulphuris fixi naturam secum multum  
 continere. Qui igitur voluerint in hac nostra scientia videre  
 investigationem horum omnium, studeant cum sedulitate operis  
 donec per eam principia ipsorum corporum et proprietates  
 30 spirituum inveniunt inventione certa non coniecturali quam  
 tradidimus in hoc nostro volumine sufficienter ad artis  
 exigentiam.

---

22. videlicet: scilicet RT//fumo: furno elevato T//23. expressionem:  
 expressione D//elevato: elevati T elevata D//25. estimavimus: Et  
 estimavimus P//vera: natura D//in qua sumus *om.* T in qua fuimus  
 W//26. certificati: certi B *om.* T//sulphuris: sulphure H//secum:  
 secundum A//multum: multam D//27. igitur: ergo B//27-8. videre  
 investigationem: perficere horum omnium naturas per investigationem  
 T//28. studeant: studeat APBRH studeat indagare T//29. eam: ea  
 D//principia: principiorum AP//ipsorum: horum BT eorum H//  
 proprietates: proprietatem APRTD//30. inveniunt: inveniat P//non  
 coniecturali: nec coniecturabili P//31. tradidimus: tradimus BTWH//

< 62 > Sermo in principiis componentibus saturnum secundum naturam

Restat igitur nos de saturno descriptionem ponere. Et  
 35 dicimus quod non diversificatur a iove per calcinationis  
 reiterationem ad illius naturam redacto nisi quia immundiorem  
 habet substantiam a duabus substantiis commixtam grossioribus,  
 sulphure videlicet et argento vivo, et quia sulphur in illo  
 comburens est sue argenti vivi substantie magis adhesivam, et  
 40 quod plus habet de substantia sulphuris fixi ad compositionem  
 suam quam iupiter. Et harum probationem per experientias  
 manifestas adducemus. Quod ipsum igitur sit maioris terree  
 feculentie quam iupiter manifestatur per visum et per lavacrum  
 eius ab argento vivo in hoc, quoniam plus per lavacrum

---

33. Sermo-naturam: De essentia et procreatione saturni PBWHRT De  
 jovis saturni procreatione D//34. descriptionem: procreationem sive  
 descriptionem W//36. ad: nec ad T//redacto: reductio BWHD per  
 reductionem T//nisi *om.* T//37. a: ex T//commixtam: commixta AP  
 permixta T//grossioribus: grossioris B grossiore H//38. sulphure:  
 sulphuris BH//videlicet: scilicet T//38-9 et quia - argenti vivi *om.*  
 D//argento vivo: argenti vivi BH//illo: eo BWH//39. est: cum T//sue: et  
 BH suo T//argenti vivi: argento vivo T//40. quod: quia T//41. harum:  
 horum BWH//probationem: probationes PBRTHD//per: ad T//42.  
 terree: terrei T//41-2. experientias manifestas: experientiam manifestam  
 W//43. *alt.* per *om.* PRTWD//lavacrum: lavationem RT//44. eius *om.*  
 W//ab: ad T//hoc: natura PRTWD natura sua BH//quoniam: quia  
 BWH//lavacrum: lavationem RT//

- [76vb] emanant feculentie ab eo quam a iove, et quod  
 primum gradum calcinationis suscipit facilius quam iupiter,  
 quod est signum multe terreitatis. Nam pluris terreitatis  
 corpora facilioris invenimus calcinationis et terreitatis  
 5 pauce difficilioris calcinationis, et huius est probatio  
 difficillima solis calcinatio completa. Et quia non  
 rectificatur eius feditas per calcinationis reiterationem  
 sicut in iove, quod est signum maioris feditatis in principiis  
 eius ex natura sua quam iovis. Quod vero sulphuris quantitas  
 10 combustibilis magis sit argenti vivi substantie adhesiva

---

1. emanant: emanat PBWHD//quod: qui A *om.* T//2. primum *om.*  
 T//gradum: gradus T//facilis: saturnus T//5. calcinationis: calcinationis  
 quia quoniam pauce terreitatis ideo difficillime calcinationis BHD quia  
 quoniam pauce terreitatis ideo difficillime calcinationis RT calcinationis et  
 quoniam pauce terreitatis ideo difficillime calcinationis W//huius: hoc  
 D//6. solis: et solis A//7. *post eius add. se* D//7-8. *per-feditatis om.* T//9.  
*ex:* in BWH//10. *sit: iter.* A fit B//adhesiva: adhesivum D//

- in eo quam in iove significatur per hoc - quod non separatur de  
 eo in fumum quantitas notanda quin sit citrini coloris multe  
 citrinitatis, cuius signum similiter est quod in fundo  
 instrumenti remansit ex eo, quod necessario unius trium esse  
 15 signum relinquitur - aut nullius quantitatis sulphuris  
 combustibilis in eo, aut paucissime, aut multum coniuncte in  
 principiorum propinquitate ad radicem commixtionis. Sed  
 certificati sumus per illius odorem ipsum alicuius esse  
 quantitatis et non pauce immo multe, quoniam non movetur ab eo  
 20 odor sulphureitatis in brevi tempore. Ideo consideravimus  
 consideratione qua certi sumus sulphur comburens illius  
 sulphuri non comburenti ad naturam fixi approximanti

---

11. in *om.* D//significatur: *fort. signatur* APTW//12. notanda: non ostenda  
 A//citrini: citrina P//13. signum *om.* P//est *iter.* R//quod: illud quod  
 BH//fundo: profundo T//14. quod *om.* A//unius trium: certum B trium  
 H cum D//esse: est T//15. relinquitur: relinquatur R *om.* T//16. in eo  
 aut: aut in eo H//19. movetur: removetur RT//20. sulphureitatis:  
 sulphuris T//Ideo: Ideoque PBRT//consideravimus: consideramus R *om.*  
 W *add. s.l.* W<sup>2</sup>//22. sulphuri: cum sulphure PBRWHD .q. sulphure  
 T//comburenti: comburente *rell.*//approximanti: approximati A  
 approximante *rell.*//

in argenti vivi substantia uniformiter esse commixtum.  
 Ideoque cum scandit fumus eius, necessario cum sulphure non  
 25 comburente scandit, de cuius proprietate est citrinitatem  
 creare. Quod vero maior quantitas sulphuris non adurentis  
 sit in ipso quam in iove nobis adductum est cum veritate per  
 hoc - quod videmus totum colorem ipsius in citrinitatem mutari,  
 iovis vero in album, in calcinationibus suis. Ideoque nobis  
 30 in hoc aperta est via investigationis huius operis, per quod  
 in calcinatione mutatur iupiter facilius in durum quam  
 saturnus, non autem in tarditatem liquefactionis velocius quam  
 saturnus. Et illud ideo, quoniam causa duritiei nature est

---

23. in: ad *in ras.* A *om.* T//substantia: substantiam *in ras.* A substantie  
 T//26. non *om.* D *add. in mg.* D<sub>2</sub>//27. sit *om.* R//est *om.* W//veritate:  
 necessitate BWHD//28. citrinitatem: citrinum D//29. Ideoque: Et ideo  
*rell.*//nobis: non *legitur* T//30. in hoc: hic P//investigationis: esse  
 investigatione W esse investigationes D//huius: esse huius T//per quod:  
 quod per W per quam H//31. *pr. in s.l.* A//calcinatione: calcinationem  
 P//durum: duriciem W//32. non autem: nam T//tarditatem: tardatione  
 PT tarditate BWH//33. nature *om.* D//

sulphur et argentum vivum fixum. Causa vero liquefactionis  
 35 est duplex, argentum vivum scilicet et sulphur combustibile,  
 quorum alterum ad fixationem perfectionem non sufficit, in  
 unoquoque gradu eius, cum ignitione scilicet et sine ignitione  
 argenti vivi. Quia igitur in iove multa argenti vivi  
 quantitas est, non vero fixi, remanet in illo multum  
 40 liquefactionis velocitas, et non removetur ab eo faciliter.  
 Causa vero mollificationis est duplex, argentum scilicet vivum  
 et sulphur combustibile. Quia igitur removetur sulphureitas  
 comburens ex iove facilius quam ex saturno, ex eo altera

---

35. est *om.* WD//argentum vivum: argenti vivi R//et *om.* W *add.*  
 W<sup>2</sup>//sulphur: sulfuris R//combustibile: combustibilis R//36. fixationis:  
 fusionis T//non *om. rell.*//37. scilicet - ignitione *om.* D//38. in iove:  
 ignitione D//ante argenti *add.* scilicet AR sufficit T//argenti vivi:  
 argentum vivum T//39. vero: vere PRD bene BH//illo: eo W//multum:  
 multa R multe T//41. *post vero add.* liquefactionis seu *in ras.*  
 A//mollificationis non *legitur* R//scilicet *om.* B//41-2. argentum-  
 combustibile: argenti vivi et sulfuris combustibilis R argenti vivi scilicet et  
 sulphuris combustibilis T//43. comburens: combustibilis P//saturno:  
 saturno ideoque *rell.*//

25 corpora maxime sint perfectionis inventa, et pluris igitur quan-  
titatis argenti vivi corpora a perfectione diminuta magis perfecto  
approximare necesse est. Itaque et multe sulphureitatis  
30 corpora plurime corruptionis esse contingit. Quamobrem igitur  
ex iam dictis patet iovem maxime perfecto approximare, cum  
perfectionis plus participet, saturnum vero minus, minus vero  
et adhuc venerem, minime vero martem, quo ex perfectivo  
35 dependet. Aliter autem ex medicina complente, et defectum  
supplente, perfectiva, attenuante ad profundum corporum  
spissitudinem et sub fulgentis splendoris substantia eorundem  
palliante fuscedinem, se habere contingit. Ex hac enim  
maxime perfectibilis venus existit, minus vero mars, adhuc

---

23. maxime *om.* T//sint: sunt D//et *om.* PR//23-4. sint-corpora *om.*  
T//pluris: plurime BWH//24. perfecto: perfectioni BRTWH//25.  
approximare: appropinquare T//Itaque *om.* W//multe sulphureitatis:  
multi sulphuris T//27. cum: que T//28. participet: participat T//29. et  
*om.* BTW//venerem: venus TW//martem: mars TW//quo ex: quod ex R  
quorum T//perfectivo: perfecto A perfectio T//30. dependet: vero  
dependet BH//Aliter-medicina: ab aliqua medicina conveniente et post  
projectionem T//ex: et R//et: ad D//31. perfectiva: perfectum ABTWH  
et perfectum R perfectivi D//attenuante: que T//ad: et ad BRWH//  
corporum: corporum in duris T//32. et-splendoris: attenuet in mollibus  
econtra scilicet tenuitatem inspisset et sui fulgoris splendore T//sub  
fulgentis: fulgentis P suffulgentis BWH//substantia *om.* P//eorundem:  
earundem D//33. palliante - contingit: scilicet palliando fuscedine illa  
decoret T//Ex: Et H//hac: hoc T//34. existit: existimatur D//minus:  
quod minime P *om.* D//adhuc: et adhuc *rell.*//

35 minus iupiter, minime vero saturnus. Ex his igitur, repertum  
laboris investigatione veridica, ex corporum diversitate  
diversas inveniri cum preparatione medicinas necesse existit.  
Alia enim medicina eget durum ignibile, alia vero molle et non  
40 ignibile corpus, hoc quidem mollificante et ad profundum  
attenuante et in sua equante substantia, illud vero indurante  
et inspissante occultum eius. Ex his igitur nos expedit ad  
medicinas transire cum manifestis experienciis, diversarum  
ponentibus nobis medicinarum causas inventionis, et quid  
diminutum relinquunt, et quid ad complementum deducant.

---

35. vero *iter.* P//Ex: Cum ex T Et H//repertum: repertum est BTWH//  
36. *post* laboris *add.* inventum laboris A//ex: et D//37. cum *om.*  
R//preparatione: preparationis D//medicinas *om.* D//necesse *om.*  
R//existit: existit BTWHD//39. corpus hoc quidem: corpus hoc quoque R  
hoc corpora quoque T//et *om.* W//40. et *om.* B//equante: equalitate  
BRWH equalitatem faciente T cavitate D//illud: et illud BWHD//41. *post*  
eius *add.* Explicit liber .5. Incipit .6. Prohemium ad summam intentionis  
libri sexti que est de diversitate preparationis. In precedenti itaque  
particula huius nostri voluminis principia corporum et ipsa etiam corpora  
quid videlicet sint secundum omnes eorum causas et quid boni malive in se  
contineant et eorum naturas in suo profundo et manifesto que videlicet sint  
in eis corruptionisvel perfectionis omnis monstravimus cum suis cunctis  
experienciis et probationibus manifestis. P//42-4. diversarum- deducant:  
Diverse enim sunt medicinarum cause diversarum rebis ponentibus  
complementum deducant. BH diverse enim sunt medicinarum cause  
diversarum nobis ponentibus medicinarum causas inventionis et quod  
diminutum relinquunt et quid ad complementum deducant. D//44. et  
quid: qui T//ad *om.* W//deducant: deducant T//



[77rb] <63> Probatio quedam quod spiritus corporibus  
magis assimilantur

Probamus igitur spiritus corporibus magis assimilari per  
hoc, quod magis corporibus uniuntur et amabilius quam alia  
5 in natura. Per hoc igitur adductum est nobis inventione prima  
hos esse corporum alterationis medicinam veram. Ideoque omni  
quo potuimus ingeniorum genere nos ipsos exercuimus, ut per  
illos imperfectorum unumquodque corporum mutatione firma in  
perfectum lunare vel solare transformemus corpus. Quamobrem  
10 igitur ex eisdem medicinam diversam ex diversa alterandorum  
intentione creari necesse est. Cum sit igitur duplicis

---

1-2. Probatio - assimilantur *om.* P Incipit liber quintus de duplici medicina  
cuiuslibet corporis imperfecti et de duplici medicina argenti vivi albi  
scilicet et rubei B Incipit septima pars principalis de duplici medicina  
cuiuslibet corporis imperfecti et de duplici medicina argenti vivi alba  
scilicet et rubea in genere R De duplici medicina cuiuslibet corporis  
imperfecti et duplici medicina argenti vivi alba scilicet et rubea T Liber  
sextus. Capitulum primum de duplici medicina corporis imperfecti et  
medicina argenti vivi W Incipit liber sextus de duplici medicina cuiuslibet  
corporis imperfectiet de duplici medicina argenti vivi albi scilicet et rubei  
H De duplici medicina cuius corporis et de duplici medicina ar. vi. alba  
scilicet et rubea capitulum D//4. alia: alius H//5. in natura: mutabilia A in  
natura albi scilicet et rubei H//post natura *add.* et natura naturam attrahit  
et simile applaudet suo simili BRWD//6. Ideoque: Ideo T//omni: vero B  
enim H//8. firma *om.* R//10. *pr. ex mg.* A//11. creari: creare D//necesse  
est: necessarie accidit PBTWHD necessarie acciderit R//

generis alterabile, argentum vivum scilicet perfectione  
coagulabile et a perfectione diminuta corpora, et hec  
siquidem multiplicia - alia quidem dura ignibilia, alia  
15 vero mollia non ignibilia, dura quidem ignibilia ut  
mars et venus, mollia vero ut iupiter et saturnus -  
necesse est et medicinam similiter perfectivam multiplicem  
esse. Alia etenim medicina perficiente eget argentum vivum,  
alia vero corpora transformanda. At etiam et alia egent dura  
20 ignibilia ut venus et mars, alia vero mollia non ignibilia  
ut saturnus et iupiter. Et hec utraque utriusque generis, cum  
a se invicem differant in natura, similiter diversa egere

---

12. *post* alterabile *add.* corpus *in ras.* A//perfectione: perfecte RTW et  
perfecte BH//14. quidem: quoque A//dura: horum dura T//15. non: non  
autem PRWD et non BH//quidem: quoque A vero BH quod D//17. *ante*  
necesse *add.* Itaque *in ras.* A//et *om.* BWH medicinam: martem A//18.  
etenim: enim BWH//medicina: *fort.* materia A *om.* R//19. At: Aer *ut vid.*  
P Ac BH *om.* T//etiam *om.* T que D//et *om.* P ut BH//alia: alia vero  
TW//20. non ignibilia *om.* T//21. utraque: utique T//22. a: ad  
AP//natura: essentia T//

medicina necessario accidit. Unius etenim generis mars  
 et venus, duricie scilicet, in speciali nature quadam  
 25 proprietate duritie differunt. Est enim hic non fusibilis,  
 illa vero fusibilis. Ideoque alia quidem mars, alia vero  
 venus medicina perficitur. Et hic quidem ex toto immundus,  
 illa vero non. Et hic quidem quadam albedine fusca, illa vero  
 30 rubedine et viriditate participat, que in medicina  
 diversitatis necessitatem proponunt consimiliter. Alterius  
 enim generis mollitie corpora, scilicet ut iupiter et  
 saturnus, cum hec et similiter differant, diversa medicina  
 et similiter egere necesse est. Est enim hic quidem mundus,

---

23. etenim: enim PR est enim W//24. speciali: specialis A//nature: vero  
 BTWH//25. duritie om. *rell.*//enim: etenim BTWH//25-6. hic - fusibilis:  
 fusibilis, ille vero infusibilis B hec fusibilis ille vero non W hec fusibilis ille  
 vero infusibilis H hic fusibilis illa vero non fusibilis D//27. et om.  
 T//quidem: vero quidem B//immundus: immunda T//28. hic: his D//*pr.*  
 illa: alia H//*alt.* illa: et illa H//28-9. illa - participat: et indica te participat  
 D//29. in *iter.* B//30. diversitatis: diversitatem A//necessitatem:  
 necessario W//proponunt: ponunt PBRTH componunt W//consimiliter:  
 consimili R//32. hec: huius *ut vid.* R//32-3. cum-*pr.* est om. T//33. et om.  
 BR//egere: agere A//hic: hec iupiter B iupiter hic H //quidem: scilicet  
 iupiter TD idest iupiter quidem W quod D//

ille vero non. At vero et hec quidem mutabilia omnia nunc  
 35 lunaria nunc solaria efficiuntur perfectionis corpora.  
 Ideoque necesse est uniuscuiusque duplicem medicinam fore,  
 unam quidem citrinam in citrinum mutantem solare corpus,  
 alteram vero albam in album lunare mutantem similiter. Cum  
 horum quatuor igitur imperfectorum corporum unicuique duplex  
 40 medicina adveniat, solaris videlicet et lunaris, octo igitur  
 in summa una erunt omnes medicine corpora perficientes in  
 forma bona. Perficitur et similiter argentum vivum in solare  
 et lunare; ideoque et medicine alterantis illud duplicem  
 differentiam esse contingit. Decem igitur erunt omnes medicine

---

34. ille vero: ille vero saturnus BHD saturnus T ille vero videlicet saturnus  
 W//hec: hoc B huius R hic D//quidem: quoque A//omnia: omnia sunt A  
 et omnia quatuor B omnia quatuor TWHD//35. nunc: nunc vero  
 PBWHRT nunc in se vero D//36. medicinam: materiam A//37. in: et in  
 BWH om. T//citrinum om. T//mutantem: mutantem P//38. in: et in  
 BH//lunare: lunare corpus BH//Cum: et H//39. horum: ex A//40.  
 medicina: materia A//videlicet: scilicet RT//41. una om. *rell.*//corpora:  
 corporum A//42. bona: bonorum BH//et similiter: similiter PRT//43. et  
 medicine: et medicinas R ex medicina T//alterantis: alterantes R alterante  
 T//illum: illum D//44. esse: habere RT//

[77va] quas invenimus cum totalitate sua ad cuiuslibet  
 imperfecti alterationem completam. Verum utique cum  
 diuturni laboris instantia et magne indagationis  
 industria excusari volumus ab inventionis labore  
 5 harum decem medicinarum per unius medicine  
 beneficium. Et invenimus inquisitione longa nec non  
 et laboriosa maxime, et cum experientia certa  
 medicinam unam qua quidem durum molle fit, et molle  
 induratur corpus, et fugitivum figitur, et illustratur  
 10 fedum splendore inennarabili, etiam eo qui super

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1. sua *om.* B//cuiuslibet: cuiusque D//2. cum: non D//3. diuturni:  
 diuturnitatis *rell.*//4. labore: labare idest nos oportet laborare D//5.  
 harum *om.* D//6. Et *om.* D//inquisitione: inventione P in exquisicione  
 BTWH//7. et laboriosa: laboriosam B//experientia: experientie D//cum  
*om.* W//8. quidem: quidem omne T//molle fit: mollescit BTWHD//*alt.*  
 molle: omne molle T//9. induratur: indurat D//fugitivum: omne fugitivum  
 T //illustratur: illustrat BWH//10. fedum: omne fetidum T// etiam: in  
 TD et W//qui: quod PD//super: supra PBTWH//

naturam consistit. Ideoque omnium harum medicinarum  
 expedit singulum sermonem adducere cum causis  
 suis et manifestis probationum experientiis;  
 primum igitur medicinarum decem seriem. Et  
 15 dehinc quidem primo corporum omnium, deinde vero argenti vivi,  
 dehinc vero et ad ultime perficientis magisterii medicinam  
 transeundum est. Cum tamen preparatione indigeant imperfecta,  
 ideo ne propter artis insufficientiam traditionis mordeamur  
 ab invidis, afferamus inprimis narrationem  
 20 de imperfectorum preparationibus, earum inventionis cause  
 necessitatem ponentes, quibus siquidem nostro artificio

---

13. experientiis *iter.* A//et *om.* R//14. igitur *om.* BH//seriem: serie  
 B//15. quidem: in genere T//primo: primum W//deinde vero: dehinc B  
 deinde igitur T demum vero W deinde H//16. et ad ultime perficientis: et  
 ultime ad perficientis A ad perfectionis ultime BT ad ultimo perficientis  
 Rad perfectionis ultimi WH//magisterii medicinam: magisterium A  
 magisterii materiam R magisterii medicinarum T//17. est *om.*  
 PRTWD//tamen: tamen et W//imperfecta: imperfecta corpora BH//18.  
 ideo: ideoque T//propter: per W//20. earum: eorum RD// inventionis:  
 invencionum BH inventis inventionum T//21. ponentes: ponente  
 T//siquidem: siquidem preparationibus BH//

efficiantur congrua perfectionis in unoquoque gradu  
 medicinam suscipere, et ab eadem perfici, dehinc  
 vero addendum medicinarum sufficientem omnium

25 narrationem congruam.

< 64 > Sermo minus generalis in preparationibus corporum

Ex iam igitur a nobis narratis sermonibus, apparet  
 quid superfluum quidve diminutum ex operibus  
 natura relinquat in unoquoque eorum que imperfecta

30 sunt corporum secundum sufficientem partem. Secundum vero

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22. efficiantur: enarrata efficiantur T//congrua: cognita ut vid.  
 R//perfectionis: perfectionis albedinis et rubedinis BTWHD//23.  
 medicinam: medicine T//24. addendum: ad eundem AP ad dandum T ad  
 eandem D//26. Sermo-corporum: Prohemium in administratione  
 corporum que diversa est secundum diversitatem essentialium et  
 differentiarum ipsorum P De diversa administratione corporum secundum  
 diversitatem essentialium et differentiam earum B De preparatione  
 corporum et argenti vivi in genere R De administratione corporum qua  
 diversimodo est secundum diversitatem essentialium et differentiarum  
 ipsorum T De diversa ministracione corporum secundum essentialium  
 diversitatem et differentiarum ipsarum W De administratione corporum  
 que diversa est secundum diversitatem essentialium et differentiarum  
 ipsorum H De administratione corporum que diversimoda est secundum  
 diversitatem essentialium et differentiam ipsorum. Rubrica D//27. Ex: Xx  
 A//apparet om. A//28. quidve: quid T//29. natura relinquat: nature  
 relinqui B nature relinquatur H nature relinquatur W//post unoquoque  
 add. gradu in ras. A//imperfecta: perfecta B//30. corporum: corpora  
 BRTWH//sufficientem: sufficientie PBTD sufficiente R//

complementum quod in superioribus omissimus hic complebimus  
 sufficienti sermone totaliter. Primum igitur cum duplicis  
 fore generis imperfectionis corpora mutabilia  
 contingit, mollia videlicet nec non etiam non ignibilia  
 35 ut saturnus et iupiter, dura vero non fusibilia  
 aut cum ignitione fusibilia, ut mars et venus,  
 hic quidem non fusibilis, illa vero cum ignitione,  
 necessario nobis natura informando edocuit  
 ex illorum diversitate essentialium in natura et radice  
 40 nature diversas preparationes illius secundum exigentiam  
 illius administrare. Sunt itaque unius generis  
 transformanda imperfectionis corpora duo necessario,  
 plumbum videlicet quod melan dicitur et

---

31. quod: que BTWH//complebimus: implebimus T//33. imperfectionis:  
 in perfectionis B imperfecta W//34. contingit: contingat PTD om. BWH  
 add. contingat s.l. W<sup>2</sup>//videlicet: scilicet RT//nec non etiam non ignibilia:  
 nec non etiam non ingressibilia A nec non ignibilia BH et nonignibilia  
 W//35. vero: enim BWH//fusibilia: fixilia A//37. hic: hoc P//vero: vero  
 fusibilis BH//38. post Necessario add. a in ras. A//informando: estimando  
 T//39. ex: quod ex T//in natura et om. PWD in BRTH//40. illius om.  
 BRTWHD//41. itaque: utique BH//42. transformanda: reformanda//  
 post imperfectionis add. videlicet D// H//necessario: necessaria  
 PTWD//43. melan: nigrum PR melon vel nigrum B malencoa nigra T  
 melam W//et: quod P om. R//

- [77vb] per artem saturnus, et plumbum stridens quod album dicitur et hac scientia iupiter, que a se invicem sunt diversa in sui occulti profundo ex radice sue nature innata et manifesto similiter, quoniam saturnus fuscus, lividus,
- 5 ponderosus, et niger, sine stridore totaliter mutus, iupiter etiam albus, livens parum, multum vero stridens et modico sonore tinnitum adducens. Differentiam in profundo illorum vero tibi cum experienciis manifestis monstravimus et illarum causis necessariis, ex quibus secundum magis
- 10 preparationis ordinem colligere bone mentis artificem contingit. Primo igitur secundum ordinem corporum

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1. saturnus: saturnus similiter T//2. a: ad A//4. manifesto: manifesta T in manifesto W om. D//similiter om. BRHD//fuscus: est fuscus T//lividus: humidus T//6. etiam: autem P om. BRTWHD//albus: album A//et om. W//7. sonore tinnitum: sono tantum P sono tinnitum BRH sono tinnitum totum T sono tinnitum ut vid. W//post Differentiam add. non D//8. vero om. WH//tibi cum om. B cum WH//monstravimus: monstramus B narravimus RT //et om. B cum W//9. illarum: illarum experienciarum BWHD illorum R illarum experientia T//causis necessariis: causas necessarias adducemus B causis necessariis adducemus H//ex: notis ex T//secundum om. PR//magis: magis et minus BWH//10. ordinem: ordine B//11. igitur om. T//

- preparationem narremus, postea vero et ipsius argenti vivi coagulabilis, sed et primo unius generis mollitiei, sed post hoc vero et alterius. Primi quoque generis corporum ponatur
- 15 preparatio saturni et iovis, postea vero et aliorum secundum suum ordinem determinatum.

< 65 > Sermo generalis in preparationibus duorum corporum mollitium, saturni et iovis

Saturni vero preparatio multiplex adhibetur essentie et

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12. narremus: narraremus A narramus D//vero: vere D//et om. PRT//13. pr. sed: scilicet W//mollitiei: scilicet mollitiei BH//alt. sed om. BTH//14. hoc: hec B//et alterius: et alterius scilicet duritiei B scilicet et alterius scilicet duritiei H//quoque: quidem A//15. vero om. BRTWHD//et om. RT//aliorum: aliorum corporum BH//16. suum om. W//determinatum: determinatum Quia in preparacione corporum nihil superfluum ex profundo ipsorum removendo sed potius ex manifesto BH determinatum Quod in preparacione corporum nichil superfluum ex profundo ipsorum removendum sed diminutum potius sit augendum R determinatum quia in preparacione corporum nichil superfluum in fundo ipsius removetur sed potius ex manifestis T quia in preparacione corporum nichil superfluum ex profundo ipsius removetur sed potius ex manifesto W quia in preparacione corporum nichil superfluum ex profundo ipso removendum sed ex manifesto potius. D//17-8. Sermo - iovis: De preparacione corporum in genere et proprie saturni et iovis P De preparacione saturni B om. R De preparacione corporum in communi et primo de saturno T De preparacione corporum et primo de saturno WH Incipiunt preparaciones corporum et primo de saturno D//19. vero om. rell.//

- 20 iovis similiter secundum ipsorum multiplicis perfectionis approximationis aut elongationis ab ea gradum, cum sit igitur aliud ex corruptentibus quidem suo profundo adveniens ex sue nature radice innata sulphureitatis, videlicet terreitas, atque argenti vivi
- 25 impuritas terre, illorum creationi principiis essentiali natura commixta, aliud vero superveniens post primam illorum mixtionem corruptionem adducit. Et sunt primi generis res sulphureitas scilicet comburens et illius impuritas, et argenti vivi substantia feda, que omnia sunt
- 30 saturni et iovis perfectionis substantiam corruptentia. Sed horum itaque alterum quidem impossibile est removeri per medicinam primi ordinis alicuius industrie. Alterum vero parvo adminiculo removeri contingit. Hoc quidem removendum esse impossibile advenit propter hoc - quod in principiis

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20. secundum: per PBRTWD propter H//multiplicis: multiplices R multiplicatione T//21. approximationis aut elongationis: approximationem aut elongationem B approximationes aut elongationes R approximationi aut elongationi T//ea: eo *rell.*//gradum: gradu BRT//22. corruptentibus: corruptibilibus BHD corporibus corruptibilibus quod W//quidem: quod BRTWHD//23. innata: innatum R//sulphureitatis: sulphureitas *rell.*//24. videlicet: scilicet et B seu RT scilicet WHD//25. creationi: creationis BW//principiis: in principiis T//26. vero: non T//27. mixtionem: commixtionem T//corruptionem *om.* B//28. res: tres D//sulphureitas: sulphureitatis D//comburens: comburentis D//29. argenti vivi: mercurii T//substantia feda: in substantia fetida B substantia fetida//omnia: scilicet T//31. est *om.* D//32. industrie: industria RT//33. parvo *om.* D//34. esse *om.* D//

- 35 nature proprie huius generis corporum in veram essentiam commixta fuerunt et vera essentia facta sunt. Ideoque cum non sit possibile veram rei cuiuscunque in natura removere essentiam re permanente, non fuit ab eis possibile hec corruptentia delere. Quamobrem igitur putaverunt et quidam
- 40 philosophorum per hoc ad artem perveniri non posse. Sed nos quidem et nostro tempore hanc inquirentes scientiam pervenimus ad hoc - quod et similiter nullo ingeniorum preparationis modo potuimus corpora illustrare cum complemento sui fulgoris lucidi, quin contingeret illa ex toto infici et denigrari
- 45 penitus. Propter hoc igitur et nos similiter in stuporem

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35. corporum: corpora D//*post* essentiam *add.* corrupta D//37. in natura: nature *ut vid.* B vera D//38. essentiam: essentia B//*re:* que re B//*hec:* et hec T sed D//39. et *om.* BH//40. perveniri: pervenire RTW//41. quidem: quod D//*et:* in B//*inquirentes:* requirentes *rell.*//42. *post hoc add.* idem D//*quod om.* T//43. potuimus: potius D//44. contingeret: contingit T//45. hoc *om.* P//

[78ra] adducti multi temporis spatio sub desperationis  
 umbraculo delituimus. Redeuntes igitur in nos ipsos,  
 nosmet ipsos torquentes immense cogitationum  
 meditationis afflictionibus respeximus a perfectione  
 5 corpora diminuta in profundo sue nature feda existere  
 et nihil in eis fulgidum inveniri, cum in eis secundum  
 naturam non sit. Ideoque ex illis substantiam elici fulgidam  
 non contingit, cum in illis non sit. Non enim invenitur in re  
 quod in illa non est. Cum nihil igitur perfecti in illis  
 10 inveniatur, necessario et in eisdem nihil superfluum reperiri  
 relinquitur in diversarum substantiarum separatione in illis

1. adducti: deducti P//multi: multo B//2. delituimus: delinquimus B  
 deficiimus D//igitur om. D//nos om. W//3. nosmet: nos D//immense:  
 in mense(!) B//4. meditationis: cogitationis meditationis B//afflictionibus:  
 afflictibus W//5. *post* diminuta *add.* que D//existere: existancia T//7-8.  
 Ideoque-sit om. P//7. Ideoque: Ideo RD//elici: elio B elicere W//illis:  
 illam B//sit: fit B//9. in illa: illa A in ea PRT//nihil: nil D//perfecti:  
 imperfecti B om. D//9-10. in illis inveniatur *iter.* B//et om. B//nihil: nil  
 D//reperiri: reperire B//11. relinquitur: requiritur D//

in profundo sue nature. Ideoque per hoc invenimus aliquod  
 diminutum in illis fuisse quod compleri necessario accidit per  
 medicinam sibi convenientem et diminutum complementem. Est  
 15 igitur diminutum in illis scilicet paucitas argenti vivi in  
 illis, et non recta inspissatio eiusdem. Igitur complementum  
 erit in illis argenti vivi multiplicatio et inspissatio bona  
 et fixio permanens. Hoc autem per medicinam ex illo creatam  
 perficitur. Hec enim ex argento vivo cum sit in esse deducta,  
 20 per illius beneficium luciditatis splendoris illorum  
 fuscadinem palliando celat et tegit, et in splendorem adducit,  
 et in fulgorem convertit. Cum enim argentum vivum in medicina

12. Ideoque: Ideo W//aliquod: aliquid PBTH quod R//13. in illis: ex eis  
 T//fuisse: fuisset R esse vel fuisse T//14. medicinam: materiam *ut vid.* AP  
 naturam D//15. argenti *iter.* B//15-6. in illis om. BRTWH//17. erit: nec  
 permanens fixio erit T//argenti vivi: mercurii T//18. Hoc: hec P//autem:  
 autem non fit nisi T//19. ex: est D//cum sit: sic D//20. splendoris:  
 splendorem B splendorum W splendore H//illorum: *fort.* illarum P//21.  
 fuscadinem: fuscadine B//palliando: palpando W per aliam D//celat et  
 om. T//in om. BH//22. medicina: medicinam B//

preparatum per nostrum artificium sit mundatum et in  
 substantiam purissimam et fulgidissimam redactum, proiectum  
 25 super diminuta a perfectione illustrabit et sua fixatione  
 perficiet. Hanc vero medicinam in sua narrabimus oratione.  
 Relinquitur itaque ex preiacentibus necessario duplicem  
 fore perfectionis inventionem necessariam, aut unam quidem  
 per medicinam que de commixto substantiam fedam separet, aut  
 30 alteram vero per medicinam que illam sui fulgoris splendore  
 palliando tegat et illustrando decoret. Cum nihil igitur  
 superfluum sed potius diminutum in profundo corporum

23. preparatum: paratum BRTW//in om. D//24. redactum: redactam A  
 redactum et BWH//25. perfectione: perfectione corpora  
 BRTWH//fixione: fixatione A//26. vero: veram WH//oratione: narratione  
 B//28. fore om. B//unam om. B//quidem: quod D//29. substantiam:  
 illam substantiam BH//separet: separat ARTW om. H//29-30. aut-illam  
 om. H//30. vero om. PRT//per medicinam: medicinam per W//que:  
 quam W//illam: illam scilicet substantiam fedam BWD//31. tegat: regat  
 D// decoret: decorat T//

reperiri contingat, si quid igitur superfluum removeri  
 expedit, necesse est id ex manifesto sue nature  
 35 superveniens et tolli et moveri cum diversis preparationibus  
 quas in hac oratione narrare nos expedit, primum quidem in  
 eadem oratione iovis et saturni, ultimo vero et aliorum  
 secundum ordinem.

< 66 > De preparationibus multiplicibus

40 Preparantur igitur iupiter et saturnus preparationibus  
 multiplicibus secundum maioris approximationis perfectioni  
 necessitatem communi scilicet et speciali preparationis modo.  
 Communis quidem est per gradus approximationis ad  
 perfectionem multiplices.

33. contingat: contegat A//Si quid: Sed quid BHD//superfluum: superflui  
 WD//removeri: remove W//34. id: illud *rell.*//35. moveri: removeri  
 BRWH//36. oratione: ratione A//primum: prima D//37. ultimo: ultimum  
 D//39. De - multiplicibus: De preparatione saturni et iovis generali et  
 speciali P De preparatione saturni et iovis communi et speciali modo B De  
 preparatione iovis et saturni in specie R De preparatione iovis et saturni T  
 De preparatione iovis et speciali modo W De preparacione saturni et iovis  
 suis communi et speciali modo H De preparacione saturni et iovis  
 communiter et speciali modo D//40. Preparantur igitur: preparatur  
 D//41. approximationis: approximantis P//perfectioni: perfectionis RW  
 perfectionem H//42. communi: commune B communis T//scilicet om.  
 R//speciali: specialis T//modo: modus T//43. Communis: communi A  
 om. T//est: talis est T//43-4. ad - 78<sup>rb</sup>,1 approximationis om. PT//44.  
 multiplices: multiplicem B//



[78rb] Est enim unus gradus approximationis scilicet  
fulgor ex substantia munda, alter vero durities cum  
sue fusionis ignitione, tertius vero fixio per  
remotionem fugitive substantie. Mundificantur igitur  
5 fulgida que fiunt tripliciter, aut per res mundificantes  
aut per calcinationis et reductionis modum,  
aut per solutionem. Per res igitur depurantes  
mundantur dupliciter, aut in calce redacta,  
aut in natura corporum. In calce vero redacta  
10 purificantur per hunc modum aut per sales atque  
alumina, aut per vitrum. Et est ut cum corpus,

---

1. scilicet *om.* W//2. ex: et P//3. ignitione: extinctione *in textu* W alius  
ignitione *s.l.* W<sup>2</sup>//5. fulgida: et fulgida PBRWHD//que fiunt: fiunt  
PRWHD sunt B *om.* T//tripliciter: multipliciter H//aut: ut T//per res:  
partes D//7. igitur *om.* W//solutionem: sublimationem D//Per res:  
partes D//depurantes: mundificantes vel depurantes W//8. dupliciter:  
dupliciter aut in natura aut extra naturam suam T//calce: calcem B  
calcinatione H//9. aut-redacta *om.* T//calce: calcem B calcinatione  
H//vero *om.* BRH//10. per: in BWHD//hunc modum: hoc modo H//  
atque: et BRTWHD//11. Et est *om.* BWH//

videlicet iupiter et saturnus calcificatum extiterit,  
tunc infundatur super eorum calcem aluminum  
aut salium aqua, aut commisceatur cum ea  
15 vitrum tritum et reducatur in corpus. Hoc igitur totiens  
super hec corpora alternata vice reiteretur quousque munda  
complete se ostendant. Nam cum sales et alumina  
et vitrum fundantur fusione alia quam corpora,  
ideo ab illis separantur et secum terream substantiam  
20 ducunt, relicta sola corporum puritate. In natura vero  
corporum similiter et per eundem depurantur modum. Et

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12. calcificatum: calcinatum PD cum calcinata B cum calcinati T cum  
calcinatum WH//extiterit: extiterint BTH fuerit W//13. infundatur:  
fundatur W//aluminum: aut aluminis B aluminis WH// 14. aut: et  
W//cum: vel in T//16. hec: hoc *ut vid.* B// reiteretur: reiteratur  
T//munda: mundiora BH//20. relicta - puritate: relicto solo corpore  
purificato BWHD//sola: solo T solum R//21. et *om.* T//

est ut limentur subtilissime hec duo corpora; post hoc  
vero cum eisdem administrentur, aluminibus, salibus  
et vitro videlicet, et postea in corpus reducantur.

- 25 Et sic alternata vice reiteretur quousque  
mundiora appareant. Mundificantur et per  
argenti vivi lavacrum, modum cuius attulimus.  
Mundificantur vero et hec similiter utriusque generis corpora  
per reiterationis vicem calcinationis ad illa et  
30 reductionis similiter cum sufficientia sui ignis quousque  
mundiora appareant. Per hanc enim mundantur

---

22. hec: scilicet hec T//23. cum: ab T//administrentur: administratur  
T//23. salibus: et salibus BH//24. videlicet *om.* PRT//25. alternata:  
iterata W//reiteretur: reiterentur W//26-7. Mundificantur-attulimus *om.*  
B//26. Mundificantur: similiter mundificantur T//27. lavacrum:  
lavationem RT//28. vero et hec: vero hec P et hec BWH//29. reiterationis  
vicem: reiterationem TW//vicem: vicim D//illa et: illa W//31. appareant:  
fiant et appareant W//hanc: hoc W//enim: igitur T//

corpora hec a perfectione diminuta duplici corrumpente  
substantia, hac quidem inflammabili et fugitiva,  
illa vero terrea feculentia. Et illud

- 35 ideo, quoniam ignis omnem fugitivam substantiam elevat  
et consumit. Et idem similiter in reductionis modo  
omnem dividit terre substantiam cum proportione sua,  
et hanc proportionem in alio nostro volumine  
quod de perfectionis investigatione intitulatur conscripsimus,  
40 quod secundum ordinem hunc precedit librum.  
In illo enim quecumque investigavimus secundum nostre  
mentis rationem scripsimus. Hic vero quod vidimus

---

32. corpora: corpore *ut vid.* P//hec *om.* W//33. hac quidem: hoc videlicet  
T//inflammabili: flammabili H//34. feculentia: feculenta T//35.  
substantiam *om.* W *add. s.l.* W<sup>2</sup>//36. idem: illud ignis B//in: ignis scilicet  
in T idem ignis WD idem dignis H//37. cum: quasi D//39. intitulatur:  
immutatur D//40. quod: qui T//41. enim: *iter.* A idest D//investigavimus:  
investigamus B//42. quod: que BWH quoniam T//

[78va] et tetigimus complete secundum sciencie ordinem  
determinavimus. Mundificantur et hec utique similiter per  
solutionem substantie sue cuius modum iam diximus, et per  
reductionem similiter eius quod ex eis dissolutum  
5 extiterit. Invenitur enim illud mundius et perfectius alio  
quoquam preparationis genere hoc eodem preparationis modo.  
Et huic modo non comparatur modus nisi qui per sublimationem  
perficitur, et ideo huic equipollet. Est et similiter  
10 preparatio in illis induratio sue mollis substantie cum  
ignitione sue fusionis, et est scilicet ut ingeniemur illis

---

1. complete: complere B//secundum: et secundum W//sciencie: suum  
R//2. determinavimus: terminavimus BWH//et om. RT //similiter om.  
BRTWHD//4. ex: in W//5. enim: etenim H//illud: id R//alio: quam alio  
PRD quam aliquo alio BWH quam differentie cuiuscunque T //6.  
quoquam: quaqua D//genere: modo H//hoc-modo om. H//eodem: eo de  
D//7. qui: quod D//10. scilicet: similiter scilicet B//ingeniemur:  
ingeniemus BWH ingeniamur T//

permiscere argenti vivi substantiam fixam in profundo illorum,  
aut sulphuris fixi, aut sui comparis, aut ex rebus  
duris et non fusibilibus, sicut talc, marchasita,  
et tutia. Hec etenim cum illis uniuntur et  
15 amicantur illa indurant quousque non fundantur  
antequam igniantur. Et per medicinam perficientem  
hoc idem completur similiter, cuius narrationem ponemus.  
Est et similiter alter preparationis modus per remotionem  
sue fugitive substantie. Et hic quidem perficitur per  
20 conservationem post primum calcinationis gradum illorum in  
igne, illis proportionali. Et quia ordo in modis

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11. argenti vivi: mercurii T//in: et in D// 13. talc: talcis D//marchasita: et  
marchasita WH//14. etenim: enim PRT//15. amicantur: admiscentur et  
amicantur BH admiscentur W//illa: et illa TW//17. hoc: hec RD//idem:  
quidem B//18. et om. R//19. hic: hec B//21. illis om. BTWH//in modis:  
in modum BWH et modus T//

preparationis contingit necessario, ideo ponamus ordinem completum ex illis. Primo igitur mundetur ex eis omnis substantia fugitiva et adustiva corrumpens.

- 25 Dehinc vero terrea superfluitas deleatur; post hoc solvantur et reducantur, aut per lavacrum argenti vivi laventur complete. Et hic ordo utilis est.

< 67 > Sermo particularis in speciali preparatione iovis

- 30 Specialis attamen horum corporum preparatio, primum quidem iovis, est multiplex, una quidem per calcinationem, et per hanc induratur eius substantia magis, quod saturno

---

22. Ideo ponamus: Nunc ponimus T nunc ponamus WD//ordinem om. D//23. mundetur: mundemur D//24. eis: illis BRTWHD//fugitiva: fugitivum D//et om. BT//25. superfluitas mg. P//26. hoc om. PBTWHD//lavacrum: lavationem RT//27. argenti vivi: mercurii T//27-8. utilis est: necessarius est PRTH necessarius est et utilis BWD//29. Sermo-iovis om. PRT Sermo de preparatione iovis B De preparatione iovis WH De preparacione iovis. Rubrica. D//30. Specialis: Est specialis T//attamen: actum ut vid. B//corporum: duorum corporum BWH//32. hanc: hunc D//

- non evenit, et per alumina similiter, hec enim proprie iovem indurant. Altera vero per conservationem eius in igne sue calcinationis, per hanc enim stridorem amittit 35 et corporum similiter fractionem, quod saturno similiter non contingit, quia stridorem non habet neque corpora frangit. Et per calcinationis reiterationem similiter ab acuitate salis stridorem amittit. Saturni vero secundarie 40 est preparatio specialis, scilicet per calcinationem a salis acuitate, per hanc enim induratur et per talc specialiter dealbatur et induratur, et per marchasitam et tutiam. Modos vero omnes preparationum determinavimus

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35. enim: vero B//36. alt. similiter om. P//37. neque om. D//corpora: similiter corpora W//38. Et om. D//per: propter RT//39-41. stridorem - acuitate om. B//39. secundarie est: secundario et est T secundario est WD//40. est: eius H//scilicet om. T//41. induratur: indurantur A//specialiter: similiter RT//42. dealbatur: dealbantur A//et induratur: et indurantur A et inspissatur et induratur BWH//alt. et om. D//43. Modos: Modum T ipsos D//omnes: omnium T//

[78vb] completius in libro qui de perfectionis investigatione  
intitulatur, quoniam in hoc abbreviavimus summas illarum.

< 68 > Sermo particularis in speciali preparatione veneris

Immitantes igitur promissorum ordinem, durorum corporum  
5 preparationem narremus, primo ergo veneris, deinde vero  
martis. Est igitur veneris multiplex preparationis modus.  
Alius quidem per elevationem, alius vero sine elevatione  
perficitur. Per elevationem vero est modus scilicet ut  
10 accipiatur tutia cum qua venus magis convenit, et secum per  
ingenia uniat. Deinde vero in suo sublimationis vase  
ponatur ad sublimandum, et per excellentissimum ignis gradum

---

1. libro: libris BWH//qui *om.* RT quod D//investigatione: inventione  
AD//2. intitulatur: intitulantur BWH *om.* RT//abbreviavimus:  
abbreviamus D//summas: sententias BWH//illarum: illorum  
BRTWH//3. Sermo-veneris: De preparationibus durorum corporum et  
primo veneris P De preparacione veneris BTWH De preparatione veneris  
in specie R De veneris preparatione. Rubrica. D//4. igitur: ergo R enim  
W//promissorum: premissorum RW//5. preparationem: preparationes  
PH//ergo: igitur BWHD//vero *om.* BH//6. igitur: enim BWH//7.  
quidem *om.* BRTWHD//7. vero *om.* BRTWHD//8. scilicet *om.*  
BRTWHD//9-10. per ingenia: per ingenium PRT in igne W//10.  
Deinde: demum W//sublimationis: sublevationis B//11. et *om.* B//

eius elevetur pars subtilior que fulgidissimi splendoris  
inventa est, vel cum sulphure per minima misceatur et postea  
elevetur per modum sue elevationis iam dictum. Sine  
15 sublimatione vero preparatur aut per res mundationem facientes  
aut in calce sua aut in corpus, velut tutia, sales, et  
alumina, aut per argenti vivi lavacrum cuius modum attulimus,  
aut per calcinationes et reductiones, ut in aliis narratum  
est, aut per solutiones et reductiones eius quod solutum est  
20 ad naturam corporis, aut per argentum vivum mundificatur,  
sicut et corpora reliqua a perfectione diminuta.

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13. minima: minime BH//16. corpus: corpora T//tutia: tutiam in tutiam  
D//17. argenti vivi: mercurii T//lavacrum: lavationem *rell.*//18.  
calcinationes et reductiones: calcinationis et reductionis modum T  
calcinationis et reductionis W//19. solutiones: calcinationes P  
sublimationes D//reductiones: reductiones eius P//20. argentum vivum:  
mercurium T argenti vivi W//mundificatur: mundificationem W//

## &lt; 69 &gt; Sermo in preparatione martis

Martis vero preparatio est similiter multiplex; quedam  
 enim per sublimationem, quedam vero sine sublimatione  
 25 completur. Que vero per sublimationem fit cum arsenico fit,  
 cuius modus hic est. Ingeniemur quam profundius possumus  
 eidem arsenicum non fixum unire ut cum fusione secum  
 liquescat. Postea vero sublimetur in vase proprie  
 sublimationis; et hec preparatio melior et perfectior inter  
 30 ceteras reperitur. Est et alia preparatio ipsius martis per  
 arsenicum sublimatum ab eo multotiens quousque secum maneat  
 quantitas aliqua ipsius arsenici. Hoc enim si reductum fuerit

22. Sermo-martis: De preparationibus martis P De preparatione martis  
 BTWHD De preparatione martis in specie R//23. vero om.  
 RTW//similiter om. R//24. enim: vero BWHD enim est R//vero om.  
 RTW//25. Que vero: quod D//completur: perficitur W//vero om.  
 BRTWH//pr. fit: sit D//alt. fit om. A sit D//26. cuius: huius RT//hic:  
 hec BD//ingeniemur: ut ingeniemur T//27. eidem: idem B//non fixum  
 om. W//secum: cuius D//28. sublimetur: sublimatur H//29. melior et  
 om. T//perfectior: fortior BWHD om. T//30. ceteras: ceteris  
 D//reperitur: preparationes reperitur BTWH//et - martis: huius  
 preparationis martis D//30-1. per arsenicum sublimatum: scilicet per  
 arsenici sublimationem T per arsenicum cum sublimatum W//31. ab: ut  
 ab H//multotiens: sublimetur multotiens BH multotiens R//32. Hoc:  
 hec B//reductum: redactum T//

emanabit album, mundum, fusibile, preparatum. Est et  
 similiter tertius preparationis modus eiusdem per fusionem  
 35 illius cum plumbo et tuthia, ab his enim fluit mundum et  
 album. Sed quoniam ne minus sufficientes videamur, cum nos  
 determinaturos esse promisimus de durorum corporum ingeniosa  
 mollificatione atque mollium induratione per calcinationis  
 modum, ideo illum non omittimus, sed mollium quidem primo,  
 40 durorum vero postea. Et est scilicet ut solvatur argentum  
 vivum precipitatum et solvatur corpus calcinatum de cuius  
 intentione sit indurari. Et he ambe solutiones misceantur,  
 et ex his alternata vice calcinatum corpus misceatur terendo

33. emanabit: manebit B//et om. P etiam RT//34. similiter om.  
 RT//eiusdem om. B//fusionem: fusiones R//35. illius: eius BH//his: istis  
 RT//enim om. B//36. post album add. De durorum mollificatione et  
 mollium induratione PD De durorum mollificatione B De corporum  
 durorum mollificatione et mollium induratione RTW De duorum  
 mollificatione et molliuminduratione H//Sed quoniam: Sed PT om.  
 R//sufficientes: insufficientes B//37. esse om. PRTWHD et  
 B//promisimus: promiserimus P//39. ideo illum: ideo illud P illud vero B  
 illud//omittimus: omittamus R//quidem om. D//primo: primum R prius  
 T//40-1. solvatur-calcinatum: calcinatur res de cuius intencione sit  
 indurare et resolvetur BH//41. calcinatum om. P similiter BH//42. Et iter.  
 B //misceantur: misceatur P//43. et om. T//alternata: alternati  
 D//misceatur iter. B//vice: vice post vicem W//

[79ra] et imbibendo et calcinando et reducendo quousque durum fiat cum ignitione fusibile. Hoc idem et cum talc et tutia et marchasita calcinatis, solutis, et imbibitis, perfici complete contingit, et quanto quidem hec mundiora, tanto  
 5 et perfectius mutant. Mundificantur et similiter dura corpora ingenio consimili. Et est scilicet ut cum arsenico totiens coniungantur et sublimentur, et post arsenici sublimationem assentur cum proportione sui ignis, cuius modum narravimus in libro fornacum. Et ultimo reducantur cum expressione sui  
 10 ignis in ordine suo dicto quousque in fusione mollescant, secundum exigentiam duritiei corporis. Et he quidem

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1. *alt. et om. R//tert. et: quoque ut vid. B a D//fiat: fit vel fiat W//2. cum mg. P//post cum add. sale in ras. A//post fusibile add. non solum cum mercurio sed BH non solum cum mercurio RD non solum cum mercurio TW//pr. et om. B sed et T//alt. et: idest s.l. A et cum RT//3. marchasita: cum marchasita R//solutis: et solutis T//4. quidem om. BH//alt. et om. BH//mundiora: mundiori D//5. Mundificantur: Mollificantur D//6. consimili: cum sublimatione PR consimili vel sublimatione BH consimili vel cum sublimatione T//Et-arsenico mg. H// scilicet om. BRWD modus T//cum om. W//totiens om. T//7. coniungantur: coniungan(!) B//sublimentur: sublimentur T sublevantur B//alt. et om. D//8. narravimus: narrabimus PTWD//10. in ordine: in oratione AD vigoratione BH//suo dicto: sui dicti ABHD suo dicti RTW/mollescant: mollefiat T//11. corporis: corporis quod intendis T//*

alterationes omnes sunt primi ordinis, sine quibus non perficitur magisterium.

<70> **Sermo in preparatione mercurii**

15 Igitur ex premissis necesse est argenti vivi mundationem completam narrare. Dicimus igitur quoniam argentum vivum mundatur dupliciter, aut per sublimationem - cuius attulimus modum - aut per lavacrum, cuius modus hic est. Fundatur argentum vivum in patella vitrea vel lapidea, et super ipsum  
 20 aceti quantitas spargatur quod sufficiat ad illud cooperiendum. Dehinc vero super lentum ignem ponatur, et calefieri permittatur intantum ut digitis tractari permittat.

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14. Sermo-mercurii: De preparatione argenti vivi P De lavacro mercurii BWHHD om. RT//15-32. Igitur - medicinis om. RT//17-8. cuius attulimus modum om. W//18. cuius modus hic est: quorum modos sufficienter superius narravimus W//18-30. Fundatur-signum om. W//20. aceti: robes B//spargatur: superaspergatur PD aspergatur BH//illud: istud B//21. Dehinc: Deinde HD//vero om. BHD//ponatur: pone BHD//22. permittatur: permittit BHD//intantum: tantum BH//digitis: quod in illo digitis B//permittat: se permittat BH//

Deinde vero digitis agitetur quousque in partes minutissimas  
 dividatur in pulveris similitudinem. Tam diu igitur agitetur  
 25 quousque aceti totum quod in illo fustum est consumetur omnino.  
 Deinde vero quod in illo terreitatis inventum est lavetur cum  
 aceto et abiiciatur. Totiens igitur super illud opus  
 reiteretur quousque terreitas illius in celestinum mutetur  
 colorem perfectissimum, quod perfectione lavationis est  
 30 signum. Ab his igitur ad medicinas est transeundum.

**<71> Particula secunda huius tertii libri, de sermone  
 ultimo in medicinis**

Afferamus igitur in primis sermonem universalem in  
 medicinis cum causis suis et experienciis manifestis.

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23. vero *om.* D//24. Tam: et tam BD//igitur *om.* BHD//25. aceti:  
 acetum PBHD//quod-omnino: sit consumptum BHD//fustum: infusum  
 P//26. est lavetur: lavetur A fuerit lavetur P//27. Totiens: et totiens  
 BH//igitur: igitur igni BH//29. quod: qui HD//perfectione: perfecte  
 PBH//30. Ab: ad D//his: huic//est: relinquitur P//31-2. Particula -  
 medicinis: De medicinis in genere et de .5. differentiis perfectionis que  
 necessarie sunt ad medicinam perficientem P Sermo de medicinis  
 generalibus et est unius de .v. differentiis perfectionis B De quinque  
 differentiis perfectionis RD *om.* T De medicinis generalibus et  
 universalibus et de differentiis perfectionis W Sermo de medicinis  
 generalibus universalis et de quinque differentiis perfectionis H//33.  
 igitur *om.* RT//

35 Innuimus igitur quod nisi quidem omne superfluum sive per  
 medicinam sive per preparationis modum auferatur ab  
 imperfectis non perficientur, scilicet ut ab illis tollatur  
 omnis superflua sulphureitas omnisque terreitas immunda, ita  
 scilicet quod de commixto separentur in fusione post  
 40 proiectionem medicine alterantis illa. Et cum hoc quidem  
 inveneris, iam ex perfectionis differentiis habes. Similiter  
 utique nisi et medicina illustret et alteret in colorem album  
 aut citrinum secundum intentionem quam queris, qui fulgoris  
 splendore amenitatis luciditatem adducat, non perficiuntur a  
 45 perfectione corpora diminuta in complemento totaliter.  
 Amplius autem et nisi fusionem lunarem

---

35. quod: quid B//sive *om.* W//36. per *om.* T//37. perficientur:  
 perficietur H//scilicet ut: ut scilicet A //post scilicet *add.* ut A<sub>2</sub>//tollatur:  
 totaliter BD//39. commixto: commixtione T//40. alterantis: alterant  
 T//quidem: quid quidem T quod D//41. iam *om.* RT//perfectionis:  
 perfectis T//differentiis: essentiis W// habes: habens R unam habes  
 D//42. utique: itaque BTWHD *om.* R//nisi *om.* T//et *om.* RT//alteret:  
 alterat T//in *s.l.* A//43. aut: vel W// citrinum: citrinum que B//quam:  
 quem T//qui: que BWH quod RT//fulgoris: sulphuris D//44. splendore:  
 splendorem BRWH//amenitatis: ad vicinitatis R//non: aut non T//a *om.*  
 R//46. et *om.* PRT//nisi: non D//



[79rb] aut solarem determinatam adducat, non est in complemento alterabile, quoniam in iudiciis non quiescit, sed de commixto separatur et cedit. Hoc autem a nobis latius determinatum in sequentibus monstratur. Amplius autem  
 5 et nisi perpetuetur medicina cum alterationis impressione firma, non valet ipsius immutatio, quoniam non permanet, sed evanescit impressio. Amplius autem et nisi pondera perfectionis adducat, non mutat sub complemento nature firmo et vero, cui non sit fraus per credulitatis errorem. Est enim  
 10 pondus nature unum ex perfectionis signis. Patet igitur cum perfectionis differentie quinque sint, necesse est et medicinam nostri magisterii has quinque adducere in projectione differentias. Per hoc igitur patet ex quibus medicina nostra eliciatur. Nam per ea elicitur que maxime  
 15 corporibus adiunguntur et amicabiliter eisdem in profundo

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1. aut: ac W//2. alterabile: alteratum T//3. *post separatur add.* omnino D//cedit: recedit BTWHD//Hoc: hec R hac D//a nobis *iter.* D//4. determinatum: erit determinatum T//in sequentibus monstratur: in sequentibus demonstratur P demonstratur in capitulo de cinericio BHD in sequentibus demonstrabitur R sequentibus in capitulo de cinericio T determinatur in capitulo de mercurio W//4-7. Amplius - impressio *om.* A *add. mg.* A<sub>2</sub>//4. autem *om.* T//5. et *om.* RT//*post et add.* si *s.l.* W<sup>2</sup>//6. firma *om.* P//immutatio: mutatio PR imitacio B//quoniam: quia *rell.*//7. autem: etiam PH//pondera: pondus T//8. non: et non BH//9. fraus: fictus superans T//11. *post differentie add.* signis A//necesse: necesse in *ras.* *add.* necessario P//et *om.* BH//12. has: ad PRT//14. eliciatur: elicitur B efficiatur D//que *om.* D//15. corporibus *om.* W//*post profundo add.* et A//

adherent alterantia. Ideoque cum in rebus ceteris exquirentes non invenerimus inventione nostra rem aliam magis quam argentum vivum corporum naturis amicari, per hoc opus nostrum in illo impendentes, reperimus ipsum  
 20 esse veram alterabilium medicinam in complemento, cum alteratione vera et peculiaria non modice. Restat igitur nos substantiam ipsius et proprietatis substantie differentias determinate ascribere. Et cum non invenerimus ipsum sine alterationis illius administratione mutare nature, invenimus

---

16. *post alterantia add.* Quod argenti vivi sit preparanda substantia et de modo ignis fixationis ipsius et de causa ponderis RT//in rebus: rebus WD//17. invenerimus: invenimus BWD//*rem om.* B//18. naturis: in naturis B//*post amicari add.* in natura sua unde eis miscetur et postea figitur cum igne lento BRWH nec in natura sua unde eis miscetur et postea figitur cum lento igne T in natura sua unde ei miscetur et postea figitur cum igne lento D//19. nostrum: enim RT//impendentes: intendentes RT//reperimus: reperimus PRTH//20. veram *om.* T//alterabilium: alterationem BWH//medicinam: materiam A//21. vera et *om.* D//modice: modicum R//*post modice add.* Quomodo substantia argenti vivi preparanda sit idest de modo fixationis et causa ponderis BH Quod substantia argenti vivi preparanda sit et de modo fixationis et causa ponderis eius W Quod substantia ar. v. preparanda sit idest de modo ignis fixationis ipsius et de causa ponderis D//22. nos *om.* PR//ipsius: ipsius tantum BH tantum D//et proprietatis: et proprietates BWH cum proprietatibus RT//differentias: et differentias BWH differentis R et differentis T//23. non invenerimus: invenimus T//24. nature *om.* R//

- 25 et similiter ipsum preparari debere necessario cum non  
permisceatur in profundo absque illius preparationis modo,  
quod est scilicet ut talis fiat illius substantia quod  
permisceatur in profundo usque ad occultum corporis  
alterabilis sine separatione in eternum. Hoc autem non fit  
30 nisi subtilietur ultime cum preparatione determinata et certa  
in capitulo suo. Et non permanat eius impressio nisi figuratur  
similiter, neque illustratur nisi fulgidissima ex illo eliciatur  
substantia cum sui modi ingenio et modo sue preparationis  
per ignem congruum. Et non prestet fusionem perfectam nisi in  
35 illius fixatione adhibeatur cautela cum hoc dura remollire et  
mollia indurare. Est enim talis cautela ut cum sufficientia  
servetur sue humiditatis proportionate secundum exigentiam

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25. et *om.* BH//26-8. absque-profundo *om.* A *add. mg.* A<sub>2</sub>//30. subtilietur: sublimetur R//ultime: valde·BWHD ultimo T//cum: in R//31. suo: sublimationis sue P sublimacionis notata BWH *om.* R sublimationis TD//permanat: permanet D//32. similiter *om.* P//ante eliciatur *add. se in ras.* A//33. modo: modi BH//preparationis: separationis PBWH//34. congruum: convenientem R congruum et convenientem T//perfectam: perfectivi AP perfectioni R//35-6. cautela-indurare *om.* AP cautela cum habeat dura mollire et mollia indurare R cautela cum habeat dura emollire et mollia indurare T cum hac dura remollire et mollia indurare. W cautela in hac dura remollire et mollia indurabit D//36. Est enim talis cautela ut: cautela mentalis nisi A cautela talis videlicet ut P talis tamen ut RD talis vero cautela est ut T Est tamen talis ut W//37. proportionate: proportio BTH//

- eius que queritur fusionis. Per hoc igitur patet quod ipsius  
talis administretur preparatio quod fulgidissima et mundissima  
40 substantia ex illo creetur. Deinde vero figuratur, et cautela  
eidem exhibeatur ut scilicet exercitetur artifex in  
administratione ignis in modo sue fixationis qui possit ex illo  
delere humiditates in tantum quod sufficiat ad fusionem  
perfectam complendam. Et est scilicet ut si queris per hanc  
45 corpora fusionis dure mollificare, in principio sue creationis  
lentus adhibeatur ignis. Ignis enim lentus humiditatis est  
conservativus et fusionis perfectivus. Si vero mollia  
indurare, impius componatur ignis, talis enim humiditatis

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38. eius: sue T//post administretur *add. scilicet ut vid.* D//39. quod: qua A//40. substantia *om.* T//illo: illa T//creetur: creatur TD//Deinde: demum T//41. exhibeatur: adhibeatur PBD//42. fixationis: fusionis R//qui: quod BTWD quam H//illo: eo D//43. delere: deleri W//humiditates: humiditatis APD//tantum: terram B//44. perfectam: perfectivi AP//45. creationis: cerationis W//46. lentus *om.* D//47. et fusionis perfectivus *om.* D//48. impius: et impius P//ignis: ignis scilicet vehemens BWH ignis vehemens RT ignis idest vehemens D//enim: enim ignis BTH//

[79va] est consumptivus et fusionis turbativus. Et has regulas  
 omnes quidem in omni medicina bone mentis artificem  
 considerare necessario expedit. Et multas similiter alias in  
 ponderis mutatione considerationes adducere necessarium est,  
 5 cum causis suis et ordine congruo. Est igitur causa ponderis  
 magni subtilitas substantie corporum et uniformitas in  
 essentia. Per hoc etenim illorum possunt densari partes cum  
 nihil intercidat; et partium densatio ponderis est adductio et  
 illius perfectio. Patet igitur quod tam corporum  
 10 administrationis preparatione quam ipsius perficentis  
 medicine per operis artificia subtilitatem perquirere necesse  
 contingit, quoniam quanto maioris sunt ponderis

---

1. turbativus: perturbativus B//Et om. WD//post has add. autem D//2.  
 quidem om. D//post medicina add. scilicet tam primi et secundi ordinis  
 quam tercii seu supp.... D//3. necessario: necessarie T//multas: multos  
 P//4. mutatione: mutationes D//necessarium est om. R necessarium  
 evenit fort. T//5. igitur: enim T//6. uniformitas: illorum uniformitas T//7.  
 etenim: enim T//densari: depressari T//8. densatio: depressatio T//11.  
 medicine: medicine modo BWHD//artificia: artificii R//necesse:  
 necessario W//12. maioris: magni P//ponderis om. H//

corpora transmutata, tanto et maioris sunt perfectionis  
 inventa investigatione per artem. Completur igitur sermo  
 15 de medicinis sed omnium medicinarum differentias narremus.

<72> De triplici medicinarum differentia

Innuimus quod medicinarum triplicem differentiam  
 esse necessario accidit. Alia est primi ordinis, alia  
 vero secundi, alia vero tertii. Dico autem primi ordinis  
 20 medicinam omnem preparationem mineralium que super diminuta a  
 perfectione corpora proiecta alterationem imprimat que non  
 adducit complementum sufficiens, quin contingat et  
 alteratum mutari et corrumpi cum evaporatione

---

13. corpora: corporis D//et om. RT//14. investigatione: investigationis  
 B//sermo: universalis sermo BWHD//14-5. igitur-narremus om. T//15.  
 medicinis: medicinis quinque BH//sed: si A om. H//differentias:  
 triplicem differentiam R//16. De-differentia om. A Sermo universalis de  
 medicinis T//17. Innuimus quod: Innuimus quidem BH non legitur T  
 Invenimus quidem W add. s.l. quod W<sup>2</sup>//differentiam: differentiam  
 medicinarum P//18. esse: omnem esse W//accidit om. BH//est: enim est  
 rell.//19. pr. vero om. rell./alt. vero om. RTWHD//tertii: tertii ordinis  
 P//20. que: et que H//22. et om. BTWH//23. alteratum: alteratam W//

25 impressionis medicine illius totali. Sicut est omnis  
 25 sublimatio dealbativa veneris aut martis que fixationem non  
 suscipit. Et huiusmodi est omne additamentum coloris  
 solis et lune aut veneris commixtorum super fumum  
 cementi positum ziniar et similiarum. Hic enim mutat  
 in mutatione non stante sed potius diminvente  
 30 per exhalationem. Secundi vero ordinis  
 30 medicinam dicimus omnem preparationem que quando super  
 diminuta a perfectione corpora proiecta est alterat in  
 differentiam aliquam complementi, relictis differentiarum  
 aliquibus corruptionis omnino, velut est calcinatio corporum

---

24. impressionis *om.* B//25. fixationem: fusionem AR *ras.* B fusionem  
 D//26. huiusmodi: huius RT huius vel huiusmodi W huius de modi  
 D//27. et: aut BW//28. positum: positionis R//ziniar: zimar PR et  
 zinzinar BH et ziniar TW et mar D//Hic: hoc BRH//29. in *om.* T//  
 diminvente: se diminvente PBWHRT se minvente D//30. exhalationem:  
 exaltationem W alacionem D//31. quando: cum W//33. differentiarum:  
 differentis BRT//34. aliquibus: alicualibus complementi P alicualibus  
 BHD alicualibus alicuius T//

35 qua omne fugitivum deletur. Et est huius generis medicina  
 perpetue lunam citrinans aut perpetue venerem dealbans,  
 relictis aliis in eis corruptionis differentiis. Tertii  
 autem ordinis medicinam dico omnem preparationem que quando  
 corporibus advenit, omnem corruptionem cum projectione sua  
 40 tollit, et cum omni complementi differentia perficit. Hec  
 autem est unica sola, et ideo per illam excusamur a laboris  
 inventione decem medicinarum secundi ordinis. Primi igitur  
 ordinis opus minus appellatur, secundi vero medium, tertii  
 vero maius. Et hec est omnium medicinarum differentia  
 45 sufficiens.

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37. corruptionis *om.* R//38. dico: appello PRTW appellamus BH  
 applicatio D//39. advenit: adveniatur P//40. complementi: supplementi  
 B//Hec: Hoc B//41. est *om.* R//laboris: laboribus BWH//42. inventione:  
 invencionis BWH//secundi ordinis *om.* BRWHD//igitur *om.* RT ergo  
 W//43. ordinis: ordinis medicina T//medium: ordinis medium W//44. est  
*om.* H//

[79vb] <73> **Sermo generalis in medicinas corporum primi ordinis**

Ex ordinis igitur determinati promissione secuta, cum quidem alia sit medicina corporum, alia vero argenti vivi, et corporum quidem alia primi ordinis, alia vero secundi, alia  
 5 vero tertii, et argenti vivi consimiliter, narremus igitur omnium medicinarum differentias primi ordinis, deinde vero secundi, dehinc vero et tertii. Corporum quidem primo, postea vero in argenti vivi medicina cum sermone completo et ordine congruo narrationem tradamus. Dicimus igitur quoniam primi  
 10 ordinis medicina corporum alia est durorum corporum, alia vero mollium. Durorum quidem corporum alia veneris, alia martis,

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1. Sermo-ordinis: De ordine et modo medicinarum trium ordinum P De differentiis omnium medicinarum BWH De differentiis medicinarum trium ordinum R *om.* T//2. cum: est P//3. quidem: quod D//et *om.* R//4. vero *om.* *rell.*//5. vero *om.* BRTHD//consimiliter: similiter PBRWHD *om.* T//igitur *om.* BWH//6. vero *om.* *rell.*//7. dehinc: deinde PBWH//vero et: vero PW *om.* BTHD et R//8. vero *om.* BTWH//in-  
 medicina: mercurii vivi medicinam T//9. congruo: convenienti P conveniente R//Dicimus: diximus T//10. *alt.* corporum *om.* RTD//vero *om.* BRTD est WH//11. mollium: mollia D//ante durorum *add.* hoc membrum oblitus est D//quidem: quoque *rell.*//corporum *om.* *rell.*//

alia vero lune. Veneris quidem et martis est pura illorum substantie dealbatio, lune vero rubefactio cum citrinitate fulgoris ameni, quoniam veneri et marti rubefactio  
 15 non advenit cum medicina primi ordinis cum fulgoris apparitione, quoniam ex toto immunda sunt, non apta rubedinis fulgorem recipere prius quam illis adveniat preparatio fulgorem adducens. Narremus igitur inprimis veneris medicinas omnes, postea vero  
 20 martis que cadunt in ordine primo.

<74> **De medicinis primi ordinis dealbantibus venerem**

Est igitur medicina venerem dealbans alia per argentum

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12. vero *om.* W//Veneris: sed veneris T//est: preparatio est T//15. advenit: convenit sive advenit BH convenit T//cum medicina *om.* AD//16. immunda: munda H//apta: autem apta T//17. rubedinis: sunt rubedinis T//recipere: recapere A//illis: eis BWH *om.* T//19. inprimis: inprimis primi ordinis T//vero *om.* RT//21. De-venerem *om.* A De medicinis veneris in primo ordine BHD De medicinis veneris primi ordinis RTW//22. venerem *om.* T//argentum: mercurium T//

vivum, alia vero per arsenicum. Per argentum quippe vivum sic  
 completur medicina dealbans illam. Solvitur etenim primo  
 25 argentum vivum precipitatum et solvitur similiter veneris  
 calcinatio, et he ambe solutiones commiscetur in unum.  
 Dehinc vero coagulantur et super ipsius veneris corpus  
 proiciatur eorum medicina, hec enim dealbat et mundat; non  
 adducit tamen complementum, quin contingat alteratum mutari  
 30 et corrumpi. Amplius autem et aliter solvitur precipitatum  
 argentum vivum et solvitur litargirum, et he ambe solutiones  
 coniunguntur in unum. Et solvitur corporis calcinatio de  
 cuius intentione sit dealbari, et coniungitur cum predictis  
 solutionibus et coagulatur. Dehinc vero super illius corpus  
 35 proiiciuntur, dealbantur enim per hoc. Aliter autem

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23. vivum *om.* T//vero *om. rell.*//argentum quippe vivum: mercurium  
 T//24. completur-illam *om.* T//etenim: enim BRWH *om.* T//25.  
 argentum vivum: mercurius T//precipitatum: precipitatus T//27. Dehinc:  
 deinde P demum T//ipsius: illius B//28. proiciatur: proiiciuntur R//hec:  
 hic D//28-30. non-corrumpi *om.* A//29. complementum: complementum  
 sufficiens BH//quin: quoniam D//30. corrumpi: rumpi R//solvitur:  
 solvitur autem T//30-1. precipitatum argentum vivum: mercurius  
 precipitatus T//32. coniunguntur: coniungantur T//in unum: insimul  
 R//33-4. et-coagulatur *om.* A//33. sit: est sic T//coniungitur:  
 coniungantur B coniungatur TH//34. coagulatur: coagulantur BRTW//35.  
 proiiciuntur: proiiciatur BH proiiciantur T//dealbantur enim per hoc: per  
 hoc enim dealbatur P dealbatur vero per hec BH et dealbatur enim RW  
 dealbatur enim per hoc D//Aliter: Similiter D//

sublimatur alternata vice ex illius corpore argenti vivi  
 quantitas quousque cum illa permaneat argenti vivi pars cum  
 ignitione completa. Dehinc vero ex aceto distillato sepissime  
 imbibendo teratur, ut in profundo illius melius commisceatur.  
 40 Abhinc vero assetur, et ultime consimiliter ab eo argentum  
 vivum sublimetur et iterato imbibatur et assetur. Et sic  
 totiens iteretur opus super illa quousque multa argenti vivi  
 quantitas in ea cum ignitione completa quiescat. Hec enim  
 primi ordinis bona est dealbatio. Aliter autem super argentum  
 45 vivum precipitatum totiens sublimetur argentum vivum in natura  
 propria quousque in illo figatur et fusionem prestet. Dehinc  
 vero super veneris substantiam proiiciatur

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36. alternata: alterata D//corpore: corporis calce T//37. illa: illo  
 BTWHD//permaneat: maneat B//39. imbibendo teratur: in discendo  
 ceratur D//ut: et W//40. Abhinc: dehinc W ad hunc D//ultime: ultimo  
 rell.//40-1. ab eo argentum vivum: ab argento vivo A ab eodem argentum  
 vivum B ab eo similiter cum R //41. sublimetur: sublimatur BH//42.  
 iteretur: reiteretur BTWHD//multa *om. rell.*//43. in: cum W//ea: eo  
 D//45. sublimetur: sublimatur A//alt. vivum *om.* A//46. quousque: usque  
 T//fusionem: fusionem bonam BH//prestet: prestant D//Dehinc: hinc  
 T//47. substantiam: fusionem BH//proiiciatur: proiicitur A//

- [80ra] dealbabitur enim peculiōse. Aliter vero solvitur luna et solvitur litargirum et coniunguntur solutiones et ex his veneris substantia dealbatur. Sed et melius quidem dealbatur si in omnibus medicinis perpetuetur argentum vivum.
- 5 Dealbetur vero per arsenicum sublimatum, ut si accipiatur calcinatio veneris et super illam iteretur eiusdem sublimatio quousque secum maneat, et illam dealbet. Sed nisi ingeniaveris te ipsum cum modis sublimationum, non perseverabit in ea arsenicum cum alteratione
- 10 aliqua. Et est scilicet ut post primum sublimationis gradum, secundo secundum reiteres, quem narravimus

1. dealbabitur: et dealbabitur A dealbat BH dealbatur RD// enim: vero R//solvitur: solvatur T//2. solvitur: solvatur T//coniunguntur: iunguntur T//3. et om. B etiam H//5. Dealbetur: dealbatur BTWD//ut: et est ut T//si om. T//6. iteretur: reiteretur T//7. sublimatio: arsenici sublimatio PT//illam: eam P//dealbet: dealbat T//8. ingeniaveris te ipsum: ingenieris P ingenieris te ipsum T//modis: modo B// sublimationum: sublimationis BH//10. post om. H//11. secundo-narravimus: super ipsum imbibicionem aceti reiteres multotiens quam narramus T//secundo: secundo RD//quem: quod B//

- manifeste in marchasite sublimatione. Dealbatur vero et aliter. Sublimatum arsenicum in lunam proicias, dehinc vero hoc totum super venerem, dealbat enim peculiōse.
- 15 Aut commisce prius litargirum vel plumbum ustum soluta cum luna. Deinde vero super hoc arsenicum proiciatur, et hoc totum super venerem proiectum dealbat, et est primi ordinis bona dealbatio. Aut solum super litargirum solutum et reductum proiciatur arsenicum
- 20 sublimatum, et hoc totum super veneris fusionem, quoniam dealbabit eam cum curialitatis aspectu. Aut commisceantur luna et venus, et super has proiciatur omnis

12. manifeste-sublimatione: in mercurii sublimatione T// manifeste om. PBRWH//et om. A//13. sublimatum: sublimatur T// lunam: luna T//proicias: proicias A om. T//14. totum super: totaliter D//venerem: venerem proice BH//dealbat: dealbatur PT dealbat a D//enim om. P//15. Aut: vel R//vel: aut BWH//16. Deinde: demum D//vero om. BH//17. proiciatur: superiacta P super proiectum B superiectum RHD proiectum TW//et-proiectum om. BD//proiectum: superiectum R//18. est om. B//20. totum: totum proice BH//super veneris: supra veneris T super veneris iter. H//21. dealbabit: dealbat BWHD//cum om. T//commisceantur: commisceatur BRHD permisceantur T commiscetur W//22. has: his BH//

medicina dealbativa. Luna etenim amica est arsenici magis  
 quam corporum aliquod, et ideo fractionem ab eo tollit;  
 25 secundario vero saturnus, et ideo cum illis commiscemus.  
 Aliter autem arsenicum fundimus sublimatum quousque fiat  
 frusta. Deinde vero frustum post frustum super venerem  
 proiicimus. Iubemus etenim in frustis potius quam in pulvere  
 proiici quoniam facilius inflammatur pulvis quam frustum, et  
 30 ideo facilius evanescit et consumitur prius quam super corpus  
 cadat ignitum. Tollitur autem et similiter aliter eidem  
 rubedo illius cum tutia videlicet et dealbatur. Sed quia

23. Luna-arsenici: venus amica est argento T//etenim: enim PR//arsenici:  
 arsenico RW//24. corporum: corpus PBRWH//24 - 80va,30 om. D//25.  
 ideo: omnino A//commiscemus: commiscetur PT miscemus R//26.  
 arsenicum fundimus sublimatum: arsenici fundimus substantiam R//fiat:  
 fiant R//27. frusta: frustum BTH//Deinde om. H//vero om.  
 BRTWH//frustum om. H//post: super BW//28. pulvere: ego pulverem  
 codd.//30. ideo om. ABRWH//facilius evanescit et om. AW//31. autem  
 om. T//et similiter: et PBRTW om. H//eidem: in veneri eidem B om.  
 T//illius BH//

tutie dealbatio non sufficit, ideo solum citrinat, et citrinatio  
 35 quelibet albedini est affinis. Et est modus huius scilicet ut  
 calcinetur et solvatur omne tutie genus, deinde vero venus,  
 et he ambe coniungantur solutiones, et cum his citrinetur  
 veneris substantia. Et cum tutia si exercueris, proficuum  
 invenies. Dealbatur vero per sublimatam marchasitam  
 40 quemadmodum cum sublimato argento vivo, et est modus idem.  
 <75> Sermo particularis in medicinis martis primi ordinis  
 Restat ergo et dealbationes martis ex medicinis  
 sibi propriis creatas narrare, que sunt secundum essentiam  
 primi ordinis. Sed quoniam fusionem non habet rectam, ideo

35. quelibet: qualibet B//albedini: albedinis RW//36. et: et ut  
 RTW//omne: omnis T//vero om. BRTWH//venus om. T//37. et om.  
 T//citrinetur: citrinatur BRWH//38. cum: ideo P//si:etiam si  
 T//exercueris: exercueras T//40. cum: et cum P//sublimato: sublimatione  
 T//argento vivo: mercurio R argenti vivi T//41. Sermo-ordinis: De  
 medicinis dealbantibus martem exprimo ordine P De medicinis martis  
 primi ordinis BRWH De medicina martis primo ordine T//42. ergo: igitur  
 R//et om. BTWH//43. sibi om. W//creatas: crurias ex parte in ras. B  
 creatam T//essentiam: exigentiam B//



[80rb] expedit nos cum medicina multipliciter fundente dealbare illum. Est igitur omnis medicina veneris dealbativa et martis similiter, cum eiusdem ordinis preparatione. Sed fusiva illius specialis est arsenicum cuiuscunque generis. Et  
 5 fusiva illius similiter est plumbum et litargirum solutum. Cum quocunque igitur dealbatur et funditur, expedit quod cum argento vivo coniungatur et lavetur quousque omnis impuritas tollatur ab illo, et fiat album et fusibile. Aut calefiat cum ignitionis vehementia et super ipsum eiiciatur  
 10 arsenicum. Et cum fusum videris illum, proiice super ipsum lune quantitatem, quoniam quando secum unitur, non separatur

1. multipliciter *om. rel.*/2. illum: illam A//veneris *om. W add. s.l. W<sup>2</sup>//4. est om. T//cuiuscunque: cuiusdem W aliuscuiuscunque add. s.l. W<sup>2</sup>//6. igitur dealbatur et: igitur dealbatur istorum et B igitur istorum dealbatur et RWH istorum dealbatur et T//7. et lavetur *om. B//9. ignitionis: ignis W//vehementia: violentia T//eiiciatur: proiiciatur RW//11. lune: equalitatem ut vid. T//quando: cum BH//unitur: unitur et iungitur T//separatur: separabitur BH//**

ab ea per leve artificium. Aut calcinetur et lavetur omnis ex illo solubilis aluminositas corruptionis infectionem adducens per modum solutionis iam dictum.  
 15 Dehinc vero ab illo sublimetur arsenicum mundatum per sublimationem aliquam et reiteretur multotiens quousque secum aliquid ex illo figatur. Deinde vero cum solutione litargiri alterna vice imbibatur commiscendo et agitando et assando mutua vice, et ultime  
 20 reducendo cum igne, quem docuimus in iovis reductione a calce sua. Ex hac enim exhibit albus mundus et fusibilis. Aut solum cum arsenico

12. ea: eo RH//per leve: plene per BWH//13. illo: eo BRWH//14. infectionem: imperfectionem B//15. vero *om. P//sublimetur: sublimatur BTH//16. multotiens: multotiens per sublimationem aliam T//17. illo: eo BWH//18. alterna vice: alternatim PT alternata vice BRWH//19. pr. et om. P//mutua vice: mutata vice A om. P//ultime: ultimo PBTWH//22. mundus: color mundus A et mundus PRT *om. BW//22-4. et- albus om. W//post fusibilis add. mars in ras. A//**

ab illo sublimato in calce sua reducatur,  
 et exhibit albus, mundus, et fusibilis. Sed eundem  
 25 artificem expedit adhibere cautelam quemadmodum  
 et in veneris reiteratione sublimationis ab  
 ea arsenici figentis se in illius profundo docuimus.  
 Dealbatur vero et similiter per marchasitam et tutiam cum  
 ingenio et industria, que tibi narravimus. Sed horum  
 30 dealbatio aut horum non est sufficiens.  
 <76> **Sermo particularis in medicinas rubificantes lunam  
 ex primo ordine**  
 Prosequentes igitur promissorum ordinem, lune medicinam

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23. reducatur: reducitur T//24. albus: album A albus et PT//mundus *om.*  
 R//alt. et *om.* PT//fusibilis *om.* T//25. adhibere: adherere B//26. et *om.*  
 R//cautelam: cautelam ut scilicet in reiteratione sublimationis arsenici ab  
 ea ipsum figendo ex aceto sepiissime imbibatur ut in illius profundo melius  
 commisceatur sicut docuimus. T//25-6. quemadmodum et *om.* T//26.  
 reiteratione: preparacione scilicet reiterando T//sublimationis:  
 sublimationes T//27. se: se ut T//profundo: profundo melius  
 commisceatur sicut T profundo sicut BRWH//28. vero: enim RW// *pr.* et  
*om.* PBTH//28-9. cum-narravimus *om.* W//29. horum: harum B//30.  
 horum: eorum R//post sufficiens *iter.* 79vb, 22-4, et postea 80rb, 16-27  
 R//30. aut horum *om.* BWH//31-2. Sermo-ordine: De medicinis primi  
 ordinis citrinantibus lunam P De medicinis lune primi ordinis  
 BRTWH//33. promissorum: promissorum W//medicinam: medicinarum  
 W *add. mg.* vel medicinam P//

substantiam citrinantem in ordine primi generis narremus  
 35 cum veritate certa. Et est scilicet omnis medicina citrina  
 que eidem in profundo adheret et adherendo colorat sive per  
 naturam propriam sive per artificium huius magisterii.  
 Narremus igitur medicinam que ex sua radice innata illi  
 adheret. Deinde vero hec artificia per que facimus rem  
 40 cuiuscunque generis adherere cum ingressione firma. Elicimus  
 autem illam aut ex sulphure, aut ex vivo argento, aut ex  
 amborum commixtione, sed per sulphur diminute  
 quidem magis, per argentum vero vivum perfectius. Elicitur  
 autem et similiter per quasdam res minerales que non sunt

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34. in ordine *mg.* P//35. scilicet: scilicet ut A//36. que: quod T//adheret:  
 adheret cum ingressione firma P adhereat H//et *om.* B//39. hec *om.*  
*rell.*//41. vivo argento: mercurio T//40. Elicimus: Elicuimus H//42. *post*  
 commixtione *add.* ultimovero et que ex gummo cupri *in ras.* H//sulphur:  
 illius sulphuris T//diminute: *non legitur* P//43. per argentum vero vivum:  
 per argentum vivum BRWH agit per mercurium vero *ut vid.* T//Elicitur:  
 Eliciatu T//44. et *om.* PRTW//res: alias res P//minerales: universales  
 W//

[80va] huius generis, quemadmodum est vitriolum et cupirosum, quod et  
 gumma cupri aut eiusdem stillicidium nuncupatur. Afferamus  
 igitur inprimis modos omnes medicinarum que ex vivo argento  
 consurgunt, deinde vero que ex sulphure aut ex amborum  
 5 commixtione, ultimo vero et que ex gumma cupri aut similium.  
 Est igitur modus eius per argentum vivum qui perficitur talis.  
 Sumatur precipitatum et per precipitationem illius  
 mortificatum et fixum. Dehinc vero ponatur ad modum magne  
 ignitionis conservationis calcium quem docuimus, donec  
 10 rubescat in similitudinem uzifur. Si vero non rubuerit, tolle  
 argenti vivi non mortificati partem, et cum sulphure reitera

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1. cupirosum: cuperosa BTH//alt. et: est BRWH//2. eiusdem: eius  
 BRTWH//3. igitur om. BWH//inprimis om. H//4. deinde: inde  
 BWH//sulphure: illo sulphure T//aut: et W//ex om. T//5. et que om.  
 RT//aut: vel T//6. qui: quod R//per argentum vivum: argento vivo T//7.  
 post precipitatum add. s.l. argentum A<sub>2</sub>//illius om. BWH//9. ignitionis:  
 ignitionis vel reductionis T//conservationis om. W//10. in: et A//  
 similitudinem: consimilitudinem WH//vero om. B//non om. A add. s.l.  
 A<sub>2</sub>//11. argenti vivi: mercurii T//et om. T//

sublimationem illius. Sit tamen sulphur omni impuritate  
 mundatum, et vivum argentum similiter. Et postquam vigesies  
 illius sublimationem reiteraveris super ipsum precipitatum,  
 15 illud dissolve cum aquarum acumine dissolvente, et iterato  
 illud calcina et iterato dissolve donec exuberanter  
 sufficiat. Post hoc lune partem dissolve et cum soluta  
 fuerit, solutiones dissolutas commisce et coagula, et super  
 lune fusionem proicias, citrinabit enim  
 20 citrinitate peculiosa multum. Si vero argentum vivum  
 in precipitatione rubuerit ad perfectionem sue projectionis,

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13. mundatum: munda A immundatum H//14. sublimationem om.  
 B//vivum argentum: mercurius vivus T//15. illud: id R//16. dissolve:  
 dissolve illud BW solve donec H//18. dissolutas om. rell.//19. proicias:  
 proiice rell.//20. citrinitate: citrinatione R//peculiosa: pecuniosa A//vero:  
 vero per B//argentum vivum om. T//21. in precipitatione om. W//

sufficit administratio dicta sine commixtione  
rei tingentis illud. Per sulphur vero rubificatur,  
sed illius est rubificatio difficilis et laboriosa immense.

- 25 Et ad hoc nos inducit operationis necessitas ut prius  
calcinemus illud et figamus, quod laboris est copia.  
Dehinc vero hac eadem preparatione administremus et eadem  
proiectione super lune substantiam infundamus. Et  
tamen non resultat eius citrinitio fulgens, immo fusca  
30 et livens terreatate mortifera. Citrinatur vero et luna cum  
martis solutione similiter. Eius vero que per vitriolum  
aut cupirosum perficitur citrinationis modus

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22. dicta: predicta P//23. illud: illud si non commixtione reitingentis illud  
T//24. sed-immense: sed est difficilis et laboriosa intense T//rubificatio:  
dubitatio *in ras*. A rubificatio *mg. s.l.* A<sub>2</sub>//immense: valde W//25. *ante* Et  
ad *transp.* 30-1. Citrinatur-similiter. RT//Et *om.* TWH//hoc: hoc vero  
T//nos: nos necessario T//operationis: operis BRTWH//necessitas:  
necessario T//26. copia: copie B//*post* copia *transp.* 30-1. Citrinatur-  
similiter A//27. Dehinc: Deinde BWH//hac eadem preparatione: hanc  
eandem preparationem R ac eadem preparatione T hac eadem proiectione  
et preparatione W//administremus: administramus T//27-8. eadem  
proiectione *om.* W//29. non *om.* A *add. mg.* A<sub>2</sub>//eius: ipsius  
PR//citrinatio: curinatio *ut vid.* A//30. *post* Citrinatur *add.* et D//31. per  
*om.* B//32. cupirosum: cuperosam B TH//modus: vero modus B//

- est talis: tollatur illorum uniuscuiusque quantitas certa  
et illius sublimetur pars que sublimari patitur donec cum  
35 expressione sublimetur totali. Post hoc vero quod  
sublimatum est iterato sublimetur cum modo ignis illi  
appropriato, ut ex eo figatur quiddam post quiddam,  
donec maior pars illius figatur. Postea calcinetur  
cum ignis cautele intensione, ut possit illi  
40 maior ignis ad perfectionem administrari. Post hoc vero  
solvatur in aquam rubicundissimam cui non est par. Dehinc  
vero ingenieris ut illi ingressum in lunare corpus exhibeas.

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33. est *om.* W//certa *om.* R//35. *post* vero *transp.* 38-40. calcinetur-  
administrari A//sublimetur: sublimentur W//37. quiddam post quiddam:  
aliquid post aliquid B paulatim W//38. *post* figatur *add.* pars D//Postea:  
*non legitur* A Post BRTWHD//39. intensione: intencione BHD//ut:  
donec T//illi: illis R//40. Post hoc: postea A//vero *om.* BRTWHD//41.  
aquam rubicundissimam: aqua rubicunda A//42. vero *om.* BRTWHD//  
exhibeas: exhereas B exhibeat T//

[80vb] Et hec ingenia tibi sufficienter monstrata sunt si perfecti fueris operis exquisitor, quod scripsimus. Et quia res huiusmodi videmus lune profundo amicabiliter inherere, ideo consideravimus et est certum has esse de illorum radice, et ideo per illas alterari contingit. He utique sunt medicine omnes primi ordinis quas attulimus. Possunt tamen illorum plures multiplicari modi, salva pigmentalium rerum in modorum varietate essentia. Quidam vero plures adinvenerunt medicinas, sed unum ex duobus necessario evenire contingit, quoniam aut ex eisdem aut ex eandem naturam habentibus illos medicinam creare necessarium est, aut medicinam componunt que ei non est equipollens cum alteratione sua, et que nec mundo confert, nec mundi partibus, donec motor in sublimi nature mobili quieverit incorruptum.

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1. si: a T//2. fueris: sui T//res: re H//3. huiusmodi: huius BRTWHD//amicabiliter: amicabilis RT//inherere: inherere re A adherere P//4. consideravimus: consideramus BW//5. alterari:alterare BT//7. tamen: cum D//8. *post* essentia *add.* sed argenti quidpe vivi non est medicina in hoc ordine et primo cum non sit illius corpus ipsum alterans A *add.* unica differentia immo complemento totali omnino *mg.* A<sub>2</sub>//vero *om.* D//9. adinvenerunt: advenerunt T//medicinas: materias *ut vid.* A//10. aut ex eandem: vel eandem P aut ex eodem D//11. creare: creave D//aut: autem aut A *om.* BD//12. medicinam: materiam A medicinam scilicet de eis illis T// que ei: quod ei A que ei quod BTWHD//est *s.l.* W//equipollens: equipollet BRTWHD//13. *pr.* nec: non BWH//partibus: paribus *ut vid.* R//14. sublimi: sublimatione R//incorruptum: incorruptus RT//quieverit: evenerit vel quieverit H//

15 <77> Sermo de medicinis secundi ordinis in genere

Restat igitur ad secundi ordinis medicinas transire cum sermonis sui exigentie sufficientia vera et manifestis probationibus cum experientia nota. Cum sit igitur medicina alia corporum mutandorum, alia vero argenti vivi perfecte coagulabilis, prius omnium medicinas corporum narremus complete, dehinc vero dicemus argenti vivi medicinam coagulabilis in solificum vel lunificum verum. Est igitur

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15. Sermo-genera *om.* A De secundi ordinis medicina et est sermo v. B De medicinis secundi ordinis in genere R De medicinis secundi ordinis TW De secundi ordinis medicina sermo universalis H De medicine D//17. exigentie sufficientia: exigentia sufficienti RW exigentia sufficientia T//vera: natura D//manifestis: manifeste T//18. probationibus: scit probationibus T probationibus suis W//experientia: exigentia R//nota: certa BW vera HD//19. mutandorum: permutandorum B mundandorum H//20. coagulabilis: coagulationis BRTWH//prius: prius tamen BTWH prius eam D//corporum: corporum mutandorum B//21. dicemus: ad ipsius ABWHD//*ante* argenti *add. mg.* eundem A *in textu* D//argenti vivi *om.* W mercurii vivi T//medicinam: medicinas BWH//22. coagulabilis: coagulabilis BH coagulationis RT//vel: et *rell.*//*post* verum *add.* eundem est *in ras.* A//

secundi ordinis medicina que quidem in sola perfectionis  
 unica differentia complet, velut cum multe sint corruptionis  
 25 cause in unoquoque imperfectorum corporum - videlicet in  
 saturno quidem sulphureitas volativa et argenti vivi fuga  
 per que corruptionem adduci necessario accidit et  
 illius terreitas - fiat medicina que alterum eorum tollat ex  
 toto aut quidem palliando decoret, relictis solis aliis  
 30 imperfectionis causis. Quia igitur est aliquid impermutabile,  
 ut in corporum radice innatum est, per secundi ordinis  
 medicinam, ideo omnis illa medicina que illud de commixto  
 tollit non secundi ordinis sed tertii et maioris appellatur  
 ordinis medicina. Et quia superfluitas fugientium  
 35 per calcinationis modum tollitur, et per reductionis modum

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24. complet: completur R//velut: verum *rell.*//sint: sunt D//25. videlicet  
*om.* PBWHRT sed D//26. et: in H//27. adduci *om.* W//28. medicina:  
 igitur medicina BRTWH//alterum: quidem alterum P//tollat: tollat aut  
*rell.*//29. quidem *om.* *rell.*//30. Quia: que W//igitur: igitur corporum  
 BTWH igitur corpus D//est *om.* W//aliquid: aliquod D//31. ut: quod  
 BTWHD//31. est *om.* A//32. illa *om.* W//illud: illum D//33. *post* ordinis  
*add.* medicinam D//34. Et quia: invenimus vero quia P Et quia invenimus  
 quod T quia D//fugientium: *add.* invenimus *mg.* A<sub>2</sub> fugientium invenimus  
 quod BHD fugientium invenimus et W//35. et *om.* R//tollitur-modum: et  
 reductionis tollitur A *om.* D//

terreitas non innata, ideo necesse fuit secundi ordinis  
 medicinam invenire que quidem innatam palliet et durum  
 remolliat et molle induret, in duris videlicet et mollibus  
 secundum complementum non sophisticum, sed perfecte  
 40 constituat solificum corpus aut lunificum verum. Cum pateat  
 igitur in corporibus solis quidem mollibus per ingenia  
 huius artificiorum operis non posse liquefactionis  
 festinantiam tolli nec impuritatem in sui radice principiorum  
 innatam, necessario evenit medicinam percunctari que quidem  
 45 in proiectione illorum tenuitatem inspisset et

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36. terreitas *mg.* P//necesse: necessarie T//37. innatam: terreitatem  
 innatam T innata W *om.* D//palliet: palliant A palliat T *om.* D//et:  
 terreitatem D//38. remolliat: remolliant A remolliet D//induret: indurant  
 A//39-40. sed-verum: et solificum aut corporum perfecte constituat  
 lunificum verum A sed perfectione constituat solificum corpus aut  
 lunificum verum R et perfecte constituat solificum corpus aut lunificum  
 verum T sed perfecte constituat solificum *mg.* corpus aut lunificum verum  
*in textu* W//40. *post* verum *add.* De medicinis secundi ordinis et est sermo  
 universalis B De medicinis secundi ordinis determinacione vera et certa W  
 De medicinis secundi ordinis sermo H De medicinis secundi ordinis cum  
 determinacione certa et vera D//Cum: Nunc W//pateat: patet H//41.  
 solis: solum B//quidem *mg.* P//42. operis: operationis R//43. radice:  
 radicem B//principiorum *om.* B//44. innatam: innatam *in textu* vel  
 inventam *mg.* P inventam R in natura *ut vid.* D//necessario: necessarie  
 T//45. illorum: illius sive illorum A sua illorum W//

[81ra] inspissando ad sue liquefactionis ignitionis sufficientiam  
 induret. In duris spissitudinem attenuet, et attenuando  
 ad fusionis velocitatem sufficientiam cum  
 proprietate ignitionis adducat. Et utriusque generis corporum  
 5 fuscedinem palliando decoret; hec in album, illa vero  
 in citrinum transformet perfectissimum. Non autem  
 diversificatur hec medicina a tertii ordinis medicina nisi per  
 minorem preparationis imperfectionem. Et non diversificatur a  
 se quo in diversorum corporum proiectione et pigmentorum  
 10 acceptione constat, sed in modo preparationis sue. Alia

---

1. ad sue: a sua T//liquefactionis: liquefactione T//2. induret: inducat *ut vid.* T//duris: duris vero P//3. velocitatem sufficientiam: velocitatem sufficientem PRT//*post* sufficientem *add.* vel velocitatis sufficientiam *mg.* P//4. Et: a D//5. hec: hoc B//6. transformet perfectissimum: transformando perfectissime PRT//7. hec *om.* T//medicina: medicina secundi ordinis T//8. minorem: minoris *rell.*//preparationis: preparationem W//imperfectionem: perfectionem PBRTH perfectionis W//9. quo *om.* PRT quod BH//et: in A et in BWH//pigmentorum: philosophorum T//10. acceptione: receptione PRT acceptione BH//constat *om.* R//sue: similiter A *om.* BWH//Alia *om.* D//

etenim eget preparationis industria corporum mollium medicina  
 tenuitatem inspissans, alia vero durorum attenuans  
 spissitudinem. Hec quidem ignis consumptivi modo, illa vero  
 humiditatis conservationis administratione eget.

15 < 78 > Sermo universalis in medicinis secundi ordinis

Afferamus igitur sermonem universalem in medicinis huius  
 secundi ordinis, completum cum determinatione certa et vera,  
 et prius omnes lunares omnium a perfectione diminutorum  
 corporum cum differentiis preparationis earum, dehinc vero  
 20 solares cum propriis similiter differentiis. Probavimus iam  
 ex nostris sermonibus sulphur cuiuscunque generis perfectionis  
 esse corruptivum, argentum quippe vivum perfectivum in operis

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11. etenim: et R *om.* D//eget preparationis *om.* D//12. durorum: durorum corporum T//13. hec: hoc B//14. humiditatis *om.* B//15. Sermo-ordinis *om.* P De medicinis secundi ordinis cum determinatione certa et vera R De medicinis secundi ordinis cum determinatione certa T Sermo universalis de medicinis secundi ordinis D//16. Afferamus igitur: Faciemus nunc: R Faciamus nunc T//universalem: universalem et completum PRT//huius *om.* BRTWH //17. completum *om.* PRT complementum adducentem BH//certa et vera: certa et nota vera P//18. et *om.* R//prius: dicemus prius *rell.*//20. solares: solarium AD//Probavimus: Probamus PB//22. argentum: sed argentum PRT//quippe *om.* PRT//perfectivum: perfectum D//operis: opere BD//

nature completis regiminibus. Igitur et naturam imitantes in  
 quibus nos est possibile sequi operibus, argentum similiter in  
 25 huius operis artificio seu magisterio vivum assumimus  
 in cuiuscunque perfectionis medicina, lunari videlicet et  
 solari, tam quidem imperfectorum quam ipsius argenti vivi  
 coagulabilis. Cum iam ex novissime dictis duplicem sermonibus  
 30 medicine differentiam diximus, aliam quidem corporum, aliam  
 vero coagulabilis argenti vivi, et abhinc quidem corporum,  
 abinde vero argenti vivi medicine narrationem tradamus certam.  
 Est igitur per se huius medicine materia cuiuscunque generis  
 una, et est quod iam sufficienter notum est. Assume igitur

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24. quibus: quo B qua T//nos: nobis W//argentum: mercurium T//24-5.  
 in-magisterio: in hoc *ras*. in huius operis magisterioP in magisterio BH in  
 hoc magisterio T in huius magisterio RWD//25. vivum *transp. post*  
 argentum 24 PBRWH *post* mercurium T//26. cuiuscunque: cuius BWH  
 melius D//videlicet: scilicet *rell.*//28. duplicem: duplicens A//29.  
 medicine: medicinarum RT//diximus: dixerimus PBTW//*pr.* aliam: alia  
 RT//29-30. aliam vero: alia autem R alia T//30. vero *om.*  
 BWHD//abhinc: nunc PRT//corporum: prius corporum *rell.*//31. abinde:  
 deinde PR//argenti: mercurii T//certam *om.* D//*post* certam *add.* De  
 medicinis corporum lunificantibus ex secundo ordine P//32. per: propter  
 R//huius: hoc B//medicine *om.* D//

id, et si vis ad lunare secundum ordinem tibi promissum  
 35 exercitatum te reddere, prepara id cum modis huius magisterii  
 notis, quorum intentio est ut puram ex illo substantiam  
 dividas et partem quidem figas, partem vero ad cerandum  
 omitte, et sic totum magisterium prosequendo donec compleas.  
 Tenta illius fusionem. Quod si se subito fuderit in duris,  
 40 perfecta est, in mollibus vero econverso. Hec enim medicina  
 super imperfectorum unumquodque proiecta in lunare perfectum  
 mutat corpus, siquidem perveniant huic preparationes note.  
 Si vero non, diminutum relinquit, sed perficit in altera  
 perfectionis differentia tantum quantum ex huius generis  
 45 medicine ordinis administratione dependet, quantum enim ex  
 tertii non perveniente administratione aliqua, perficit in

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34. id: illud *rell.*//35. reddere: redde PRT//id: illud *rell.*//37. cerandum:  
 serandum B//38. prosequendo: persequendo D//39. fusionem: fusione  
 A//*se om.* T//fuderit: fundetur T//duris: duris corporibus BH//40.  
 perfecta: perfectio RT facta H//econverso: econtra R et contra D//41.  
 imperfectorum: imperfectorum corporum *rell.*//lunare perfectum:  
 lunarem perfecte T//42. corpus *om.* D//huic: huic medicine  
 BRTWH//preparationes: preparationis D//43. diminutum: diminuta  
 W//43-6. altera-in *om.* T//44. tantum *om.* R//huius: eius BWH//45.  
 ordinis: secundi ordinis PR//45-6. ex tertii: exercitii *ut vid.* PW//



[81rb] projectione sola. Solaris vero huius secundi ordinis  
 medicina imperfectorum cuiuscunque corporum est eadem  
 medicina et administrationis eodem regimine communicans. In  
 hoc tamen differentiam habet, scilicet in maiori partium per  
 5 modos proprios subtiliatione egestos, atque sulphuris subtili  
 preparationis regimine administrati commixtione cum materia  
 medicine nota. Cum hoc enim tingitur medicina et cum hoc  
 proiecta super unumquodque a perfectione diminutorum, complet  
 10 in complemento solari quantum ex huius secundi ordinis  
 medicine preparatione dependet, administratione perveniente

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1. sola.: sola. Sermo particularis in principiis secundi ordinis ad argentum  
 coagulatum A sola. De medicinis corporasolificantibus in secundo ordine  
 P//2. medicina: medicine P//3. communicans: commundans D//5.  
 egestos: egestas AD//atque: aut T//sulphuris *iter*. R//6. preparationis:  
 separationis P preparatione RT peractionis BWH alius preparationis *s.l.*  
 W<sup>2</sup>//regimine: regimen BH//administrati: administrari et B administrati  
 et WH administrari ex D// commixtione: a commistione R in mixtione  
 T//7. nota: nota medicine vero T//*post* nota *add.* additio. et est scilicet  
 ipsius purissimi sulphuris fixio et solutio eius per modum scilicet per  
 regimenem A additio. Et est scilicet ipsius purissimi sulphuris fixio et  
 solutio eius per modum PW adductio et est ipsius purissimi sulphuris fixio  
 et solutio per eius modum. BH aductio. etenim scilicet ipsius purissimi  
 sulfuris fixio et solutio per eius modum. R additio est scilicet ipsius  
 purissimi sulphuris fixio et solutio eius per modum dictum T Additio. Et  
 est scilicet ipsius purissimi sulphuris fixio et solutio eius per modum.  
 D//enim: igitur R//*pr.* hoc *om.* B hoc similiter T eo W//*alt.* hoc *om.*  
 P//8. diminutorum: diminutorum corporum BTWH//9. huius: eius  
 BRTWHD//10. preparatione *om.* RT//administratione *om.* BWH//

nota et certa ipsius a perfectione diminuti corporis. Et super  
 lunam quoque proiecta perficit eam in complemento solari  
 peculiouse multum.

<79> Sermo particularis in medicinis solaribus secundi ordinis

15 Secundum igitur premissorum ordinem restat ex operis  
 complemento - quod ex primis nos determinaturos exhibuimus -  
 in medicine igitur argenti vivi coagulantis ipsum narrationem  
 transire. Dicimus igitur quoniam ex eisdem illius elicitur  
 medicina scilicet nota huius operis in capitulis  
 20 multiplicibus. Et illud ideo, quoniam cum fugitivum sit

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11. nota: alia vera T//12. quoque *om.* BWH//13. peculiouse: peculiouse  
 A//multum: multam B//14. Sermo-ordinis: De medicina coagulante  
 argentum vivum in solem vel lunam ex secundo ordine P De medicinis  
 argenti vivi et ex quo elicitur medicina et qualiter non ingreditur et qualiter  
 ingredi possit etenim tertii ordinis B De medicina argenti vivi ex quibus  
 eliciatur et quomodo ingredi possit et qualiter medicina ingreditur R De  
 medicina mercurii vivi ex quibus eliciatur et quarum medicina non  
 ingreditur et quomodo ingredi possit T De medicina ar. vi. ex quibus  
 eliciatur et quare medicina non ingreditur et qualiter ingreditur et  
 qualiter ingredi possit H De medicina ar. vi. ex quibus eliciatur et quare  
 medicina non ingreditur et quomodo ingredi possit. Rubrica. D//16. quod:  
 eo quod T//*ex:* in RT//exhibuimus: promissimus PRT//17-8. in -  
 transire: de medicinis coagulantibus ipsum narrationes non transire  
 T//17. igitur *om.* *rell.*//narrationem transire: narratione D//eisdem:  
 eiusdem D//18. igitur: unus igitur T//eisdem: eiusdem BWH//elicitur:  
 eliciatur BH//19. medicina: materia A *om.* T//nota: noto BTWH ex noto  
 D//20. illud: illud *ex parte in ras.* A id D//quoniam: quam D//

argentum vivum defacili absque inflammatione aliqua,  
 medicina eget, que subito ante fugam eius in profundo illi  
 adhereat et illi per minima coniungatur et illud inspisset, et sua  
 25 fixione id in igne conservet quousque adveniat illi maioris ignis  
 tolerantia eius humiditatem consumentis, et convertat id per  
 hoc beneficium in momento in solificum et lunificum verum,  
 secundum illud ad quod medicina fuerit preparata. Cum igitur  
 non inveniamus aliquid magis illi convenire quam ipsum quod  
 30 sue nature est, ideo per hoc existimavimus cum eo medicinam  
 illius commisceri et compleri, et ingeniari formam medicine  
 illi per ingenia prestare. Et est scilicet ut preparetur cum  
 modis suis iam dictis cum diurnitatis laboris instantia, qua

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21. *post absque add. sublimatione et A//22. que: qua A quare D//profundo: fundo T//illi om. W//24. alt. et om. T//25. fixione: fuxione A fixione digne T//id: illud PBRWH om. T//igne: digne R//26. eius: ipsius PRT//26. consumentis: consumens BTWH//id: illud rell.//convertat: convertatur W//26-7. per hoc beneficium om. BH//27. hoc: hee D//et: vel BH//28. illud: istud B//ad om. W//fuerit: fuerat D//preparata om. D//29. inveniamus: inveniatur BRTWHD//aliquid: quid R//illi: ei BWHD//convenire: communicare BRTWHD //existimavimus: estimavimus rell.//31. commisceri et om. rell.//32. illi: illius T//33. diurnitatis: diurnitas D//qua: quare ut vid. R quod T//*

omnis illius subtilis substantia et purissima alba quidem  
 35 in luna, citrina vero in sole intensa perhibeatur  
 perficere. Et hoc quidem non completur ut citrinum creet  
 sine commixtione rei tingentis illud que nota est vere.  
 Dehinc vero cum hac perficiatur cum huius magisterii operis  
 ingeniis medicina que maxime argento vivo adhereat  
 40 et fundatur facillime et illud coaguletur. Convertet  
 enim hoc in solificum et lunificum verum cum preparatione  
 illius prehabita. Sed ex quibus maxime hec argenti vivi  
 substantia elici possit solet queri. Et nos quidem  
 respondententes narramus quod in quibus est, ex illis elicitur  
 45 substantia.

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34. et purissima *om.* W//35. vero: quidem W//perhibeatur: prohibet RT//36. hoc: licet B hic D//completur: complet BH completum D//ut citrinum creet: scilicet ut citrinet P scilicet ut citrinum creet BWH scilicet cum citrines illud R scilicet ut citrinetur T scilicet ut citrinum creet D//37. illud: illum D//nota: res nota T//vere: nature BHD//*post vere add.* id est purissimi argenti vivi substantia A//38. *pr. cum: cum ras. add. in P//hac: hac scilicet re medicina T//magisterii: magisterio rell.//operis: ac operis PTWH hac operis B//39. ingeniis: tingentis R//medicina: medicine PW//argento vivo: mercurio vivo T//40. et fundatur: infundatur B//facillime: facile B//illud: illum D//coaguletur: coagulet PBRD coagulat T et coagulet W// Convertet: et convertat BTH//41. enim *om.* BTWHD//hoc: hec R *om.* W//et: aut BW aut in H//preparatione: perfectione D//42. illius: illi W//42-3. Sed-possit *om.* R//44. quod *om.* D//*ex om.* D//illis: illius A//elicitur: eliciatur W//45. substantia *om.* rell.//*

[81va] Est autem tam quidem in corporibus quam et in ipso argento vivo secundum naturam, cum unius sint reperta nature. Sed in corporibus difficilius, in vivo argento autem propinquius, non autem perfectius. Igitur cuiuscunque generis sit medicina, tam quidem in corporibus quam in ipsius argenti vivi substantia, lapidis preciosi indagatur medicina. Sed quoniam contingit quandoque medicinam quidem permisceri, quandoque vero non, ideo modum permiscendi narramus, scilicet qualiter unaqueque res in corpus profundissime ingressum acquirat, aut unaqueque medicina non intrans. Et est modus per dissolutionem eius quod ingreditur et dissolutionem eius quod non ingreditur, et per mixtionem ambarum solutionum. Facit

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1. autem *om.* T//corporibus: corporibus metallicis T//et *om.* *rell.*//1-2. ipso argento vivo: ipsius mercurii vivi substantia T//2. vivo *om.* A//3. non *om.* D//4. autem: tamen RT *om.* D//post autem *add.* difficilius non sed *in ras.* A//medicina: materia D//6. post medicina *add.* De ingressione danda in corpus cuiuslibet medicine non ingredienti P//quoniam *om.* BH//7. quidem *om.* T//permisceri: commisceri BRTWD commiscere H//8. ideo: ideoque B//narramus: narrabimus *rell.*//9. unaqueque: unaqueque B//in corpus *om.* T//9-10. aut unaqueque: ac unaqueque B ac unaqueque WH//10. intrans: metans D//11. dissolutionem: per dissolutionem BTWH//quod: quoniam D//12. et *om.* B// mixtionem: commixtionem BWH//

enim ingressivum esse quod ei per minima coniungitur. Hoc autem per solutionem completur. Et completur per solutionem fusio in rebus non fusilibus, et ideo magis apta sunt ingredi et alterare. Et hec ideo est causa quare quasdam res calcinamus que non sunt de natura harum, scilicet ut melius solvantur. Et per hoc etiam solvuntur ut melius ab eis corpora impressionem suscipiant et ab eis per hoc similiter preparentur et mudentur. Aut ingressionem damus his que suam spissitudinem ingredi non permittunt cum multiplici sublimationis reiteratione spirituum non inflammabilium super illa, arsenici videlicet et argenti vivi

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13. enim *om.* BH//ingressivum: ingressum B//esse quod ei: omne quod illi PB quod illi R esse quod illi TD esse omne quod illi WH//minima: minimie(!) B//14. Hoc autem: id est quod ingrediatur. Hoc autem A Hec autem id est quod ingreditur BH Hoc autem quod ingreditur T Hoc autem id est quod ingrediatur W hec idest qui ingrediatur autem D//pr. completur: completurarum B//15. per: post W//fusio: fixio A//17. de *om.* T//harum: horum RTW//18. ut: scilicet ut W//per: propter *rell.*//etiam *om.* BRTWD//19. ab: et ab T//eis: eis similiter P//hoc: hec B//20. ingressionem: ingressum D//21. his: hic A//suam spissitudinem: sua spissitudine *rell.*//23. illa: ea W//et: vel W//argenti vivi: mercurii T//

25 non fixorum, aut cum multiplici reiteratione  
 solutionis eius quod ingressum non habet. Est  
 tamen bona cautela ad ingressum rebus impermiscibilibus  
 dandum, ut solvatur corpus de cuius intentione sit per has  
 mutari et alterari, et solvantur res quarum intentionis  
 sit ingredi cum alteratione. Non fiat tamen omnium partium  
 30 solutio, sed quarundam. Dehinc idem et non aliud imbibatur  
 corpus vice post vicem, per hoc enim beneficium in id  
 solum ingressum habet necessario. Non autem in quoquam alio  
 necessario hoc contingit. Ex his igitur modorum ingeniis  
 necesse est rem quamlibet et ingressum quo ex illius nature

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24-5. reiteratione-solutionis: sublevationis reiterationem H//25. solutionis:  
 solutiones A//quod: que D//26. impermiscibilibus: permissibilibus  
 B//27. dandum: tantum A deinde H//28. mutari: immutari PRT//res  
 quarum: quorum W//29. omnium: harum omnium P//30. Deinde idem:  
 Dehinc inde B//et om. T//aliud: aliunde B//31. per: post P//id: illud  
 PRTWH istud B//32. quoquam: quocunque BRWH//alio: alio corpore  
 sed B alio corpore T alio corpore scilicet WH//33. necessario: necessarie  
 T//modorum: medicinarum R//34. et om. BTH//ingressum: ingressum  
 habere BH//quo: que T//

35 beneficio pendet habere et alterare cum permixtione inventa.  
 Per hunc igitur sermonem, decem medicinarum completur numerus  
 cum sue traditionis sufficientia. Restat igitur nos ad  
 tertii ordinis medicinam transire.

<80> Sermo in medicinis tertii ordinis

40 Est autem huius tertii ordinis medicina duplex, scilicet  
 solaris et lunaris. Est tamen in essentia una et agendi modo  
 similiter. Et ideo unica medicina nuncupatur a nostris  
 veteribus, quorum scripta perlegimus. Est tamen additamentum  
 citrinantis coloris que a sulphureitate fixi sulphuris  
 45 mundissima perficitur et substantia differentia inter hanc  
 et illam lunarem scilicet et solarem. Hec

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35. pendet: dependet B om. T//habere et om. A et BH add. habere et mg.  
 A<sub>2</sub>//38. medicinam: materiam A//39. Sermo-ordinis: Sermo generalis de  
 medicinis tertii ordinis P Demedicinis tertii ordinis BRTWHD//40. Est:  
 Post W//tertiū om. ABD//scilicet om. B//41. Est: et est A//et om.  
 BTWH//43. additamentum: per additamentum T//44. citrinantis:  
 citrinitatis B iter. H//que: quod RTW quia D//a om. TD//sulphureitate  
 om. rell.//45. et om. rell.//differentia: differente ex parte in ras. A add. -tia  
 s.l. A<sub>2</sub>//inter: est tamen B tamen est in W add. -ter W<sup>2</sup> est tamen inter H  
 tamen inter D//46. et om. T//scilicet om. T//Hec: ex solaris B//post Hec  
 add. idest solaris medicina A solaris scilicet W solaris H//Hec: huius D//

[81vb] quidem id in se continet, et illa non. Est tamen  
 hic ordo tertius maioris operis ordo appellatus, et illud  
 ideo quoniam maioris sagacitatis industria in illius  
 administratione et perfectionis preparatione et labore  
 5 longiori ad veritatis complementum eget quam cuiuslibet  
 alterius ordinis medicina. Et ideo non diversificatur huius  
 ordinis medicina a secundi ordinis medicina in essentia  
 medicine ullatenus, nisi per subtilissimos preparationis  
 gradus in creatione illius, et per diuturniorem laboris  
 10 instantiam. Et hos gradus omnes narrabimus cum complemento et  
 preparationis modum complete cum causis suis et experiētiis

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1. quidem *om.* W//id: illud PBWH totum T//et illa non: illa vero in sulphure A illa non BTH *om.* R illa vero non W//Est: Et est R in *ut vid.* T Et W//tamen: autem P//2. hic: hec B//maioris: maior W//alt. ordo *om.* T//appellatus: appellatur A nuncupatur W//3. maioris: minoris *in ras.* maioris *s.l.* P//4-6. *pr.* et - medicina *om.* D//5. eget: indiget BWH eius eget T//5-6. quam-medicina *om.* BRTWH//6. Et *om.* H//7. a-medicina *om.* BWH *mg.* T//7. in *om.* PBRT//7-8. essentia-ullatenus: in essentia *in textu add. mg.* ullatenus P *om.* BT essentia nullatenus RD ullatenus in essentia W in essentia medicina nullatenus H//8. preparationis: peractionis D//9-10. in-instantiam: increacione illius per diuturnioris laboris instantiam et per hos preparacionis gradus *mg.* T//9. creatione: seracione B//diuturniorem: diuturnitatis BWH diuturnioris R diuturnitatem D//10. instantiam: instantia B *om.* W *add. s. l. W<sup>2</sup>//Et:* in RBH//post hos *add.* preparacionis R *add.* peractionis HD//omnes: quos omnes BH//complemento: complemento sermonis *rell.*//11. preparationis: peractionis BHD//suis: scilicet D//

manifestis, et modorum gradus administrationis plures huius  
 tertii ordinis. Alio etenim gradu eget solaris medicina in  
 pigmentorum preparatione completa, alio vero lunaris, hec  
 15 quidem sulphuris administratione tingentis eam, illa vero  
 non. Primum igitur administrationis modum lunaris  
 medicine narremus. Et est ut accipias lapidem  
 illius notum et per separationis modum illius purissimam  
 partem dividas et seorsum ponas. Dehinc vero  
 20 eius que purissima est partis aliquid figas, et aliquid ex  
 illa relinquas. Et cum fixa fuerit, solve quod ex illa

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12. et modorum gradus: et modorum gradus *in textu* vel exinde narrabimus gradus *add. mg.* P exinde eorum narrabimus gradus BH et inde eorum narrabimus gradus RD et exinde eorum narrabimus gradus T Exinde horum narrabimus gradus W//post gradus *add.* similiter BTWHD//administrationis: et ministraciones B//13. medicina: materia *in ras.* medicina *add. mg.* P//Alio: Alia B//etenim: enim BRTH//gradu *om.* B//14. completa: completo R//alio: alia BH//15. quidem: quidam B//administratione *om.* T//16. *post non add.* De medicina lunari tertii ordinis P//modum: gradum T modicum D// 17. narremus: narramus BH//ut: scilicet ut BH//19. Dehinc: Deinde WD//20. purissima: purissime BTH//20-1. ex-solve *om.* T//21. illa: illo AW ea BH//

solubile fuerit; quod vero non est solubile ad calcinationem mittas et abhinc super idem solutionem reitera donec iterum quod ex ea est solubile solvatur omnimodo.

- 25 Sic igitur iste ordo reiterando servetur quousque illius maior solvatur quantitas. Post hoc vero solutiones omnes simul commisce et coagula. Dehinc vero leniter assando in ignis temperamento conserva quousque illi maior ad illius exigentiam ignis administrari
- 30 possit. Post hoc vero primum solutionis ordinem serva quousque iterato totum solvatur quod ex ea est solubile. Et

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22. fuerit: fiat T//vero om. T//est om. A//solubile: solubilis D//23. et: et super illud et B et super idem et H super idem et D//idem: illud PRTD//donec om. D//24. ea: eo T//omnimodo: omnimode BRTWHD//25. Sic: Sit T//igitur: ergo BWHD//ordo: ordo calcinationis et solutionis vel totum si possibile est coagulando et B ordo calcinationis et solutionis vel totum si possibile est coagula revertendo T ordo solutionis et calcinationis vel totum si possibile est coagulando WH calcinationis et solutionis vel totum si possibile est coagulando D//26. solvatur: solvetur BH//27. simul om. P//post et add. postea in ras. B//Dehinc: Deinde PBTH//29. post maior add. coagulacio D//30. primum: predictum *rell.*//solutionis: solutionis et calcinationis *in textu* BTWH vel coagulationis *add. s.l.* P//31. iterato om. T//ea: eo APT//Et om. BW//

iterato coagula et iterato in ignis temperamento conserva quousque iterato illi possit ignis maior ad eius perfectionem administrari. Omnes igitur hos ordines preparationis super

- 35 illam quater reitera, et ultimo calcina per suum modum. Et sic pretiosissimam lapidis terram sufficienter administrando rexit. Deinde vero servate partis non fixe cum hac terre parte administrate quantitatem per ingeniorum subtilem coniunge modum per minima. Et sit ingenium hoc
- 40 intentionis levationis eius per modum sublimationis dictum quousque fixum cum non fixo levetur totaliter. Quod si non eveniat, addatur iterato vicissim non fixe partis

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32. *pr.* iterato: et R om. TH//et iterato om. BW//conserva: leniter assando conserva ut prius B conserva leniter assando ut prius TWHD//33. eius: sui W//34. preparationis: preparacionis calcinationis solutionis coagulacionis et in temperamento ignis leniter assando conservacionis BHD preparationis calcinationis solutionis coagulationis et in temperamento ignis scilicet leniter assando conservacionis T preparationis calcinationis solutionis et coagulationis in temperamento ignis conservacionis W//36. terram: partem W//37. servate: servare D//38. hac: huius P// administrate: administrare PD//39. subtilem: utilem *fort.* A//sit om. A fit BH//hoc: huius *rell.*//40. sublimationis: solutionis D//dictum: dandum P om. W deinde D//42. eveniat: adveniat W//iterato: ei iterato PBRWH illi iterato TD//partis: partes B//

[82ra] quantitas quousque ad elevationem illius sufficiat. Cum  
 igitur elevata fuerit, reiteretur illius sublimatio quousque  
 per hanc administrationis reiterationem figatur  
 totum. Cum igitur fixum fuerit, iterato cum non fixe partis  
 5 quantitate post quantitatem combibe per ingenium tibi notum,  
 quousque totum iterato levetur. Igitur iterato figatur  
 quousque fusionem prestet facilem cum ignitione sua. Hec  
 enim est medicina que omne a perfectione diminutum corpus  
 omneque cuiuscunque generis argentum vivum in lunare  
 10 perfectissimum transformat corpus.

**<81> Sermo particularis in medicina ultimi complementi solaris**

Solaris igitur huius generis medicine preparationi non

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1. illius: eius P *om.* W//2. igitur: autem B//reiteretur: iteretur  
 W//sublimatio: sublevatio *fort.* H//3. administrationis reiterationem:  
 administrationem iterationis W //4. fixe: fixi AP//partis: parte T//6.  
 totum *om.* T//iterato: reiterato D//levetur: elevetur T *om.* D//Igitur: Et  
 T *om.* D//iterato *om.* D//7. facilem *om.* W//sua: scilicet AD//8. enim:  
 esse T//que: quod T//omne: omnis P//9. omneque: et omne BWH omne  
 RTD//cuiuscunque: quodcunque D//generis: est generis BH genus R  
 generis est W//argentum vivum: argenti vivi BRH//lunare: lunam BH  
 lune W//10. perfectissimum: perfectissimam BH perfectissime T  
 perfectionem W//transformat: transmutat BRTH transformet W//11.  
 Sermo-solaris *om.* A *add. mg.* A<sub>2</sub> De medicina solari tertii ordinis P De  
 modo administracionis solaris medicine BHD *om.* RTW//12.  
 preparationi: preparatio BTWHD//non *om.* D//

adurentis fit additamentum sulphuris per modum figentem et calci-  
 nantem cum astutie industria administrati perfecte, atque solutionis  
 15 modum multiplicem cum reiteratione multa quousque mundum fiat, h  
 quidem administratione perfecta perveniente que  
 per sublimationem perficitur. Et est scilicet huius  
 additamenti modus per reiterationem partis non fixi lapidis  
 sublimationis cum ingenio coniungendi per minima quousque  
 20 elevetur cum ea. Et iterato figatur cum illa ut stet. Et  
 quanto huius complementi ordo reiteratur pluries, tanto et  
 huius exuberantia medicine multiplicatur magis, et illius

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13. fit: sit PBH fit per T//14. administrati: administrata BH administrante  
 W administrari D//solutionis: per solutionis et sublimationis W//15.  
 modum: per modum T//cum reiteratione: reiterationem T//mundum:  
 mundum *in textu* vel humidum *add. mg.* P//15-6. multa-quidem *om.*  
 T//16. *post* quidem *add.* id est fixioni et solutioni A//perfecta: perfecte R  
*om.* D//16-8. administratione-reiterationem *mg.* T//17. sublimationem:  
 sublevationem *ut vid.* H//*post* perficitur *add.* sublima fixa solve non  
 solutum calcina et solve quousque etc. et coagula solutiones et coagolatum  
 ... temperamento conserva leviter assando ... maior ignis ad eius  
 perfectionem administrare ... *mg.* P ergo sublima fixa solve non solutum  
 calcina et solve quousque etcetera et coagula sublimationes et coagolatum  
 in igne temperato conserva leniter assando quousque illi possit maior ignis  
 ad eius perfectionem administrari D//Et *om.* BH//19. sublimationis:  
 ublimationis *in textu* vel solutionis *add. mg.* P solutionis vel sublimationis T  
 solutionis D//coniugendi per minima: coniugendi A coniugendi per  
 minimam B iugendi per minima T//20. figatur cum illa: cum ea W//ut  
 stet *om.* T stet W//21. huius complementi ordo *iter.* H//et *om.* D//21-2.  
 et huius *om.* BH huius W//

magis augetur bonitas, et multiplicatur illius augmentum perfectionis maxime. Et nos quidem, ne mordeamur ab impiis, 25  
narramus totum huius magisterii sub brevitate sermonis completa et nota. Et est illius intentio ut per sublimationem mundetur perfectissime lapis et illius additamentum, et abhinc quidem ingeniorum cum modo volativum ex eis figatur. Dehinc vero fixum volatile fiat et iterato volatile fixum, et totiens 30  
fiat volatile fixum et fixum volatile et volatile fixum quousque fusionem prestat facilem cum ignitione. Et in hoc ordine completur arcanum pretiosissimum quod est super omne huius mundi scientiarum arcanum, et thesaurus incomparabilis.

24. maxime: materie BTH//impiis: invidis W//25. narramus: narremus BWH complementum narremus D//26. sublimationem: sublimationis modum *rell.*//28. ingeniorum cum: cum ingenio R//Dehinc: demum T//29. iterato: iterum BWH//29-31 et-ignitione *om.* A et totiens fac fixum volatile et volatile fixum *mg.* quousque scilicet prestat fusionem facilem cum ignitione *in textu* P//30. fiat - *pr.* et: fac//31. *in om.* W//32. ordine *om.* R//pretiosissimum: preciosum BWH//33. mundi *om.* D//thesaurus incomparabilis: thesauris incomparabile A//

Et tu quidem exerciteris ad illum cum laboris instantia maxima 35  
et cum diuturnitate meditationis immense. Cum illa enim invenies et sine illa non. Et huic quidem medicine reiteratio bonitatis administrationis cum talis cautele industria potest in preparatione lapidis evenire, quousque argentum mutet vivum infinitum solificum et verum lunificum, et non dependet 40  
nisi in multiplicatione illius. Iam igitur laudetur sublimis naturarum deus benedictus et gloriosus qui nobis omnium medicinarum revelavit seriem cum experientia quam illius investigationis bonitate et nostri laboris instantia perquisimus. Et oculo perquisivimus et

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34. ad illum *om.* BWH//maxima: maxime T//36. huic: hic *in textu* alius huic *add. mg.* P huius T//quidem: quoque A//reiteratio: iterate B iteratio TW reiterato H//37. bonitatis: et bonitas Tadministrationis: administratione BH//cum: ex BWH *om.* T est D//talis *om.* RT tali WH//cautele: cum cautele D//38. preparatione: preparacionem BT//argentum: mercurius T//mutet: mutes BWH *om.* mutet T//39. vivum: vivus T//infinitum: *non legitur* T in infinitum BWH et infinitum D//solificum: et solificum P//verum: in verum W//non *om.* A hoc non BTW//40. in: ex BRTWH//multiplicatione illius: multiplicatione illius *in textu* sive multa iteratione illius preparationis *add. mg.* P multa reiteracione illius scilicet preparacionis B multiplicitate illius melius dicitur multa reiteracione illius scilicet preparationis W multitudine illius melius dicitur multa iteratione illius scilicet preparationis H multitudine illius melius dicitur multa iteracione illius preparationis D//*post* illius. *add.* In hoc capitulo refert auctor gratias deo altissimo P//igitur: enim T//sublimis: deus sublimis T//41. naturarum: martirum vel mirabilis BH//43. seriem: sermonem RT//illius: investigavimus B//investigationis: instigationis P investigavimus W//nostri: nostre B//44. perquisimus: perquisivimus D//perquisivimus: vidimus D//



[82rb] manu tetigimus complementum illius nostro magisterio  
indagatum. Sed et siquidem hanc palliavimus, non  
miretur doctrine filius. Non enim palliavimus sed malis  
et improbis, eam enim tali sermone tradidimus quam latere  
5 insipientes necessario contingit, et eodem ad illius  
inventionis perquisitionem prudentes allici. Filii igitur  
doctrine, perquirite et hoc excellentissimum dei donum  
vobis solis servatum inveniatis. Filii insipientis  
nequitiæ et malivole pravitatis immense, ab hac scientia  
10 fugite, quoniam vobis est inimica et adversaria et vos in  
miseria paupertatis constituet, quoniam vobis penitus hoc  
dei donum a divine prudentie est occultum iudicio

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1. manu *om.* W *add. s.l.* W<sup>2</sup> viam D//illius *om.* B//2. et: etiam B//2.  
palliavimus: palliamus D//3. palliavimus: palliamus HD//malis: magis  
malis T magis D//4. et *om.* D//eam: et eam BH//tradidimus: tradimus R  
tradimus vel tradidimus HD//quam: quem A//5. contingit: accidit  
D//eodem: heedem A eo BH//6. igitur: ergo BWH// allici: eliciatur B  
eliciet T alliciat H//7. perquirite: perquiretis R//8. vobis: in vobis T non  
D//solis: solum BH// insipientis: insipientes T//9. nequitiæ: et nequitiæ  
T//pravitatis: parvitatis A//10. quoniam: quia *rell.*//vobis: nobis D//vos:  
nos D//11-2. quoniam-constituet *om.* BH//11. vobis: nobis D//12. a: ad  
B//prudentie: providentie TW//occultum: occultatum RW//iudicio:  
iudicium D//

et denegatum omnino. Perquisitis igitur omnium medicinarum  
modis, nostri propositi prosequentes initium, ad eas que huius  
15 magisterii perfectionem notificant cum probationum  
causis abhinc transeundum industrias.

<82> Sermo particularis in cineritio

Perquisitis igitur manifestis experienciis de quibus  
narrationem non facimus, cum omnibus sint note et certe absque  
20 illius sagacitatis ingenio, ponderis scilicet

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13. omnino: omnino. Explicit liber sextus. Incipit septimus. Prohemium ad  
summam intentionis huius libri est de examinationibus per que cognoscitur  
utrum magisterium in perfectione consistit P *om.* W // igitur: enim B//14.  
initium: initium industria B//eas: ea BWH//14-6. ad-industrias: abhinc  
transeundum est ad ead industrias que huius magisterii perfectionem  
monstrant cum probationum causis R abhinc transeundum est ab eis ad  
eas industrias que huius magisterii perfectionem monstrant vel notificant  
cum probationum causis T//16. transeundum: transeundum est  
BHD//industrias *om.* BWH//17. Sermo-cineritio *om.* P Explicit  
liber quintus. Incipit liber sextus de probationibus quibus probatur utrum  
magisterium sit in perfectione B Incipit ocatava pars principalis de  
quibusdam ingeniis huius artis per que cognoscitur utrum magisterium sit  
in perfectione R Prohemium ad quedam ingenia huius artis per que  
cognoscitur utrum magisterium sit in perfectione TW Prohemium ad  
quedam ingenia huius artis per que liber sextus cognoscitur utrum  
magisterium sit in perfectione H Prohemium ad quedam ingeniali artis per  
que cognoscitur utrum magisterium sit in perfectione D//18. Perquisitis:  
pretermisissis BRTWH exquisitis D//igitur *om.* D//19. facimus: fecimus  
BWH//sint: sit H sunt D//20. illius: ullius BRTH//sagacitatis:  
fatigationis et sagacitatis A//20. scilicet *om.* BWH//

et coloris et extensionis per malleum, per artificiorum  
 experientias tentemus cum cautela an sit  
 huius artis administrationis proiectio complementum  
 cum veritate adducens, que sunt scilicet cineritium,  
 25 cementum, ignitio, fusio, super vapores acutorum expositio,  
 extinctio, adurentis sulphuris mixtione  
 probatio, calcinationis et reductionis reiteratio,  
 et argenti vivi facilis aut difficilis susceptio.  
 Primum quidem a primis secundum ordinem incoandum, dehinc vero  
 30 secundum eundem ad alia secundum promissionem perfecte  
 curramus cum causis eorum notis.

**< 83 > Sermo specialis in consideratione examinis perfectionis  
 magisterii, scilicet cineritii**

Dicimus igitur sermonem in cineritio cum omnibus suis  
 35 causis manifestis et sue fictionis modo. Est igitur sola

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21. *pr. et om. R//alt. et om. B//extensionis per malleum: malleationis PR  
 malleationem et malleationis T//22. tentemus om. D//23. artis: operis seu  
 artis A//24. cum veritate: et veritatem R//adducens: adduces A//25.  
 cementum om. T//vapores: vaporum W//26. mixtione: immixtione  
 PBTWHD immistio R//27. reiteratio: iteratio PRW//29. Primum om.  
 T//quidem a primis: ergo ad primum BH igitur a primis RD a primo ergo  
 T igitur ad primum W//incoandum: est incoandum BH// 30. secundum  
 eundem om. T secundum D//ad: et B om. D//perfecte: perfective R//31.  
 curramus: queramus BRTWH curamus D//32-3. De examine corporum  
 per cineritium P Sermo in cinericio BTWH Sermo in cinericiis R Primus  
 sero super cinericium D//35. et sue: in B//fictionis: perfectionis W  
 fictionis H//*

lunaris atque solaris substantia in cineritii perdurans  
 examine. Perquirentes igitur horum corporum perfectorum veras  
 substantie differentias et causas similiter cineritii  
 scilicet quare quedam magis, quedam vero minus in huius  
 40 magisterii examine a perfectione diminutorum perdurent  
 perscrutabimur. Est tamen a nobis sufficienter narratum horum  
 duorum secretum corporum in sue profundo substantie, et est  
 scilicet quoniam illorum prima radix multa fuit argenti vivi  
 quantitas et purissima illius essentia et subtilissima prius,  
 45 inspissata vero postea donec cum ignitione fusionem suscipiat.

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36. atque: aut R et W//39. *pr. quedam: quod B//alt. quedam: quod  
 B//40. post magisterii add. commixto B//perdurent: perdurant BTH//41.  
 perscrutabimur: percunctavimus B percunctabimus RW investigabitur T  
 percunctabimur D//42. sue: suo RTWHD//45. vero om. W//fusionem:  
 fusionis D//*

[82va] Quecunque igitur a perfectione diminuta plus terreitatis habent,  
 minus vero in hoc perdurant examine; quecunque vero minus,  
 plus, quoniam hec quidem adherent propter eorum partium  
 subtilitatem, maxime se permiscentem et unientem. Et que  
 5 similiter maioris sunt tenuitatis corpora aut econtra quidem  
 que maioris spissitudinis corpora quam que in perfectione  
 constituunt necesse est de commixto separari omnino, quoniam  
 non sunt eiusdem fusionis, et ideo separantur.  
 Et que quidem minore sunt argenti vivi quantitate  
 10 participantia facilius de commixto separentur. Patet igitur  
 quod cum multe terreitatis sit saturnus pauceque argenti vivi

1. Quecunque: Quicunque B//igitur: ergo B//habent: sint P habeant R//2. *pr. vero om. rell.*//hoc: hee D//alt. vero om. W//3. hec: hee D//quidem om. T//adherent: magis adherent PBT magis adherat R//4. *se om. W//5. post sunt add. mg.* liquefactionis T//tenuitatis: tenuitatis vel duorum corporum B tenuitatis ut duorum corporum TWH tenuitatis ut duorum plumba D//quidem om. BRT//5-6. quidem-corpora om. P//6. corpora: corpora ut mars et venus BTWHD//alt. que om. D//9. minore: minorem PTWH maiorem BD//quantitate: quantitatem PBWHD om. T//10. participantia: percipientia W// igitur: ergo W//pauceque: pauce W//

quantitatis facilisque liquefactionis tenuitatisque,  
 que maxime a perfectionis examine cineritii sunt opposita,  
 ideo et saturnus inter cetera corpora minime in cineritii  
 15 artificio in commixto perdurat, immo citissime separatur et  
 cedit. Ideoque cum inter cetera a perfectione diminuta  
 corpora magis cedat, ideo per hoc magis proprium est ad huius  
 magisterii examen. Et illud ideo, quoniam citius cedit, et  
 citius imperfectorum unumquodque secum de commixto trahit. Et  
 20 propter hoc salvatur maior perfecti quantitas ab ignis  
 examinis combustionem forti - quoniam non quiescat spatio  
 temporis longo perfectum consumptioni examinis - et ideo ex eo

12. tenuitatisque: tenuitatis AP tenuitatis quoque BH //13. a om. BRTWHD//examine: examinis BH examini TW//14. et om. BTWHD//cineritii: cineritium A//15. immo: ideo W//perdurat: perdurans D//immo citissime: imotissime D//16. cedit: rededit BW//17. cedat: cedant A recedat W//ideo: ideoque PWHD//ad om. A//17-8. huius-examen: vias operis scilicet magisterii examen W//18. *post examen add.* accedere BH//quoniam: quoniam cum A//cedit: cedat A cedet P//19. unumquodque: omnium quoque corporum B unumquodque corporum H//20. salvatur: salvator D//examinis: examine B//21. quiescat: quiescit PBWH//22. longo: longi BWH//perfectum: imperfectum quin cum T//consumptioni: compressionem vel consumptioni B consumptionis R consumptionem vel consumptioni H consumptionem D//et ideo: evanescat et ideo T//eo: illo rell.//

per plumbi examen minus comburitur et facilius depuratur.  
 Quia vero iovis substantia pluris argenti vivi capax existit  
 25 et minoris terreitatis quantitate maiorive puritate  
 illius atque subtiliori substantia participans, ideo magis  
 in commixto salvatur quam saturnus et venus, quoniam magis  
 commixto in profundo adheret. Et ideo est causa hec quare  
 multa perfecti deletur quantitas priusquam ab illo separetur  
 30 coniunctum. Venus vero fusionem cum ignitione prestat, sed  
 quia tardior est illius quam perfecti fusio, ideo separatur  
 de commixto tardius quam saturnus propter ignitionem

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23. per plumbi examen: plumbo examine B plumbi examine TWH//24.  
 vero: ideo D//substantia: substantie P om. W//vivi: vivi quantitatis  
 BTWH vivi quantitas D//capax: compax H corpore D //existit: extitit  
 AP//25. maiorive: maiorisve BRWHD om. T//puritate: puritatis  
 BRTWH//26. substantia: subtilitate PBRTWD subtilitatem H//28.  
 commixto: in commixto BRTH om. W in commixto et D//in profundo  
 om. T//Et om. W//ideo: id D//hec om. W//29. perfecti: perfectionis  
 A//deletur: tenetur B om. R consumitur T//separetur: separatur  
 BH//30. coniunctum: coniunctus A commixtum BT//31. tardior:  
 tardiozem D//est om. D//quam perfecti: et perfecta R//32. quam:  
 tamen quam APRTWD//propter: quoniam in ras. propter add. mg.//

substantie sue fusibilis. Quia vero minoris est argenti vivi  
 quantitatis quam iupiter et maioris terreitatis et substantie  
 35 spissioris, ideo facilius quam iupiter de commixto tollitur,  
 quoniam in profundo magis iupiter quam venus adheret.  
 Mars vero fusionem rectam non habet et ideo non permiscetur,  
 quod propter sue humiditatis privationem contingit. Sed etsi  
 ignis propter vehementiam illum permisceri contingat, quia  
 40 humiditatem non habet, lune aut solis humiditatem  
 combibendo, ei per minima unitur et ideo - licet terreitatem  
 multam et argenti vivi paucitatem et fusionis  
 carentiam habet - non separatur ab eis per artificium

---

33. vero: nec D//34. Quantitatis: quantitas D//et substantie: ex specie  
 D//37. rectam om. APRTWH//permiscetur: commiscetur P//39. ignis  
 propter: per ignis R//illum: illud RT//40. aut: autem D//41. combibendo:  
 cohibendo A tamen combibendo B//ei: secum BH//minima: minime  
 BH//42. pr. et om. B//43. separatur: separabitur B//

[82vb] leve. Per hoc igitur artificis dilatatur industria ad  
 cuiuscunque corporis rectificationem veram, si recte eius quod  
 scripsimus efficaciam noverit. Si vero fantastice super  
 illud intellectum contraxerit, nihil ex eo veritatis  
 5 cognoscet. Sunt autem duo in hoc perdurantia examine  
 perfectionis corpora, sol videlicet et luna, propter bonam  
 compositionem que per bonam mixtionem resultat et illorum  
 puram substantiam. Narremus igitur modum illius cum maxime  
 nobis sit necessarius in perfectionis huius magisterii  
 10 cognitione certa. Est igitur modus illius ut tollatur cinis  
 cribellatus aut calx aut pulvis ossium animalium combustorum

---

1. Per: et D//igitur: enim BWHD//dilatatur: delatatur D//ad: secundum  
 scilicet T//2. recte: ratione W//quod: qui D//3. noverit: noveris T//4.  
 illud: istud B//contraxerit: contraheris T//veritatis: necessitatis T//5.  
 cognoscet: cognosces T//hoc: hec BD//perdurantia *om.* W durancia  
 D//5-8. Sunt-substantiam *om.* P//6. corpora: corporis T//videlicet:  
 scilicet T//7. mixtionem: commixtionem TW//9. perfectionis: perfectione  
 TW//

aut horum omnium commixtio aut quorundam. Dehinc  
 itaque cum aqua madefiat et super illud prematur  
 manu, et fiat stratum firmum et solidum, et in medio  
 15 stratus fiat fovea rotunda et solida, et super  
 fovee illius fundum spargatur vitri triti quantitas aliqua.  
 Deinde vero exsiccare permittatur, et cum sicca fuerit,  
 ponatur illud de cuius intentione sit tollare huius examen  
 in foveam dictam, et super illam carbonum ignis fortis  
 20 succendatur, et super faciem examinabilis suffletur  
 corporis donec fundatur, quo fuso, saturni partem

---

13. itaque *om.* W//14. stratum-solidum: stratus firmus et solidus W//15.  
 stratus: strati T//16. triti *om.* TD//17. exsiccare: exfigat D//sicca:  
 siccatum PBWHR exsiccatum T//18. ponatur: permittatur *in ras.* D *post*  
*corr.* ponatur D//sit: est BRTWHD//huius *om.* BRTWH//19. dictam: de  
 cinere T//illam: illud BH//20. succendatur: incendatur B//20-1. et-donec  
*om.* T//suffletur corporis: corporis suffletur forti ignitione B suffletur  
 corporis fortis ignitionis H//21. fundatur *om.* T infundatur W//

- post partem proiciamus in illud, et super illud suffletur cum flamma fortis ignitionis, et dum videris illud agitari et moveri motu concussionis forti, non est purum. Expecta
- 25 igitur donec totum evanescat plumbum; quod si evanuerit et non cesset illius motus, non est depuratum. Iterato igitur super illud plumbum proice et super illius faciem iterato suffla donec plumbum separatur. Quod si non quieverit, iterato plumbi projectionem
- 30 et sufflationem in illius faciem procure quousque quiescat et videas illud mundum et clarum in

22. proiciamus: proicies B//illud: id R illum D//23. dum: cum RW//24. concussionis: confusionis W//purum: purus A//25. igitur: ergo BH//quod: Et PT//26. et non: quomodo *ut vid.* D//cesset: cessat RT//illius: ille BH//depuratum: puratum W//28. plumbum: totum W//separatur: separetur D//29. Quod *om.* P//si: si vero P//non *om.* D//29-30. projectionem et sufflationem: projectioni et sufflationi P//30. in: super BH et WD//procurre: reitara BH percurre RTWD//31. videas: tu videris B tu videas RWH cum videris T tu videras D//illud: illum D//mundum: mundatum W//

- superficie sua. Post hoc vero carbones aperi et ignem dissipa, et in faciem eius aquam profunde. Hoc enim perfecte examinatum invenies. Et si quandoque in sufflatione
- 35 huius examinis vitrum proieceris, melius et perfectius depurabitur, quoniam sordes tollit et illas inviscat. Potest tamen loco vitri sal proiici aut baurax aut alumen aliquod. Similiter etiam confici potest huius examen in crucibulo terreo, et in circuitu illius sufflari et super
- 40 faciem eius similiter, ut citius conflatur examinandum. His igitur sufficienter narratis, ad cementi examen transeamus cum causis suis et experienciis manifestis et notis.

33. hoc: hec RD//profunde: perfunde P funde RT//34. quandoque: quando TD//35. proieceris: proicuis *ex parte in ras.* A//36. quoniam: quoniam vitrum BH//37. loco: et loco P//aut baurax: borax aut baurac BH//38. etiam: autem W//confici: perfici *rell.*//potest: post B//huius: hoc BRTHD//examen: examen cinericii *rell.*//39. crucibulo: loco R vase terreo vel crusibolo terreo T//illius: eius BWHD//sufflari: sufflari sulphur T//40. citius: superius BWH aptius R superius cicius T //conflatur: completur B//examinandum: quod examinari debet *rell.*//41. igitur: igitur differentiis T//42. suis et: suis et suis P et suis R //manifestis et *om.* T//

[83ra]

## &lt;84&gt; Sermo particularis in cemento

Dicimus igitur quoniam corpora quedam magis, quedam vero minus per ignis comburuntur calcinationis modum, ut que pluris sunt sulphuris quantitatem combustibilis continentia, magis, que vero minus, minus. Quia sol igitur inter cetera corpora minoris est sulphuris quantitatis, ideo inter cetera corporum omnium mineralium minime per ignis inflammationem comburitur. Luna vero post solem inter omnia corpora reliqua minus est sulphuris quantitate participans, pluris autem quam sol. Igitur minus potest secundum hoc inflammationis ignitionem longo temporis spatio tollerare quam sol, et res per

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1. Sermo-cemento: De cementi examine P Sermo in cementi examine BRWH De cemento T Sermo in cementi examine secundus. Rubrica D//2. quoniam: quia W//2-3. quedam vero minus *om.* R//3. comburuntur: comburitur B//ut: et W//4. sulphuris: sulphureitatis BWHD//quantitatem: quantitate R// continentia: participantia vel continentia W//magis *om.* AD//post magis *add.* per ignis inflammationem comburuntur R//5. Quia: Quod D//corpora: corporum W//6. cetera *om.* APRD//corporum: corpora D//7. mineralium: naturarum AR numerum P//ignis *om.* W//8. minus: minoris BWH//9. sulphuris: sulphureitatis W//quantitate: quantitatis BH quantitate W//autem: tamen W//10. Igitur: igni D//11. longo *om.* P//

consimilem comburentes naturam minus. Venus, quia sole et luna pluris est sulphuris et terreitatis maioris, ideo minus inflammationem illis tolerat. Iupiter vero minus venere, plus vero sole et luna sulphureitate et terreitate participat, et ideo minus per inflammationem venere comburitur, plus vero sole et luna. Saturnus vero plus terreitatem et sulphureitatem per naturam in commixtione servavit quam nunc dicta corpora, et ideo citius et facilius omnibus nunc dictis inflammatur corporibus, et per inflammationem comburitur velocius. Non autem consumitur velocius propter hoc - quod sulphureitatem

---

12. consimilem: similem D//quia: autem quia P que B//sole: in sole A//13. sulphuris: sulphureitatis BWH//ideo: et ideo P//14. illis tollerat: illi tollereat R//venere: veneris T//16. vero *om.* BH//17. terreitatem et sulphureitatem: terreitate et sulphureitate ABWHD//19. inflammatur: inflammetur P//20. et *om.* R//facilius: velocius W//

maxime habet coniunctam et iove magis fixam. Mars vero non  
 per se sed per accidens non comburitur. Cum enim multe  
 humiditatis miscetur corporibus, combibit illa propter sue  
 25 humiditatis carentiam, et ideo coniunctus non inflammatur  
 neque comburitur, si non inflammabilia neque combustibilia  
 sint corpora sibi unita. Si vero combustibilia sint illi  
 commixta corpora, secundum naturam sue combustionis necessario  
 evenit martem et comburi et inflammari. Cum igitur ex rebus  
 30 constituatur inflammabilibus cementum, patet causa illius  
 inventionis necessaria, et fuit scilicet ut omnia

---

22. coniunctam: commixtam T//23. non *om.* BRTH//24. miscetur:  
 commiscetur *rell.*//25. et *om.* BH//ideo: iam T//26. *post* comburitur *add.*  
 Cum enim *in ras.* A//non: nec P//combustibilia: incombustibilia B//27.  
 sint: sunt D//unita: iuncta vel unita T iuncta H//*post* unita *add.* si vero  
 combustibilia corpora sint sibi unita *in ras.* P//illi: sibi B//*post* illi *add.*  
 unita *in ras.* B//28. commixta: coniuncta RT//28-9. necessario evenit:  
 necesse est evenire PR necessario est evenire BTWHD//29. *pr.* et *om.*  
 BTH//comburi: combureri *ut vid.* A//rebus: omnibus rebus T//30.  
 cementum: cementi A cementum et P//causa illius: causam eius T//31. et  
*om.* T//fuit: sunt R *om.* T//scilicet *om.* T//omnia: vero omnia P//

combustibilia adurerentur. Cum igitur unum solum sit corpus  
 non combustibile, solum igitur illud aut ad illius naturam  
 preparatum in cemento salvatur. Durant tamen quedam magis,  
 35 quedam vero in cemento minus; que vero magis et que minus  
 nota sunt cum causis dictis. Durat  
 igitur plus luna, minus vero mars, adhuc vero  
 et minus iupiter, minus vero et adhuc venus, minime  
 vero saturnus. Narremus igitur modum cementi cum in  
 40 cognitione nobis sit maxime necessarius in perfectionis  
 examine. Dicimus igitur quoniam illius est compositio ab  
 inflammabilibus rebus

---

32. adurerentur: adurantur BTH *add. s.l.* W<sup>2</sup> comburerentur R *om.*  
 W//igitur *om.* R//unum: nisi D//33. non combustibile: combustibile B  
 incombustibile RTH//illud aut *om.* BH//ad *om.* T//34. preparatum:  
 preparatam P illud preparatum BH//salvatur: solvatur ABWD servatur  
 T//quedam: quidam B//35. quedam: quidam B//vero *om.* H//minus:  
 vero minus T//36. cum causis: in capitulis B//*post* causis *add.* suis iam *in*  
*ras.* P//Durat: durant R//37. igitur: enim T//luna: es T//37-8. vero et  
*om.* W vero RT//38. vero et *om.* BT et W vero H//39. igitur *om.* B//39-  
 40. in cognitione: ignitione *in textu* ABH *co-add. mg.* A cognitio *ut vid.*  
 W//40. necessarius: necessarium RT necessaria W//



[83rb] Et sunt huius generis res omnes denigrantes et fugientes  
 et penetrantes et comburentes, sicut est vitriolum,  
 sal armoniacus et eris flos et lapis figuli antiquus  
 contritus, et sulphuris minima quantitas aut nihil, et virilis  
 5 urina et similibus acutis et penetrantibus. Incementantur  
 igitur hec omnia cum urina virili et super illius tabellas  
 tenues de cuius sit intentione probationis huius examinis  
 iudicio percunctari. Dehinc vero in fictili concluso vase  
 10 super cratem ferream extendantur tabelle ita tamen quod una ex  
 eis alteram non tangat, ut libere ignis virtus ad illas

---

1. res *om.* R//3. armoniacus: armoniacum B arsenicum H//*alt.* et *om.*  
 W//figuli: singuli B//4. contritus: et contritus W//*alt.* et: et etiam BW et  
 est D//virilis: virili *ut vid.* H//5. similibus - penetrantibus: similia acuta et  
 penetrativa BH//6. hec omnia: omnes T//et *om.* P//7. sit *om.*  
 A//probationis: pro bonis B//huius: hoc B//examinis: examinari A  
 examine T examinacionis H//8. iudicio: iudicium T//percunctari:  
 percuncteri B//Dehinc: deinde P ponantur dehinc BH//9. cratem: trabem  
 BD *in textu* W alius cratem *add. s.l.* W<sup>2</sup> strabem H//tamen *om.* B//una:  
 cum una B//10. tangat: tegat APD//

percurrat equaliter. Et sic triduo in igne forti conservetur  
 fictile. Cautela tamen adhibeatur ut igniantur  
 tabelle sed non fundantur. Post tertiam autem diem  
 tabellas omni mundas impuritate inuenies, si in perfectione  
 15 illarum extiterit corpus. Si vero non, corruptas omnino  
 et calcinatione combustas. Quidam tamen ad inflammationem  
 tabellas absque cemento componunt et depurantur  
 similiter si perfectionis sint corpora. Si vero non,  
 20 comburuntur omnino; longiori tamen combustionis spatio in hoc  
 ultimo egent examine quod sola ignis inflammatione perficitur  
 quam que cementi examinantur iudicio. Sed cum luna quidem

---

11. in *om.* RWD//forti: forte D//12. Cautela: cautelam B//igniantur:  
 igneantur T//13. autem: vero H//14. omni: omnium B//omni-impuritate:  
 omnimodas emundatas in veritate T//15. illarum: illorum BH//16.  
 calcinatione: conculcatione T//Quidam: Quedam T//tamen: tamen  
 ponunt BWH//17. absque: absque compositionum P compositionis  
 T//componunt: ponunt PT compositione BH compositionum  
 RW//depurantur: depurant R//18. sint: sit H//corpora: corporis  
 APWHTD//19. longiori: longioris BH//spatio: separatio A//20. quod: et  
 R *om.* W//sola-perficitur *om.* W//21. examinantur: examinatur PBHD//

solis nature non multa distet differentia, pauco  
 administrationis modo in iudicio cum illo quiescit. Et neque  
 separatio corporum fit ab invicem in his duobus examinis  
 25 generibus nisi per diversitatem compositionis substantiarum  
 eorum, quoniam ex ea resultat fusionis diversitas et  
 spissitudo et raritas, que quidem separationis sunt cause,  
 quoniam propter fortem illorum compositionem non corrumpitur  
 illorum substantia a substantia corporis extranei, quoniam non  
 30 fiat illorum per minima mixtio. Et ideo necesse est illa de  
 commixto a seinvicem separari sine corruptione totali illorum

---

22. nature *om.* R natura T//multa: multum PT//distet: distat T//pauco:  
 pauca BH//23. administrationis: administrationi D//24. ab invicem:  
 adinvicem B//in: cum W//his: ignis T//examinis: examinationis RT//25.  
 nisi per: nisi propter PBRHD non ut T non propter W//26. eorum: eorum  
 corporum BH earum. W//ea: eo D//27. spissitudo: sic spissitudo  
 R//cause: hodie D//28. propter *om.* P//29. illorum: illorum illius H//*pr.*  
 substantia *om.* B//a substantia: albus a A//quoniam: cum D//30. illorum:  
 illorum corporum T//*post* illorum *add.* super minima *in ras.* A//per: et  
 per A//mixtio: commixtio T//31. a: ad PT//separari: separatio T  
 separare D//sine: omnino sine H//

essentialium. Quamobrem igitur administratio corporum  
 imperfectorum completa dignoscitur cum eiusdem fusionis,  
 ignitionis, et soliditatis administrationis que refecta  
 35 sunt ingenio.

<85> Sermo particularis de ignitione

Restat igitur capitulum de ignitione tradere. Dicimus  
 igitur quoniam corpora maxime perfectionis cum ignitione  
 determinata reperta sunt ignem suscipere ante fusionem  
 40 illorum. Et ideo dicimus si alterationem illorum completam  
 adinvenire conamur, necesse est ad fusionem illorum corpora  
 administrata redigere. Et est scilicet ut priusquam  
 fundantur perfectionis corpora, ignitionem

---

32. essentialium: essentie *rell.*//33. dignoscitur: dinoscitur D//34.  
 ignitionis: et ignitionis *rell.*//et *om.* A//que *om.* BRTWHD//  
 administrationis: administratione R//refecta: refecta vel reperta BWH  
 recta RT refecta alius reperta D//35. sunt *om.* T//36. Sermo-ignitione:  
 De examine per corporum ignitionem P Sermo in ignitionis examine  
 BWH Sermo in examine ignitionis RT Sermo in ignitionis examine  
 secundus D//37. Restat-tradere: Trademus autem nunc ignitionis  
 capitulum et RT igitur: igitur ut PBWHD//de ignitione: ignitionis  
 W//tradere: tradamus PBWHD//38. igitur *om.* RT//39. sunt: sint  
 P//40. *pr.* illorum: aliorum R illarum T//completam: completa H//41.  
 adinvenire: advenire W//illorum: eorum T//42. Et: Et fusio A *om.*  
 T//est *om.* T// scilicet ut: scilicet B ita scilicet quod T//42. priusquam:  
 postquam P *om.* T//43. fundantur perfectionis corpora *om.* T//  
 ignitionem: ignem seu ignitionem A//

- [83va] suscipiant cum inflammatione celestini coloris  
 amenitatis priusquam perveniat illorum ignitio  
 ad albedinem ignis quam non possit oculus conspicerere quidquam.  
 Patet igitur ignitionem illorum perfectam compleri  
 5 ante fusionis actionem cum rubore intenso, et non  
 cum albedine quam non possit conspicerere oculus. Si enim prius  
 quam igniantur administrata fundantur corpora, in complemento  
 non sunt. Si vero et igniantur cum labore ignis  
 expressionis fortis, non est illorum administratio vera.  
 10 Et hoc quidem in mollibus, idem vero in solo contingit marte  
 colligi. Non enim non ignibilia defacili ignitiones

---

1. cum inflammatione *om.* T//2. amenitatis: et amenitatis  
 BTWH//perveniat *om.* T adveniat W//illorum: eorum P//3. quam:quem  
 W//3-6. quidquam-oculus *om.* T//5. ante: aut D//fusionis actionem:  
 fusionem PBRWHD//6. oculus: oculo D//6-7. priusquam: prius *in textu*  
 quam *mg.* A//8. et *om.* BTH//igniantur *om.* T//labore: laboris R labore  
 et D//ignis: in ignis B et ignis WH//9. expressionis: expressione BRWH  
 impressione T//fortis *om.* B//10. quidem: quoque PBWHD//idem: illud  
 RW id D//contingit: contingi D//11. *pr.* Non: corpora R//*alt.* non *om.*  
 T//ignitiones: ignitionem PBWH ignitionis RTD//

- preparationis modo suscipiunt, neque non fusibilia fusionem  
 rectam quam in perfectis secundum naturam invenimus. Et  
 si cum ignitione flammam amenitatis celestini  
 15 non protendunt coloris administrata, non est  
 completa administratio. Et si minuatur  
 aliquid pendens ex preparatis differentiarum bonitatis  
 inventum astutia, non fuit sufficiens artificis indagatio.  
 Reiterato igitur inquiret donec inveniat  
 20 cum modis divina bonitate collatis.

< 86 > Sermo particularis in fusione

In fusionis igitur narratione sufficientiam  
 tradamus secundum quod examen est ipsorum omnium corporum

---

12. preparationis: preparationem T//modo: modum B modicam  
 T//suscipiunt: suscipiet H suscipiat D//neque: et R *om.* H//13. in  
 perfectis: imperfectionis A//15. protendunt: portendunt APT portendant  
 R pretendant W protendant D//16. minuatur: minuitur PRTW//17.  
 pendens *om. rel.*//preparatis: preparati A preparatione preparatis T//18.  
 astutia: astutiam T//sufficiens: fusionis sufficiens W//19. Reiterato:  
 reiteratio A Reiteret H// inquiret: inquiret B et inquiret H//inveniat:  
 inveniant A//21. Sermo-fusione: De examine per corporum fusionem P  
 Sermo in fusionis examine BWH Sermo in examine fusionis RT Sermo in  
 fusione Rubrica D//22. In-sufficientiam: Fusiones narrationem  
 sufficientem W *om.* H//igitur *om.* B//23-4. tradamus-certam *om.* H//23.  
 tradamus: tradimus P//secundum-corporum *om.* T//ipsorum *om.*  
 PR//corporum: corpora D//

- ad cognitionem illorum certam. Dicimus igitur quoniam unica
- 25 est perfectionis fusio, cum ignitione scilicet et non cum  
cuiuscunque ignitionis genere, sed cum ignitione in  
qua non albescit omnino corpus, et cum ignitione in qua non  
sit fuscedo igni adveniens, et in qua non subito  
post ignitionem fundatur et liquescat corpus ut fluat.
- 30 Igitur cum se fuderit corpus ex minima ignis pressione  
debilis aut sine ignitione, aut cum ignitione  
fusca, huius preparationis necesse est corpus imperfectionis  
unum esse quodlibet imperfectorum in artificio diminuto.

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24. cognitionem: cognitiones P ignitionem RT//illorum om. T//25.  
scilicet: sua scilicet PT//25-6. et-ignitione om. R secundum quod examen  
est ipsorum omnium T//alt. cum om. W//26. cuiuscunque: cuiusque A  
cuiusque D//ante ignitionis add. generis A//genere: essentia in ras. A  
genere mg. A<sub>2</sub> in genere W//27. non - qua om. D//cum: cum nec  
T//ignitione: ignitione gravi ut vid. T ignitionis genere scilicet cum  
ignitione H//ante in add. sed cum ignitione T//28. sit: fit BR//igni: igitur  
D//et om. BTWHD//in qua non subito om. T//29. post ignitionem om.  
PR//liquescat: liquescit T//fluat: fruatur D//30. se om. W//minima: nimia  
BTWH//pressione: impressione PT expressione R//32. necesse:  
necessarie T//corpus: est corpus T//33. unum esse quodlibet: esse  
unumquodque RTWHD//in: corporum in PBRHD//

- Et si post fusionem infrigidari omittatur, et omnino
- 35 subito in nigredinem illius vertatur ignitio,  
et ab hoc quidem priusquam durescat  
ignitionem perdat, non est in complemento corpus cuiuscunque  
generis illud extiterit. Sed iudicari quidem expedit  
mollitiei hoc corpus existere ex imperfectionis
- 40 corporum generibus. Et siquidem cum ignis laboriosa  
expressione fortis violenti fiat illius ante fusionem ignitio  
et radio fulgoris inestimabilis albescentis,  
omnino iam non perfectionis, sed duritiei alteratum est

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34. infrigidari: infrigidare B infrigidum R//omittatur: dimittatur PWH  
permittatur BT//35. subito: subito in nigredinem colorem A//vertatur:  
iteratur B//ignitio om. T ignitione W//36. et om. RT//ab: ad BWH om.  
T//36-7. hoc-perdat om. T//38. Sed: si W//quidem: quod P//iudicari:  
indicare D//39. hoc: huius W//corpus: et corpus T//40. siquidem: -c- add.  
s.l. A//ignis: ignicionis B//laboriosa: lariosa A laboriose B//41.  
expressione forti: impressione et fortiter T//violenti: violenta PW  
violencia BRTD et violentia H//fiat: stat T//ante: autem T//42. et: cum  
T//inestimabilis: exterminabilis ut vid. H//43. omnino: omnia  
W//perfectionis: imperfectionis B//

[83vb] corpus. Et ab hoc quidem si post illius fusionem ab igne  
 tollatur et subito induretur ut non fluat, manente  
 illius ignitione fulgida, iam non lunaris aut solaris  
 perfectionis corpus existit, cuiuscunque generis et  
 5 preparationis corpus fuerit administratum, sed sub martis  
 differentiarum natura ponatur. Patet igitur ex iam dictis  
 triplicem in fusibilibus ignitionis ante liquefactionem  
 substantiarum illorum experimento recolligi gradum -  
 unam scilicet fuscam, alteram vero rubeam claram, tertiam  
 10 vero albissimam radio fulgentem. Prima quidem

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1. ab hoc: adhuc BH//igne: ille P//3. ignitione: fusione T//lunaris aut solaris: lunare aut solare H limans D//4. existit: extitit T//et om. BW//4-5. cuiuscunque-fuerit om. H//5. preparationis: perfectionis W//sed sub martis: sub veritatis differentiarum natura ponatur alius sub martis differentiarum natura ponatur D//6. dictis: dictis fusionibus R//7. in fusibilibus om. R//ante: artem *in ras.* autem B aut T//liquefactionem: liquefactionis TD//8. illorum: illarum RT//recolligi: colligi RT//9. unam scilicet fuscam: unam scilicet ignitionem fuscam BWH unam quidem ignitionem scilicet T// alteram: altera B//10. vero om. BRTWH//quidem om. B//

est mollium, secunda vero perfectorum, tertia vero durorum  
 corporum rationis experimento probatur. Sed qui harum  
 omnium ignitionum desiderat gradum perquirere, omnia fusibilia  
 confluet corpora et ignis consideret sufficientiam ad fusionis  
 15 perfectionem completam, et considerando recolligat omnium  
 signorum fusionis gradus differentiam,  
 et sic quidem inveniet, aliter vero non. Et hoc quidem tibi  
 adducatur exemplar in omnibus a nobis determinatis atque  
 determinandis examinationis manieribus. Et hec itaque de  
 20 fusione dicta sufficiant.

---

11. *pr. vero om.* PBTWHD//perfectorum: perfectorum corporum PRTWH//*alt. vero om.* BRTWHD//12. corporum om. BRTWHD//qui: quoniam A et qui D//harum: horum BRTWH//13. ignitionum om. BWH ignitionem R ignitionis T//gradum: gradu R//14. confluet: conflux A sufflet P compleat R//et: et ad T//fusionis: fusionem W//15. perfectionem: perfectionis B om. W// recolligat: recolligit T//16. gradus: gradum W//17. *pr. et om.* B//vero: autem R//18. exemplar: exemplarum B//atque: et R aut T//19. determinandis: determinandum T//manieribus: cineribus B//itaque: quidem B//19-20. de fusione om. B//

<87> Sermo particularis in expositione corporum  
super acutorum <vapores>

Prosequentes igitur sermonis complementum, de corporum  
expositione super acutorum vapores narremus. Dicimus igitur  
25 quoniam perfectionis videmus corpora super acutorum vaporem  
exposita - acrium videlicet ponticorum et acetosorum similiter-  
-omnino aut nihil florere, aut amenissimum celestinum  
emittere. Sed solem quidem purissimum non florere, lunam vero  
aut solem non purum super acutorum vapores exposita florere  
30 comperimus et celestinum amenissimum - amenius tamen solem quam  
lunam - emittere. Et ob hoc igitur naturam imitantes et nos  
similiter in preparatis colorem celestinum creemus corporibus,  
qui per argenti vivi bonitatem perficitur, ut sufficienter a

---

21-2. Sermo-<vapores>: De examine per expositionem corporum super  
vapores acutorum PRD Sermo in examine per expositionem super vapores  
acutorum BH De examinatione per expositionem corporum super vapores  
acutorum T Sermo examinis per expositionem corporum super acutorum  
W//23. igitur *om.* R//complementum: completum B//24. super *om.*  
T//24-5. igitur quoniam: quod H quoniam D//25. videmus: vidimus  
W//26. acrium: alterum W//ponticorum: et ponticorum BH//et *om.*  
W//acetosorum: asetosorum H//28. emittere: emittere colorem BH//29.  
solem: solam H//30. *post* celestinum *add.* colorem D//31. emittere *om.*  
A//Et *om.* P scilicet et BWD//igitur *om.* T//32. creemus: creamus  
R//33. ut: sicut W//

nobis narratum est in precedentibus nostri sermonis.  
35 Quecunque igitur preparata corpora super vapores acutorum  
extiterint et celestinum non creaverint amenitatis colorem  
non sunt in preparationis complemento totali. Itaque et est  
ex corporibus quedam que rubeum fuscum aut  
citrinum fuscum viriditati admixtum  
40 colorem ex acumine ponticorum floret in superficie  
sua, et huius generis est mars. Quoddam vero viride fuscum  
in superficie floret celestino admixtum turbido, et  
huiusmodi est venus. Quoddam vero album fuscum, et huiusmodi  
generis saturnus comperitur. Quoddam vero album clarum

---

34. sermonis: sermone H//35. preparata: peracta BWH//36. extiterint:  
posita BH//36. creaverint: causaverint W//37. Itaque: Ideoque T Ita quod  
H//et est *om.* B etenim R est H//38. quedam que: quiddam quod PD  
quedam B quoddam est quod R quodam quod TW quod quidem quod  
H//40. floret: florent BHD//in: et in T//40-2. colorem-admixtum *mg.*  
W//41. Quoddam: Quedam BW//42. turbido: colori turbido W//42-3. et  
huiusmodi: huius BRTWHD//43-4. Quoddam-comperitur *om.*  
BRTWHD//44. comperitur: invenitur P//Quoddam: Quedam BW//

[84ra] et huiusmodi est iupiter. Quia igitur maxime perfectum  
 corpus minime floret aut nihil, et si quid tardissimo temporis  
 floret spatio, et iupiter quidem et minime et  
 tardissime inter diminuta a perfectionis complemento  
 5 corpora gummositatem illius floret, ideo per hoc  
 consideravimus huius examen magisterii iovem maxime  
 perfectioni approximare in opere maioris ordinis. Per  
 hoc igitur examen perquiri poterit in quo pertractum genere  
 consistat corpus. Si recte eorum consideraveris ordinem quem  
 10 narravimus in hoc capitulo; sin autem tue imputa temeritatis  
 insipientie.

---

1. et huiusmodi: huius BRTWD//2. minime: minime omnino R//flore:  
 florent D//si quid: si quis W//tardissimo: tardissimus B//3. quidem: vero  
 D//alt. et om. BRTWHD//4. inter om. T//perfectionis complemento:  
 perfectione BWH//5. hoc: huius T//6. consideravimus: consideramus  
 BRTWH//huius om. T//examen: examine BRWHD//7. approximare:  
 appropinquare T//8. quo: quibus T//pertractum: tractatum P  
 pertractatum eas alius perfectionis preparatum R pertractum alius  
 perfectionis temperatum D//genere: perfectionis genere BWH//9.  
 consistat: persistit BH persistat W//eorum om. R//consideraveris:  
 consideravimus T//quem: quam BHD//10. capitulo: corpus D//tue: tui  
 B//11. insipientie: ignorancie W//

< 88 > Sermo particularis in extinctione

In extinctionis igitur examine narrationem  
 adducamus totalem. Est tamen multiplex illius experientia  
 15 in qua cognoscitur utrum in perfectione magisterium consistat.  
 Primum igitur si ignitum corpus in liquorem extinguitur  
 et lunare quidem album non fiat et solare citrinum fulgidum,  
 sed in alienum mutetur colorem, non est in complemento  
 alteratio magisterii, ut siquidem in reiteratione  
 20 sue ignitionis et extinctionis in aquis ex salium aut  
 aluminum cuiuscunque generis administratione creatis, scorum  
 nigredini affine in sui superficie protenderit. Aut

---

12. Sermo-extinctione: De examine per extinctionem corporumignitorum  
 in aquis vel aliis rebus P Sermo in extinctionisexamine BWH De examine  
 extinctionis R Sermo in examinatione extinctionis T Sermo in extinctionis  
 examine. Rubrica. D//13. In extinctionis: Intencionis B//14. adducamus:  
 tradamus BH//tamen: autem B causa W//15. magisterium: magisterii  
 A//consistat: consistit B//16. ignitum corpus: ignita corpora T//liquorem:  
 liquorem ponticum B liquore W//extinguitur: extinguitur BRWHD  
 extinguntur T//17. album: alba D//non fiat om. B//fulgidum: fulgidum  
 bonum est et completum T//19. ut: aut R//20. sue om. T//ex om. B//aut  
 om. D//21. aluminum: m ut vid. T om. D//cuiuscunque: cuiusque D//22.  
 nigredini: nigredinis R nigredine T//affine: ex extinctione affine  
 B//protenderit: pertenderit TW protendent D//

- extinctione illius in sulphuribus et ab extinctione  
ignitionis reiteratione multa, evanuerit aut nigredine  
25 feda se infecerit, aut omnino per mallei compulsionem se  
confregerit, fallax est operis artificium. Aut si ex salis  
armoniaci et viridis eris et puerilis urine mixtionis  
cementatione aut in natura consimilium, et ad ignitionem  
positum, et post ignitionem ad extinctionem similiter, et  
30 lunarem quidem vel solarem ex toto colorem amiserit proprium,  
aut scorium creaverit, in corruptione consistat corpus adhuc  
permanere sophistica. Unam tamen generalem tibi tradimus

---

23. extinctione: ex extinctione RWH in extinctione T//illius: ei illius  
B//24. evanuerit: evanuerunt T//25. infecerit: interfecerit W//26. operis:  
operibus H//salis: sal A sale TH//27. armoniaci: armoniaco T arsenici  
WH//et viridis: aut viride T//puerilis: pulveris BW//mixtionis:  
commistionis R//28. et om. B//29. ad om. B//30. lunarem: lunare  
H//vel: seu BH//ex toto om. T//amiserit: amiserint W//31. aut: cuius  
R//creaverit: creaverint W//consistat: constat BTWD//32. permanere:  
remanere PT//sophistica: sophysticum PT//tibi om. BTH//tradimus:  
trado RTWD//

- regulam certam, quoniam tam quidem in dictis quam a nobis  
dicendis examinibus, si quid ex perfectionis diferentiis  
35 alteratum commutaverit corpus, ponderis videlicet aut coloris,  
non recte sed fantastice indagavit artifex  
opus quod non peculiosum sed perditionis est potius.  
<89> Sermo particularis in commixtione sulphuris cum corporibus  
Ex sulphuris igitur mixtione utrum in perfectione  
40 consistat magisterium approbatur similiter, quoniam  
experientia nostra invenimus sulphur corporibus commixtum  
quedam magis, quedam vero minus comburere, et quedam a  
combustione illius reddere, quedam vero non nostro comperimus  
artificio. Et ex hoc itaque differentia  
45 notari potest inter ipsa a perfectione diminuta corpora

---

34. si quid: siquidem BWH//35. commutaverit om. T//videlicet: scilicet  
PRTD om. BWH//38. Sermo-corporibus: De examine corporum per  
sulphuris commixtionem cum illis P Sermo in examine mixtionis sulphuris  
BH De examinatione per sulfurismistionem R Sermo in examine sulphuris  
mixtione T Sermo inadministrazione mixtionis sulphuris W Sermo in  
sulphuris mixtione rubicata ..... D//39. igitur: etiam P om. BRTWHD//40.  
magisterium om. D//approbatur: comprobatur PBWH com approbatur  
D//41. nostra: vera H//commixtum: mixtum B//42. quedam magis om. T  
quodam magis W//alt. quedam: quodam W//tert. quedam: quodam  
W//43. illius om. RD//reddere: reducere R redire D//quedam: quodam  
W//non: ut T//44. hoc: hac T//itaque: inquam BRD//45. notari: vocari  
D//corpora om. D//



[84rb] preparata in complemento sophistico. Igitur cum inter  
 corpora cuiuscunque generis invenerimus solem minime per  
 sulphur comburi, abhinc vero et postea iupiter, deinde vero  
 luna, post hoc vero saturnus, et facilius quidem his omnibus  
 5 venus, facillime vero mars per sulphuris oleaginitatem  
 comburitur, ideo per hoc notatur quod magis, quodve minus  
 perfectioni approximat. Et ex diversitate colorum post corporum  
 combustionem perquiri potest in quo alteratum genere ex sue  
 nature radice corpus consistat, quoniam sol quidem citrinum  
 10 intensum aut rubeum clarum, luna vero nigrum celestino  
 admixtum, iupiter vero nigrum modica rubedinis tinctura

1. sophistico: solificio D//inter: inter cetera BTWH//2. invenerimus *om.*  
 A invenimus BRTWHD//3. et *om.* B//postea *om.* T//4. post hoc vero:  
 postea PT//his: ex his T in his W//5. venus *om.* B//6. notatur: notatus  
 B//quod: quid BRTWH quoddam D//quodve minus: quod minus vero A  
 quid vero minus BWH quid minus RT quoddam D//7. perfectioni:  
 perfecta A//approximat: approximant B approximet W//8. in quo *om.*  
 T//9. citrinum: citrinum vero B citrinum colorem W//10. clarum: clarum  
 protendit ex sulphuris combustionem colorem PBTWH//11. rubedinis:  
 rubedine T//tinctura: in tinctura T//

admixtum, saturnus vero nigrum fuscum multo rubori et  
 lividitati admixtum, venus vero nigrum viriditati  
 admixtum, multa preexistente combustionem sulphuris,  
 15 pauca vero existente combustionem nitidissimum et  
 amenum violaceum, protenderit ex sulphuris commixtione  
 colorem. Mars vero in omni combustionem genere  
 nigredinem fuscum colorem creat. Ex reductionem autem a  
 sulphuris combustionem notatur et similiter diversitas in  
 20 corporibus. Quedam vero redeunt, quedam vero ignis  
 expressionem a reductionem cum sulphure cedunt, aut totaliter

12. nigrum *om.* R//multo: multum RT//14. combustionem: combustionem  
 B//15. pauca *om.* BT//vero *om.* T//existente: preexistente PBRWH *om.*  
 T//combustione *om.* T//nitidissimum *om.* BT viridissimum WD//et *om.*  
 BT//16. amenum: amenum vel *non legitur* P *om.* BT//violaceum *om.*  
 BT//protenderit: protendat P protendit RWH *om.* BT//ex sulphuris *om.*  
 BT//commixtione: combustionem PRWH *om.* BT//17. colorem: *iter.* B  
 colorem nigrum T//combustionem: combustionem W//genere *om.* BW//18.  
 nigredinem: nigerrimum PW//fuscum: et fuscum W//colorem *om.*  
 R//creat: generat aut creat T//Ex: et ex B//19. notatur: etiam notatur T  
*om.* W *add.* W<sup>2</sup>//et *om.* PW//similiter *om.* TW//19-20. in corporibus  
*om.* W//20. *pr.* Quedam: quidam B//redeunt: sicut sol et luna redeunt  
 BRTWH sol et luna redeunt D//*alt.* quedam: quidam B//21. expressionem:  
 ex impressionem T//cedunt: recedunt BWH//

- aut eorum quantitas maior. Et quedam vero in sue nature corpus, quedam vero in aliud quam sue nature redeunt a combustione corpus. Redeunt autem ad proprii naturam corporis  
 25 a sulphuris combustione corpora propter diversitatem preparationis - in corpus et luna et sol. Recedunt autem iupiter et saturnus, iupiter quidem totaliter aut secundum sui maiorem partem, saturnus vero non ex toto recedit, sed quandoque maior, quandoque vero minor illius deletur pars.  
 30 Horum autem contingit diversitatem existere propter naturam et corporum et administrationis eorum in operis preparatione differentiam,

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23. corpus: corporum AD corpus redeunt T//aliud: alterius aliud R//redeunt om. W//24. combustione: sulphuris combustione BRTD sulphure combustione H//corpus: corpora PTD om. B corporum RW//proprii: propriam BH//25. a: aut W//corpora: corpus P//25-6. propter-pr. et om. rel./26. Recedunt: Recedit BD//autem om. W//27. totaliter: aut totaliter BRTWHD//28. maiorem: maioris P//vero om. W//non om. BRTWHD//29. vero om. BRTWHD//illius om. T//30. Horum: illorum T//autem: autem scilicet iovis et saturni BWH scilicet iovis et saturni autem R scilicet iovis et saturnus aut D//naturam: naturarum ut vid. R//et om. RD//et om. BTWH//31. in: et B//operis: opere W//preparatione: preparationis W//

- quoniam ex subita ignis expressione de reductione iovem deleri contingit, ex successiva vero et paulatina et saturnum et iovem salvari. Eorum tamen reductio in  
 35 alieni corporis potius quam proprii naturam vergit: in clarum quidem videlicet antimonium iovis, in fuscum vero saturni converti reductionem repertum experientia nostra extitit. Venerem vero minui in ignis reductionis impressione, martem vero magis contingit. Sed veneris  
 40 quidem est reductio ponderosa et citrina fusca, martis vero alba livida, fusca et mollis, nigredine participans cum sui augmento ponderis. Ex his igitur

---

32. quoniam om. B//ex: scilicet ex RWHD//expressione: impressione T//33. contingit: convenit T//vero om. BRTD//35. alieni: alienis D//quam proprii natura om. W//vergit: contingit vel vergit BH convenit. vergit T//in: est R//35-6. clarum quidem: clarum PB//36. videlicet: scilicet BRWHD om. T//antimonium: augmentum seu antimonium BH augmentum R colorem secundum augmentum T non leg. D//37. converti: conversi B//reductionem: redactionem W reductione D//38. extitit: existit T//vero om. D//minui: minum B minui T//in om. T//reductionis: reductionem T//impressione: expressio BRH impressionem T impressio D//39. martem: in marte T//contingit: convenit W//41. martis-fusca om. W//livida: lucida B et lucida T//nigredine: nigredinem RH et nigredine T//42. augmento om. B//igitur om. T//

[84va] perquiri poterit omnium alteratorum natura corporum.

<90> Sermo particularis in calcinatione

De calcinationis igitur et reductionis reiterationis  
examine dehinc perquirendum est. Innuimus igitur quoniam  
5 perfectionis reperta sunt corpora in calcinationis et  
reductionis reiteratione ex bonitatis differentiis nihil  
perdere coloris, ponderis, aut quantitatis, de qua curandum  
sit minui, aut fulgoris perdere, quantumcunque  
reiteretur ad illa multiplicitas illarum operationis.  
10 Et ideo si per reiterationem modorum calcinationis et  
reductionis a calce ex omni metallorum genere alteratorum

---

1. corporum *om.* W//2. Sermo-calcinatione: De examine corporum per reiterationem calcinationis et reductionis illorum P Sermo calcinationis et reductionis BW De examinatione per calcinationem reductionem et reiterationem R Sermo in calcinationis et reductionis examine T Sermo calcinationis et reductionis examine H Sermo in calcinationis et reductionis examine. Rubrica D//3. igitur *om.* BRTWHD//reductionis: reductionis et T reductionis W *add.* et W<sup>2</sup>//4. examine: est examine B examine diximus R//Innuimus: Invenimus BRWHD Inminera *ut vid.* T//5. perfectionis: que perfectionis T//sunt *om.* T//in: et B//6. ex: et W//bonitatis: bonitate RH//differentiis: differens B differentia T//7. ponderis: scilicet ponderis P//quantitatis: quantitate AD quantitatum P de quantitate T//8. minui: nimium PBTW//aut: cuius *in ras.* R//perdere: pondere A//9. multiplicitas: multiplicatis B//illarum: illorum PB operationis: operis T//10. modorum: *non legitur* P//reiterationem: iterationem T//alt. et *om.* B//11. genere: alique T//

bonitatis differentiarum perdatur aliquid, estimandum  
putes sophisticè perquisitionem artificem indagasse.  
Quamobrem igitur ad illas exerciteris, ut eas cognoscas.

15 <91> Sermo in coniunctione argenti vivi cum corporibus

Iam igitur nobis patuit veridice maxime argenti  
vivi continentie perfectionis existere corpora et ideo  
maxime argento vivo amicari et uniri. Quamobrem  
igitur auctumandum corpora magis perfectioni approximare  
20 que magis amicabiliter argentum vivum combibunt.  
Et huius est signum argenti vivi facilis susceptio a

---

12. aliquid: ad T//13. putes: potes T//artificem *om.* P//14. igitur *om.* BW//illas: illam B illa W//eas: illas T//15. Sermo-corporibus: Summa repilagationis totius operis complementi P Sermo in argento vivo facilius vel difficiliter susceptionis B De examine per susceptionem argenti vivi RSermo nocius in argento vivi facilis vel difficilis successione T Sermo in ar. vi. facilis et difficilis velcommistionis examine W Sermo in argenti vivi facilis vel difficilis mixtionis H Sermo in argenti vivi facilis vel difficilis mixtionis examine D//16. igitur: ergo P enim T//16-7. argenti vivi: argentum vivum T//17. continentie: continentia TWH//17-8. continentie-uniri *om.* B//19. auctumandum: estimandum est B estimandum RWH auctumandum est T//perfectioni: perfectionis A//approximare: appropinquare T//21. huius: his R//a: aut B *om.* H//

solari aut lunari perfectionis corpore. Ob huius igitur rationis causam siquidem alteratum corpus defacili in sui substantiam argentum vivum non suscipiat, a perfectionis maxime complemento distare necesse est.

25

**<92> Epilogatio totius magisterii complementi**

Quia pertractavimus igitur huius magisterii causarum sufficientie experientias notas secundum propositi nostri sermonis exigentiam, restat nos

30

ad complementum totius operis divini pervenire in capitulo uno et in summa contrahere sermonis abbreviati in capitulis dispersum magisterium. Dicimus igitur quoniam totius

---

22. corpore: corpora T//Ob: Ab T//huius om. B//23. siquidem: si quod B si quidam W//alteratum trans. ante siquidem A//in om. T//sui: suam H//24. argentum vivum: argenti vivi B// suscipiat: suscipiat et P//26. Epilogatio-complementi: Summa repilogationis totius operis complementi P Recapitulatio perfectionis totius operis et est in argento vivo BTHD Decomplemento totius perfectionis R Recapitulatio perfectionis totius operis que est in argento vivo W//27. Quia: Cum W// igitur om. BRTHD//magisterii: magisterii et R//28. sufficientie: sufficientiam A sufficienter T//30. divini: divinissimi T//31. contrahere: contra hac D//32. dispersum: dispersis T//

- operis intentionis summa non est nisi ut sumatur lapis in capitulis notus. Deinde vero cum operis instantia  
 35 assiduetur super illum opus sublimationis primi gradus, et per hoc mundatur a corruptente impuritate. Et est scilicet sublimationis perfectio, et cum ea subtilietur lapis donec in ultimam subtilitatis puritatem deveniat, et ultimo volatilis fiat.  
 40 Abhinc vero cum fixationis modis figatur donec in ignis asperitate quiescat. Et hic secundus preparationis gradus appellatur, et in hoc quidem una preparationis meta consistit. Sed et tertio similiter lapis administratur gradu qui in ultimo constat preparationis complemento.

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35. illum: ipsum BH illud T//36. et om. B//mundatur: mundetur BRWH//37. est: enim A//sublimationis perfectio: sublimatio primi ordinis perfectio T//38. subtilietur: solvetur ut sublimetur T sublimetur W//ultimam: ultima BWH//subtilitatis: sublimationis RTWH//39. puritatem: puritate BWH//et-fiat om. R//volatilis: volatum D//40. Abhinc: dehinc T//vero om. BWH//fixionis: fixationis R//modis: modo H//42. gradus: meta sive gradus W//appellatur om. A// in hoc: inh..t in hoc B//quidem om. R//una om. T//preparationis: perfectionis preparationis rell.//43. et: in R om. W//similiter om. BH//44. constat: consistit BRTWHD preparationis: comparationis A//

[84vb] Et est scilicet ut iam dudum fixum lapidem  
 cum modis sublimationis volatilem facias et volatilem  
 fixum et fixum solutum et solutum iterato volatilem, et  
 iterato volatilem fixum quousque flueret et alteret  
 5 in complemento solifico et lunifico certo. Ex reiteratione  
 igitur preparationis huius gradus tertii in medicina  
 resultat bonitatis alterationis multiplicatio.  
 Ex diversitate igitur reiterationis operis super lapidem  
 in gradibus suis resultat multiplicationis bonitatis  
 10 alterationis diversitas, ut ex medicinis quedam

---

1. dudum *om.* *rell.*//3. *alt.* solutum *om.* A//3-4. et iterato volatilem *om.*  
 R//4. flueret: fluat D//5. *pr.* et: vel BRTWH//6. in *om.* A//medicina:  
 media B//8. igitur: ergo BRW//10. quedam: quedam quidem P que  
 quedam T//

sui duplum, quedam vero decuplum, quedam vero  
 centuplum, quedam vero millesimum, et quedam in infinitum  
 solificum et verum perfectionis lunificum transmutet  
 corpus. Abhinc igitur et ultimo tentetur utrum in perfectione  
 15 consistat magisterium.

**<93> Narrat hic auctor qualiter occultavit scientiam et  
 huic operi finem imponit**

Et ne nos quidem mordeamur ab invidis, narramus  
 quoniam non tradidimus scientiam nostram sermonis  
 20 continuatione, sed eam sparsimus in diversis capitulis. Et  
 hoc ideo - quoniam tam quidem improbus quam probus, si continue  
 tradita, usurpasset indigne. Et eam similiter occultavimus

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11. duplum: septuplum A sex duplum *ut vid.* P//*alt.* vero *om.* P//12. vero  
*om.* PBWHD//in *om.* B//13. transmutet: transmutat BT//14. utrum:  
 verum D//15. consistat: consistit HD//16-7. Narrat-imponit *om.*  
 ABTWHD Excusatio Geberis R//18. Et: Sed RTD//quidem *om.* R//*ante*  
*invidis add.* impiis et A//narramus: narremus PBTWH//19. tradidimus:  
 tradimus RHD//20. sparsimus: separavimus BRHD//21. hoc *om.*  
 W//ideo *om.* D//improbus: probet AH probi R probis TD improbet  
 W//probus: improbet AH improbi R improbis TD probet W//22. *ante*  
 tradita *add.* fuisset D//usurpasset: usurpassent RH usurpassemus T//

ubi magis aperte locuti fuimus, non tamen sub enigmatē  
 sed sub plana sermonis serie artificem allocuti  
 25 sumus. Et sermonis modo eam ascripsimus quam solius  
 dei altissimi benedicti sublimis et gloriosi et nostri  
 qui illam scripsimus et mente recolligi accidit  
 aut divine gratia bonitatis infusi qui cui vult  
 largitur et subtrahit. Non desperet igitur doctrine filius  
 30 quoniam si illam queret, illam inveniet, non doctrine sed  
 proprie motus indagazione nature, quoniam qui per sue  
 bonitatem industrie queret, scientiam inveniet. Qui vero

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23. ubi: et ubi R ut D//fuimus: sumus BRH//Et: sed et BWHD//25.  
 sumus: sumus sed R sed T sumus modo HD//eam: ea A//ascripsimus:  
 scripsimus PT conscripsimus W//quam: quem A quam scientiam  
 T//solius om. T//26. altissimi: altissimam T//benedicti: benedictam  
 T//sublimis: sublimi scilicet T//nostri: nostra T//27. et mente: necesse B  
 mente W mento H//28. infusi: infuse T//29. post subtrahit add. et ubi vult  
 spirat et quiescit R qui summus est et gloriosus et omni bonitate repletus  
 W et ubi vult subtrahit et largitur et ubi vult spirat et quiescit D//Non:  
 Quare non R//30. queret: querit B querat T//illam inveniet om. T eam  
 inveniet W//doctrine: doctrina T//31. proprie: proprii BRD//motus:  
 mentis T//nature om. T//qui: non per ea sed in ras. A//per: per in textu  
 se add. s.l. A<sub>2</sub> per se BRTWHD//sue: et sue BHD et sui R aut sue T//32.  
 bonitatem-queret: bonitatis industriam querit BRH bonitatis industria  
 querit T bonitate industrie scientiam queret W//

per librorum insecutionem quesierit tardissime ad hanc  
 perveniet artem pretiosissimam, quoniam nobis solis artem  
 35 per nos solos investigatam tradidimus et non aliis,  
 verissimam tamen et omnino certam. Solum igitur prudentes  
 ad artem allicuimus et per ingenia a nobis tradita viam  
 investigationis eisdem exposuimus. Non autem eam inventam  
 nisi solis nobis scripsimus sed et inventionis modum et  
 40 modorum ingenia. Per ea igitur que tradidimus exerceat bone  
 mentis artifex donum dei altissimum se adinvenisse letabitur.  
 Ad artis igitur excelsę perquisitionem hec dicta sufficiant.

<94> Impositio finis totius magisterii.

45 Finit liber Yeber perfectionis deo gratias amen.

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33. insecutionem: executionem T insecutione D//hanc: illam W//34.  
 quoniam: quia W//35. tradidimus: tradimus BHD//37. allicuimus:  
 elicuimus BH allicimus R//38. eisdem: eidem T eis W eiusdem D//autem  
 om. B//39. solis: in solis A solum BH//pr. et om. APBRTHD//  
 inventionis: investigationis vel inventionis BH investigationis R  
 investigationis et adinventionis T//40. tradidimus: tradimus D//41.  
 donum: et donum rel.//post dei add. que A//altissimum: altissimi W//se  
 om. A//42. excelsę: excelsam T//dicta om. T//44-5. Impositio-amen:  
 Explicit liber Geber philosophi de summa collectionis comple menti  
 nature deo gratias P Explicit Geber in ultimo libro super artem alkemie B  
 Finit Liber perfectionis Geber anima cuius rege perfruatur eterna. Amen  
 R Explicit liber perfectionis philosophi Geber ut dicitur a plerisque T om.  
 W Explicit summa perfectionis magisterii H finit liber Ieberii perfectionis  
 anima cuius etcetera. D//45. post explicit add. Istud intrabitur ad signum  
 superius notatum postea iter. 83va,22 - 83vb,20. H//

Annotated English Translation of the *Summa perfectionis*

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[61ra]

<The *Summa* of Geber >

## &lt;1&gt; Proem

Let us here collect all our science, which we have abbreviated in our volumes with diverse compilation from the books of the ancients, into one compendium, in which whatever is deficient in the other books written by us we may make up for sufficiently by means of the teaching of this book, and make good their defect with concise discourse. Whatever was hidden by us in one part we have made manifest in the corresponding part of this volume, so that the achievement of this both very excellent and noble part of philosophy be made accessible to the wise.<sup>1</sup> Let you therefore know, dearest son, that the whole operation of art is contained sufficiently in this work, in general chapters and with universal disputation, without any diminution. Whoever practices according to this book - by God - will rejoice upon his arrival at the end of this art. But know, dearest son, that whoever does not know the natural principles in himself, is already far removed from our art, since he does not have the true root upon which he should found his goal. And whoever knows all his own natural principles and causes but has not reached the true end and profit of this most hidden art, still has an easier entry to the principles of the art even if ignorance overtake his intention as regards the method of our work: such a one is not far removed from the entrance to the art.<sup>2</sup>

<sup>1</sup>This passage is rewritten from Jābir ibn Ḥayyān's *Liber de septuaginta*. Cf. M. Berthelot, "Geber - le livre des soixante-dix," in *Mémoires de l'Académie des Sciences*, XLIX, 1906, p. 310.

<sup>2</sup>This section surely owes a debt to the pseudo-Aristotelian *De perfecto magisterio* (Manget, BCC 638-639): "Rogo itaque te fili, ut incessabili lectione philosophiae libros scrutetis, ut & ejus filius <add. esse apud BN 6514, 120vb,71> & hujus arcani magisterii habere sagaciam merearis. Qui enim in legendis libris deses extiterit, in praeparandis rebus promptus esse non poterit: quia non potest de levi ejus in Practica manus crescere, cujus in Theorica intellectus desudare renuerit. Ille namque ad operationem securius accedit, in cujus mentis aenigmate plures operationum imagines variaequae resultant. Ne autem tu fili carissime omnia philosophiae volumina ad inveniendum praelibata secreta ausi errabundus percurreres, hunc librum tuo conscripsi nomini: in quo omnia ea cum suis

And whoever knows the principles and causes of all minerals and the mode of generation which takes place according to the intent of nature, is surely not far removed from the end of the art, without which our science cannot be perfected, since art cannot imitate nature in all her works, but imitates her just as it properly can. Therefore dearest son, keep what we reveal to you a secret - that the practitioners err because they wish to imitate nature in all the differences of action of her properties. But work to study in our volumes, and try very often to go over them in your mind, so that you may acquire only the true intent of our discourse. For from them you will acquire that upon which you should base your thoughts. And you should learn from them how to avoid error, and in what you can imitate nature during the practice of your work.

**<2> General Discourse on the Whole Procedure, in  
the Order of Four Headings**

So let us lay down for you concisely all the impediments by which the practitioner is kept from reaching the true end. Second, we will dispute against the ignorant and sophistical who, because of their ignorance and incapability regarding this art, negate the art of seeking out the profit of the magistry<sup>3</sup>, and posit that it does not exist. Let us therefore lay down all their reasons, and then openly destroy them, so that it be made manifest to the understanding that none of their sophisms contain any truth. And then [61rb] we will dispute about the natural principles which are of nature's intention, and likewise about the manner of their generation and mutual mixture due to the working of nature. Third, we will dispute about

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praeparationibus per sermonem redegi, quae in praenominatis nominibus propinquiora, faciliora, et notiora reperi ad componendum album & rubeum Elixir, ut tibi ad operandum facilis esset aditus."

<sup>3</sup>Magisterium is used as a transferred epithet in the language of the Latin alchemists; it means "a product of skill," be it a transmutative agent, an alchemical technique, or the endeavor of transmutation at large.

their effects according to the view of the old philosophers. Fourth, we will relate the principles that are of the intention of our work in which we can imitate nature, and the method of mixing and altering them according to the natural course with their own causes, and of reducing them to the intent of our work.

**<3> General Discourse on the Execution of the First Chapter,  
Concerning the Impediments of this Art**

The impediments coming upon this work are therefore two in general - natural inability and lack of the necessary cost, or of the carrying out of the work. But we say that natural impotence is manifold, namely from the practitioners' organs, and from his soul. That from the practitioners' organs is also manifold, because the organs may be either weak or totally corrupt. That from the impotence of the soul is also manifold, either because the soul is perverse in its organs, having on account of its organs neither rightness nor reason just as an insane or imbecilic soul, or because it is fantastic - easily and unduly susceptible to contrary forms, suddenly extending from one knowable to its opposite, and also from one wish to its opposite.<sup>4</sup>

**<4> Particular Discourse on the Impediments  
of Practitioners' Bodies**

We have just determined the impediments of this art for you in general. Now however, we address you more openly in this chapter with a discourse upon more special things. We will describe for you all those impediments very fully and in order. We say therefore that if the practitioner does not have his organs in an

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<sup>4</sup>The following chapters concerning the impediments impinging on the alchemist find their inspiration in the pseudo-Aristotelian *De perfecto magisterio*, pp. 638-641.

integral condition, he will not be able to arrive at the end of this work by himself, for example if he is blind, or his extremities maimed, since he is not then aided by those members with whose help this art - the handmaiden of nature as it were - is perfected. But if the body of the practitioner is weak or diseased like the bodies of the fevered or leprous, from which the extremities fall off, and like the bodies of those laboring in the extremes of life, and of old men of already advanced age, he may not arrive at the end of art. The practitioner is thus impeded by these natural weaknesses of the body in his intention.

#### <5> On the Impediments from the Artificer's Soul

We have dispatched one chapter to you in which we describe the impediments deriving from the practitioners' body, with an absolute and manifest discourse. It remains that we concisely describe the hindrances from his soul, which are above all the impeters of this work's completion. We say therefore that whoever does not have natural ingenuity and a soul subtly searching the natural principles and foundations of nature, and the techniques which can pursue nature in the [61va] properties of her action, will not find the true root of this most precious science, as are the many who have a hard head devoid of any ingenious perception, who can hardly understand common discourse, and who commonly learn widespread works with difficulty. We find many from among these who have a simple soul entertaining whatsoever fantasy; but what they think themselves to have discovered is all fantastic and inconsistent with reason, full of error, and divorced from natural principles. For their head, being full of much smoke, cannot receive the true intent of natural things. And there are many beyond them who have a mobile soul passing from one opinion to another, and from one wish to another wish, for example those who believe only one thing and want the same without any basis in

reason, but who a little later believe something else and want that instead. And these men are so mobile that they can hardly finish the slightest thing that they intend, instead leaving it deficient. There are others, similarly, who can no more see the truth in natural things than a beast, just as those deprived of reason, madmen, or children. There are others who condemn this science and impute that it does not exist, whom this science in turn condemns and repels from the most precious end of the work.<sup>5</sup> And there are others who are slaves of money, desiring this marvellous science and affirming it, but who fear to put forth the necessary costs. Therefore, although they affirm it and investigate according to reason, they nonetheless fail to arrive at the practice of the work, thanks to their avarice. Hence our science does not approach them. For how can he who is ignorant and fails to investigate a science arrive at the same?

#### <6> On the Impediments of this Work Coming to the Practitioner from Beyond, from Fate and Fortune

We have reduced all the impediments hindering the end of this art that come from radical principles depending on the nature of the practitioner of this precious affair to two chapters. It is therefore necessary to describe only the impediments approaching from beyond, from contingent fortunes and mishaps, by which this most glorious work is impeded. Therefore, we see certain astute and ingenious men knowing very well the works of nature and pursuing her in those principles in which it is possible, and in these works in which such investigation is not fantastic, in all things that

<sup>5</sup>This passage is an echo of the *De perfecto magisterio*, 641A: "Quidam vero Sophistae naturarum rerum inscii, et secretum Philosophiae ignorantes, et regimentorum ejus improvidi invenientes scripturas ejus de his rebus, easque non intelligentes, cum post opus nihil in manibus suis inveniant, errorem imperitiae suae Philosophiae adscribentes, hoc opus non solum difficile, verum etiam impossibile praedicant: de quibus Philosophia non curat...."

are ruled by the sublunary actions of nature. But when these men have been pushed down beyond poverty, they are forced to set this very excellent magistry aside, out of indigence. [61vb] There are also many other eager men beyond those already described, detained by the vain cares and temptations of this world, occupying themselves wholly in every sort of secular business, from whom this precious science of ours flees.

It is now obvious enough to you from the foresaid chapters how many are the impediments distracting one from this art. We conclude therefore from the foresaid that it is necessary for the practitioner of this work to be erudite and well-advanced in the knowledge of natural philosophy. For whoever has only money, deep natural ingenuity, and desire for this art, will still fail to attain the end unless he arrive at natural philosophy from teaching. For what he does not arrive at through natural ingenuity, he is led to by teaching. The practitioner, again, must be aided by the highest scrutiny, for however much science he acquires through teaching, he will not be invited to the most precious courses of the banquet unless aided by natural industry.<sup>6</sup> In a moment he might correct his error by means of industry, whose remedy he would not know how to administer if he were educated by teaching alone. Likewise he would remedy his error in a moment with the knowledge acquired from teaching, which error he could not avoid by means of natural industry alone. For art is aided by ingenuity and likewise ingenuity by art. It is necessary also that he be of constant will in work, so that he does not at one time presume to try one thing, and at

<sup>6</sup>This metaphor is undoubtedly borrowed from the *De perfecto magisterio* of pseudo-Aristotle, *ed. cit.*, I, p. 641A, where it speaks of sophists, "de quibus Philosophia non curat: non enim omnes ad hoc epulum convocat, sed illos tantum, qui hujus mensae accubitu digni et istius miri refectioe epuli sunt inventi. Satage ergo fili, ut non sis Sophista, sed sis Philosophus: ut rerum virtutes non solum meditatione, verum etiam meditatione et experientia cognoscas. Meditatio enim sine experientia nihil prodest: sed experientia sine meditatione proficit. Unde plus est experientia quam meditatio perquirenda." While the *De perfecto magisterio* gives experiment a definite priority over teaching, the *Summa* maintains that experiment and teaching must act in tandem.

another time another, because our art is not carried out with a multitude of things. For there is one stone and one medicine in which the magistry consists, to which we neither add anything extraneous nor remove anything, unless we remove the superfluities in the preparation.<sup>7</sup> It is also important that the practitioner busily keep at his work until the conclusion of it, so that he does not let loose a mangled product. For he will acquire neither knowledge nor profit from an incomplete work, but rather desperation. It is important that he also know the principles and basic foundations which are of the work's essence. For he who does not know the beginning may not acquire the end. We will tell you all those principles with discourse complete and also sufficiently open and manifest to the understanding, according to the need of our art. It is important also that he have a good temper and be little given to anger, lest due to the fury of his wrath, he demolish and destroy his work just begun. Let him likewise preserve his money, lest he distribute it vainly on the basis of premises with the result that if he does not acquire the art, he be destroyed, paupered, in misery and desperation. And lest precisely when he approach the end of this magistry (through his own searching), his resources be consumed, and the poor man relinquish forcibly [62ra] the true end, out of poverty. This is just like him who, in the beginning, when he does not regard his wealth, wastefully destroys it all; but when these men are near the goal they do not have further money from which they may work. Whence these sorts are doubly buried in error, both because they dispense their money for useless things and because they lose the noble science which they have sought with squandered wealth. It is not necessary to consume your goods since, if you are not ignorant

<sup>7</sup>The *Summa's* distrust of "res extranee" may derive from the last sentence of Avicenna's *De congelatione* (ed. Holmyard and Mandeville (Paris: 1927), p. 55): "Hoc autem per solam liquefactionem non fit sed acciduntur ei ex hoc res quedam extranee." At the same time, the *Summa* is making an oblique reference to the "mercury alone" theory.

of the principles of art that we teach you and you understand them rightly, you will arrive at the complete magistry for a small price. If therefore you lose your copper by not heeding our precepts which we have openly and manifestly written to you in this small book, do not unjustly gnaw on us, or inflict blasphemies upon us, but blame your own ignorance and presumption. For this science does not well suit a pauper or indigent, but is to the contrary inimical and opposed to him. Nor let him strive for a sophistical limit of the work, but let him be intent upon the end alone, since our art is reserved by the divine power, and He who is most glorious, sublime, and filled with all justice and goodness extends it to and withdraws it from whomever He wills. For He might perhaps deny you the art as a punishment for your sophistical work, and push you into the bypath of error, and then from error into unhappiness and perpetual misery. Most miserable and unhappy is he who refuses to see the true end of his labors, since he concludes and terminates the space of his life perpetually in error. For he, having been constant in his perpetual labor, and occupied with every misfortune and unhappiness, loses all the consolation, delight, and pleasure of this world, and consumes his life in grief, without profit.<sup>8</sup> Let him likewise study, when he is at work, to seal in his mind the signs which appear in whatever decoction, and to inquire after their causes. These, therefore, are those things that are necessary to the artificer who is suited for our art. But if any one of those that we have described is lacking to him, let him not cling to this art.

<sup>8</sup>*De perfecto magisterio*, 638A: "Si enim alius, quam ejus [i.e. philosophiae] filius hoc attentare praesumpserit, ut indignus penitus repulsam patietur: & se, opus, & expensas amisisse merito deplorabit: scias hoc, quia magnum secretum est."

**<7> General Discourse on the Arguments of the  
Sophists Denying the Art**

Since we have set before you all the impediments of this work in one compendium, and sufficiently given you teaching for the adherence of the art, it is necessary that we dispute against the sophistical and ignorant according to the intention of our work, first presenting their reasons according to what we set forth from the beginning that we would determine, and finally doing away with them all, and demonstrating with a presentation manifest to the wise that they contain no truth. There are various opponents who deny and destroy it. Some deny it simply, while others argue from given facts that it does not exist.

**<8> General Discourse on the Arguments of the Sophists  
Denying the Art.  
Concerning Those Denying the Art Simply**

[62rb] There are some asserting simply that the art does not exist, who sophistically support their opinion thus:<sup>9</sup> the species and diversities of things are distinct because the proportions of the elements are mutually diverse and distinct in their mixture. For an ass is diverse from a man in species, because it has a far different proportion of elements in its composition. One must also induce this in other diversities of things, hence also in minerals. With the proportion of miscibles unknown, therefore, how is the form and the perfection of the thing to be arrived at? How also do we know to form a mixture? But we do not know the proportion of sol, luna, and the elements, and so we must not know how to form those bodies themselves. From these, therefore it is concluded that this

<sup>9</sup> Let the reader note the similarity between these arguments and those from the *Liber Hermetis* and *De congelatione* printed by us in the appendices to our Chapter I.

art is useless and impossible. Similarly and also differently they argue, abolishing our magistry. For they say: even if you should know the proportion of elements, you would still not know the manner of their mutual mixture, because nature begets these things in caverns, hidden places, and mines. Therefore, since you do not know the manner of their mixture, you are likewise ignorant of how to make them. Similarly - even if you should know these sufficiently in the action of their mixture, still you would not know how to equalize the acting heat, by whose mediation these things are perfected. For nature has a determinate quantity of heat by which she leads metals forth into being - whose measure you do not know. Similarly, you are also ignorant of the other differences of active causes without which nature could not perfect her intention. With these unknown, the whole manner of performing this art is likewise unknown. Moreover, I adduce for you an argument from experience. For this science has been sought for so long by wise men that if it were possible to arrive at it by any way, then they would have completed it a thousand times. Similarly, since the philosophers have struggled to treat of this in their books, and yet we do not find the manifest truth in them, it is probable enough on this account that this science does not exist. Again, similarly - many princes and kings of this world having infinite treasures and copious philosophers have desired to search out this art. But they still have not been able to arrive at the fruit of this most precious art: this, at least, is a sufficiently demonstrative argument that the art is frivolous. Similarly, we are incapable of following nature in weak mixtures, for in forming an ass, organized according to nature, we cannot follow nature. For we do not know how to make an ass and the like, whose mixtures are weak, and almost manifest to the senses. Therefore we are far more ignorant of the way to make the mixture of metals, which is very strong. [62va] This is in fact wholly hidden from our experiences and senses, and its sign is the difficulty of the resolution of the elements from one another.

Similarly, we do not see a bull transformed into a goat, nor any one species turned into another by any artifice. How therefore since metals differ in species, do you endeavor to transform them mutually according to species, so that from such and such a species you make another? This seems quite absurd to us and removed from the truth derived from natural principles. Similarly also - nature perfects metals in many thousands of years; how will you be able to remain at the work of transmutation for thousands of years? For you can hardly attain the goal of one hundred years. But even if you should respond thus - that what nature cannot perfect in a great space of time we can complete in a brief space by means of artifice, since artifice fills out the defect of nature in many ways - we still say that this is impossible, especially in metals, since they are very subtle fumes<sup>10</sup> which need a temperate decoction, so that they may be thickened in themselves, according to equality, and so that their own humidity be thickened, not fleeing from them or leaving them deprived of all humidity, by means of which humidity they undergo contusion and extension. If therefore you wish to shorten the time of the decoction of nature in metallic, mineral bodies by means of your artifice, it will be necessary to do this through excess of heat. This will not equalize them, but rather by freeing the humidity from their bodies, it will demolish and destroy them. For only temperate heat is capable of thickening humidity and of perfecting mixture, not being excessive. And similarly, being and perfection are given by the stars, as it were by the first things perfecting and moving the matter of generation and corruption to the being and not-being of species. This, moreover, happens suddenly and in an instant, when one or many stars from its own motions arrives at a determinate position in the firmament, by which is bestowed perfect being, because everthing acquires being

<sup>10</sup>This passage may be inspired by the *De aluminibus et salibus* of pseudo-Rāzī (ed. Steele, "Practical Chemistry in the Twelfth Century," in *Isis* XII (1929), p. 27: "Scias quod corpora mineralia sunt vapores qui inspissantur et coagulantur secundum mensuram servitutis nature in spatio longe."



for itself from a certain position of the stars in a moment. And there is not one position only but many mutually diverse ones just as their effects are diverse. And we cannot know thoroughly their diversity and distinction, for they are unknown and infinite.<sup>11</sup> How therefore will you correct the defect in your work from your ignorance of the diversities among the stellar positions due to their motion? Even if you should know the determinate position of one or more stars by which perfection is given to metals, you could still not perfect your own work. For the preparation of any work is not such that [62vb] a form be received by means of artificial techniques in an instant, but rather one after another. Therefore, the proper form will not be given to the work, since it does not take place in an instant.<sup>12</sup> Similarly also - in natural things there is this arrangement - that it is easier to destroy than to construe them. But we can hardly destroy gold, therefore how can we also construe it? Therefore, on account of these sophistical reasons and other less obvious ones, they believe that they destroy this divine art. These are all the persuasions of the sophists denying our art to exist simply. But I will put the reasons of those who deny the art from supposition later, along with their refutations, in the following. So we must pass to the refutation of their reasons now put forth, first by us positing the true intention about these for the fulfillment of the work.

<sup>11</sup>This argument opposing the "judgments" of astrologers is similar to one found in the *Hexaemeron* of Robert Grosseteste, ed. Richard C. Dales and Servus Gieben O.F.M.Cap. (London: The British Academy, 1982), Cap. IX,2., p. 166.

<sup>12</sup>The idea here is that an exact stellar conjunction can only last for an instant, when one star or a group of them "arrives at a definite position in the firmament...." But since any alchemical process takes an appreciable time to carry out, it must fall under the virtue of more than one precise conjunction. Therefore, it will be impossible to induce the required form into the subject.

**<9> Discourse Through Which All the Sophisms of Those  
Attacking the Art are Addressed**

We say that the principles upon which nature bases her action are of very lasting and strong composition. They are sulfur and quicksilver, as certain philosophers say. Because they are of very durable composition, they are therefore of very difficult resolution. But their mutual thickening and hardening in such a way that contusion and extension come about in them through the hammer's blows, and not fracture, occur only because the viscous moisture<sup>13</sup> in their mutual commixture is preserved through successive, long, and very temperate thickening during the cooking in its mine. But we pass on a general rule to you, dearest son - that the thickening of any moisture does not come about unless first there be an exhalation from the humid of its smallest particles, and a preservation in the humid of its larger particles, if there be humid in the mixture preponderating over the dry.<sup>14</sup> But a true mixture of the dry and humid so that the humid be tempered by the dry and the dry by the humid, and so that this become one substance homoeomerous in all its parts, and temperate between hard and soft, and extensible in contusion, does not occur except by continual mixture of the viscous humid and the subtle earthy through the smallest particles, until the humid becomes the same as the dry and the dry as the humid. And the resolution of this sort

<sup>13</sup>The terms translated as "moisture" and "humid" occur in the Latin as the substantival adjective *humidum*. This *humidum* and its counterpart, "the dry" (*siccum*), form two of the Aristotelian elementary qualities, hot, cold, wet, and dry. The *Summa* is still influenced by the qualitative physics of Aristotle, despite the former's lesser emphasis on the four elements and their makeup.

<sup>14</sup>This passage is probably based on pseudo(?) - Avicenna's *De re tecta* (ed. Anawati, in *Oriente e occidente nel medioevo* (Rome: 1971), p. 332-3, especially #29: "Est itaque subjectum liquefactionis humiditas currens permixta partibus siccis terreis in quibus movetur cum resolvit eas ignis <.> Et non est possibile ut <re> moveatur ab eis propter vehementiam commixtionis. Et invenimus causam evaporationis <esse> humiditatem non vehementem in eo commixtam, imo elevatur ab eo et egreditur."

of subtle vaporous does not occur suddenly, but gradually, and in thousands of years, and this because the substance of the principles is of uniform nature. If a resolution of the superfluous humid from them were to come about, since the humid does not differ from the dry on account of their strong mixture, the humid would at any rate be resolved with the dry, wherefore the whole would pass off into smoke; and the humid could not be separated from the dry during resolution because of the strong union which they have mutually. We see a manifest example of this in the sublimation of spirits. For when a sudden resolution comes about in them by means of sublimation, [63ra] the humid is not separated from the dry, nor the dry from the humid so that they be totally divided into the parts of their mixture. Instead, their whole substance ascends, or only a little of their components is disunited. Therefore, the long, gradual, regular, resolution of the subtle, smoky, humid is the cause of the metals' thickening. Nor can we make this thickening: therefore we cannot follow nature by this means. Hence our intention is not to follow nature in her principles, nor in the proportion of miscible elements, nor in the manner of their mutual mixture, nor in the equalizing of the thickening heat, for all these things are impossible and totally unknown by us. It remains, therefore, that we destroy the arguments of the sophists, who do not know this most excellent science.

**< 10 > Discourse on the Solutions to the Sophisms of Those  
Attacking the Art "Simply"<sup>15</sup>**

If therefore they say that we do not know the proportion of the elements, their mutual mode of mixture, the equalizing of the heat thickening the metals, and the many other causes and

<sup>15</sup>The term "simply" (*simpliciter*) refers to the fact that these sophistical arguments are based on reason alone, without empirical support. "Geber" contrasts these at 63vb, 18 *et sparsim*, with sophistical arguments "from data" (*a datis*), based on an appeal to laboratory experience.

accidents controlling the action of nature, we concede this to them, but they still do not refute our science on account of this, for we neither wish to know these things, nor can we; nor can they lead to the work. But we take another starting point for ourselves, or another way of the metals' generation in which we *can* follow nature. If they also say that the philosophers and princes of this world have desired this science and have not found it, we reply that they lie. For certain princes - although few, mostly of olden times, and wise, but even some in our age - have been known to have searched out this science. But the latter have wished to pass it on to such sophists neither orally nor in writing, since they are unworthy of it. Therefore, because they do not see any to possess this science, error falls upon their minds, so that they consider none to have found this science. If they argue in addition, fantastically asserting our incapability not only to imitate nature in weak mixtures, such as the mixture of an ass and a bull, but therefore also in durable mixtures, we say that their error is multiple. For their argument is not a necessary one, by which we would be forced to concede that our art does not exist, since they strengthen their fantasy and error by passing from a similar or rather a greater subject to a lesser one, in which argument there is no necessity, but rather contingency, as in many others. Thus we declare our argument by another way, by proving that they make an incorrect comparison between the weak composition of animal mixture, and the strong, firm one of minerals. And this is because in animals and other living things in which the composition is weak, the proportion alone does not perfect, nor the miscibles of the proportion, nor the qualities of the miscibles, nor the complexion that follows from their mutual action and passion, which comes from the aggregation of their primary qualities. [63rb] But it is the soul, according to the opinion of many, which is one of the secrets of nature, as if from the quintessence or from the prime mover. We also have said this, following the judgement of many, and we do

not know the secret of it. Therefore we do not know how to perfect such things as these, although in them there be but a weak mixture, because we do not know how to infuse the perfective agent - i. e. the soul - into them. From this it is plain that the defect due to which we may not perfect a bull or goat is not from the part of the mixture, but from the absence of the soul's infusion. For otherwise we would know how to make a composition of any degree of weakness or strength, imitating the way and course of nature according to our artifice. In metals, therefore, the perfection is less than in things of weak mixture, and this perfection involves their proportion and composition rather than something else. Therefore, since the perfection in them is less than in the others which we have described, we can surely perfect them, but the others not. For God the perfect, highest, and glorious, has diversified their perfections alternately, and multiply. For in those in which the composition which is according to nature was weak, he put a greater and nobler perfection, which was due to the soul. But He has fashioned some of stronger and firmer composition such as stones and minerals, although He put less perfection in them and of a less noble sort. And so it appears that the sophists' comparison according to the manner of mixture is not good. For we do not know how to make a bull or a goat not by reason of its composition, but because of its perfective form, for the perfection in a bull or goat is nobler and more hidden than that which occurs in a metal. But if they argue otherwise, that species is not mutated into species, we say that they lie again just as they have been accustomed to do, rather than speaking the truth about these things. For species is mutated into species according to this way - when an individual of one species is mutated into that of another. Since we see that a worm - both naturally and by artifice - is turned into a fly which differs from it in species, that a strangled calf is turned into bees, wheat into cockle, and that a strangled dog is turned into worms by the putrefaction of boiling. But we do not do this, though nature,

to whom we minister, does. Similarly, we do not mutate the metals, but nature, for whom we prepare the matter according to artifice. For she herself acts by herself, but we are her helpers. And if they should argue and strengthen their opinion sophistically by another method saying that nature perfects the metals in thousands of years, and you cannot last for thousands of years - we say that nature, acting upon her own principles, according to the opinion of the old philosophers, perfects them in thousands of years. But because we cannot follow these principles, therefore whether nature perfects in thousands of years, or in [63va] more, in less, or in a moment, their argument does not hold. We already stated cursorily in the preceding that we cannot imitate nature in her principles, and we shall demonstrate it more fully in the following. But according to the opinion of other trustworthy and perceptive men, nature quickly perfects her intention, in one day or less time. Even if this should be true, we still cannot imitate nature in her principles, which we will prove more openly, with sufficient demonstration. But we concede the rest of this objection, since we acknowledge that the whole is true. And if they should say that the perfection of metals is derived from the position of one or more stars, which perfection we do not know, we say it is not necessary for us to know this position, since there is no species of generables and corruptibles in which the generation and corruption of each of its individuals fails to occur every day, whence it is manifest that the position of the stars is every day perfective and corruptive of whatever species of individuals. It is not therefore necessary for us to wait for this position of the stars, even if it should be useful. But it is sufficient merely to arrange the matter for nature so that she, herself wise, in turn coordinate it with the suitable positions of the mobile bodies. For nature cannot perfect without the motion and position of the mobiles. Whence if you have arranged your artifice for nature, and you have considered whatever belongs to the contingencies of this magistry, it ought to be perfected under the

proper position by nature, due to its agreement with her, without consideration of that. For we see, when we want to lead a worm into being from a dog, or other putrescible animal, we do not consider immediately the position of the stars, but rather the disposition of the ambient air, and other perfective causes of putrefaction other than that. And from such a consideration, we know sufficiently how to lead worms into being according to nature, since nature finds a position of the stars agreeable to herself, though by us it be unknown. And if they say that perfection is granted in an instant, whereas our preparation does not occur in an instant, and they conclude from this that the art is not perfected by artifice, we say their heads are void of human reason, and closer to beasts than men. For they conclude from premises relating themselves with no true relation to that which was inferred. For only this sort of reasoning applies to their argument: "an ass is running, therefore you are a goat."<sup>16</sup> This is because even if the preparation does not come about in an instant, that does not mean that the prepared cannot be given form or perfection in an instant. For the preparation is not the perfection, but rather the matter's ability to receive a form. And if they say it is easier to destroy natural things than to make them by artifice, while we can hardly destroy gold, and they conclude from this that it is impossible to make that, we respond thus: [63vb] they do not argue from any necessity by which we would be forced to believe that we cannot make gold. For while what is destroyed with great difficulty is made with still greater difficulty, it is still not impossible that that can be made. We have described the cause of this - that it has a

<sup>16</sup>This proposition betrays a knowledge of the *sophismata* literature prevalent in the late medieval university. Consider the following examples of *sophismata* reprinted by Prantl from Albert of Saxony - #21. "Omnis homo, qui est albus, currit, posito quod sint aliqui homines albi et aliqui nigri et nullus niger currit." #69. "Tu non potes vere negare, te non esse asinum." #75. "Non aliquis homo currit, si aliquod animal currit." #93. "Nullo homine currente tu es asinus." #228. "Omnis homo potest esse asinus, posito quod nihil currat nisi asinus." (C. Prantl, *Geschichte Der Logik Im Abendlande* (Leipzig: S. Hirzel, 1870), pp. 84-88.)

strong composition; hence it is impossible for it to have an easier resolution; therefore it is destroyed with difficulty. This is what makes them opine that its construction is impossible. But because they do not know its natural composition, they therefore do not know its artificial construction and destruction, from the course of nature. Although they have perhaps found that it be of strong composition, they have not yet tested how great the strength of its composition may be.

**< 11 > Concerning the Diverse Suppositions about This Art  
Made by Diverse Men, and Concerning Their Errors  
Taken in General**

We have therefore sufficiently reported the fantasies of the sophists to you, dearest son. It remains, therefore, that we pass from what we made you intent upon in the foregoing to those things that must be determined as a result of the arguments of men denying the art from empirical data. We must also dispute about the essence of those principles that are determined to be from the intention of nature. After that determination, we will also supply a discourse on those principles themselves, as they are the principles of this magistry of ours. In the first delivery, we will produce a discourse on each of the principles singularly, in the following, a universal discourse. Now let us report the arguments of those negating the art from empirical data, and first their premisses. For we find many supposing this art to start from diverse principles. Some affirm this science and magistry to be found in spirits, others in bodies, others in salts and alums, niters and boraxes, and others in all vegetable matter. From all these, also, some evaluating this divine magistry have passed it on to posterity in part well, and in part badly, but others have transmitted it in a wholly bad way. It happens that we have collected the truth from the multiplicity of their errors with the conjecture of difficult,

laborious precaution, with long, tedious experience, and with the deposition of much money. Their error has very often won out over the reason of our own mind, and induced our desperation. They are therefore reviled into eternity, for they have left behind the blasphemies of their error; and they have poured out malediction upon the philosophers and not truth; rather, they have discharged a diabolical instigation lasting after their own deaths.<sup>17</sup> And I would have to be reviled if I did not correct their errors and teach the truth in this science in the degree that the art better demands. For this magistry does not need a hidden discourse, nor a wholly open one. Therefore we will teach it with such discourse which will not, [64ra] as it happens, evade the understanding. But this will be very deep for ordinary men, while it will shut up both terms pitiably from fools - all in this single delivery of ours. Returning to our proposition, we therefore say that those who posit that it is in spirits are multiply diverse.<sup>18</sup> Some claim it is necessary to seek the philosopher's stone from quicksilver, others from sulfur, and from its relative.<sup>19</sup> And of these, some claim it is sought in marchasite,<sup>20</sup> others in magnesia.<sup>21</sup> Some claim it is sought from

<sup>17</sup> This passage is rewritten from Jabir's *L. septuaginta*, ed. cit. p. 350:

"Excommunicatus sit qui legerit hunc meum librum et invenerit in eo rem cum preparatione sua, nisi experiatur ipsam ad hoc, ut sciat veritatem nostram. Ego sim excommunicatus, si dixerit aliquid diminutum, aut eorum occultum, aut cum alio commixtum, nisi quod dixerit esse occultum."

<sup>18</sup> Lists like the following, which give the views of different alchemical "schools" with "quidam...et alii," may be found in the *Liber septuaginta* (pp. 340-2) and *De perfectio magisterio* (p. 640) *inter alia*.

<sup>19</sup> The "compar sulphuris" refers to "arsenic" or rather to  $As_2S_3$ , yellow auripigment, and  $As_4S_4$ , red realgar. Since these minerals share volatility, combustibility, fusibility, and sometimes color with sulfur, they are referred to as its "compar."

<sup>20</sup> "Marchasite" refers to a class of metallic sulfides which can be made to give up their sulfur on heating. Dorothy Wyckoff gives some modern equivalents: "the following are possibilities: "golden," pyrite; "silvery," marcasite; "tinny" or "lead," arsenopyrite, cobaltite, smaltite, stibnite, bismuthinite" (*Albertus Magnus: Book of Minerals*. (Oxford, 1967), p. 246).

<sup>21</sup> "Magnesia" refers primarily to manganese oxide, used in glass technology.

tutia<sup>22</sup> others from sal ammoniac;<sup>23</sup> some, however, say it is in bodies. Of these, some say it is in lead, others in another of the bodies. Still others say it is in glass, and some in gems. Others say in diverse types of salts,<sup>24</sup> alums,<sup>25</sup> niters,<sup>26</sup> and boraces,<sup>27</sup> others in every genus of vegetable matter. To each of these supposing according to his own supposition there is an adversary: opposing them, he believes that he simply opposes the art. Each of the two sects is devoid of reason in many respects.<sup>28</sup>

#### < 12 > Concerning Those Denying the Art through Supposition in Sulfur

Some therefore supposing that it is found in sulfur, have expended their labor in sulfur. Not knowing its perfect preparation, they have left their preparation incomplete. For they believe the perfect preparation to be only by cleansing and

<sup>22</sup> Tutia refers primarily to zinc oxide deposited during the production of brass from calamine and copper, and from the refining of impure copper. It may also refer to the mineral zinc carbonate.

<sup>23</sup> Sal ammoniac is of course the quite volatile reagent  $NH_4Cl$ , obtained from chemical decomposition of animal products, such as hair and urine. The reagent's solvent properties, volatility, and ability to be used as a metallic flux explain much of the interest it held for alchemists.

<sup>24</sup> As we showed in Chapter III, this category included not only common salt (NaCl), but virtually any product made by roasting followed by leaching, such as *sal alkali* ( $Na_2CO_3 \cdot H_2O$ ).

<sup>25</sup> "Alums" here include our "alum" ( $KAl(SO_4)_2$ ), along with other metallic sulfates such as "vitriol" or "atrament," primarily copper sulfate and iron sulfate.

<sup>26</sup> "Niters" probably refer both to soda and saltpeter ( $KNO_3$ ), which were often confused.

<sup>27</sup> "Boraces" refer primarily to variously pure or impure forms of our "borax" ( $Na_2B_4O_7$ ); soda was also sometimes subsumed into the class of "boraces."

<sup>28</sup> This phrase, and indeed, the whole concept that both the alchemists and their opponents are "devoid of reason" derives, I believe from the *De re tecta*. Let us quote from p. 327 of Anawati's edition: "Mihi autem excusatio non fuit in arte mea quin scirem intentione < m > ambarum sectarum. Consideravi ergo libros affirmantium artem et inveni eos vacuos a rationibus quae sunt apud omnem artem et reperi plurimum ejus quod in ipsis contine[n]tur alienationi similiter. Et aspexi libros contradicentium et reperi contradictionem debilem et ratiocinationem debilem, cujus simili ars non destruitur."

purification; this, moreover, is done by sublimation. Therefore, it follows from their design that they consider that sublimation alone is the perfection of sulfur's preparation and also that of its comrade, namely arsenic. Coming therefore to projection, that is to the purpose of this alteration, they saw the sulfur or arsenic to burn up and vanish, and not to make a long stay in the bodies, and the bodies to be left more dirty by them than they were before, without such projection. Therefore, because they realized their delusion only in the end of the work, and they had considered for a very long time that this science was procured from sulfur alone, when they did not find it in that they argued that this science could not be found in another. Wherefore, since it is not found in this nor in another they argue that it is found nowhere.

#### < 13 > Discourse on the Response to the Foresaid

Responding to them briefly, we say that they are insufficiently experienced in this science, and understand very little, because they suppose that sulfur alone is our material. Even if this were a true supposition, they would still be deceived about the manner of preparation, for they believe that sublimation alone is sufficient. For they are like a boy closed up in his house from birth to old age, not believing the world to extend beyond the confines of his own dwelling, or farther than the eye can see. For these men do not employ their labor [64rb] in many stones; therefore they could not judge from what our medicine may be elicited and from what not; indeed they have excused their hands from labor. Therefore they have been forced - and justly - into ignorance of what would or would not be perfective of their labors. But why is their work defective? We say because they have released the burning and flight in sulfur, which not only do not perfect, but both scatter and destroy.

#### < 14 > Discourse on those Negating the Art from Supposition of it in Arsenic

But others considering it to be necessary that this stone be found in the same and its comrade, and approaching more deeply the consummation of this work, have not only cleansed the burning sulfureity by sublimation, but have also attempted to remove the remaining flight in that. But deceit likewise came upon their projection, because the sulfur did not adhere stably in these bodies themselves, but bit by bit, and gradually, it disappeared, leaving the body to be transmuted behind, in its former disposition. They, similarly attacking, argue as the first, and responding to them as to the first, we affirm the art, and we know it to exist, because we have seen and touched the truth.

#### < 15 > More Particular Discourse on those Negating the Art from Supposition in Sulfur by a further Treatment of it

Others, because they have looked more deeply into this, have cleansed it and removed its flight and burning. It has been made fixed and earthy by them, yielding no good fusion in the heat of fire, but a glassy slag alone.<sup>29</sup> Hence they could not mix it with bodies in its projection. Therefore, they argue as the first, and we respond to them as to the first, for they have released a defective work, and they have not known how to complete it. For they have not known to examine ingression, which is the final perfection. In all the other spirits, likewise, there is the same manner of preparation, except that in quicksilver and the tutias, we are freed from greater labor, which is due to the lack of burning. For these do not have combustibile and inflammable sulfureity, but only

<sup>29</sup> Metallic arsenic sublimes off at c. 450° C. The slag would be composed of silicate-rich impurities.

flight.<sup>30</sup> But marchasite and magnesia have every genus of sulfureity, marcasite more and magnesia less. All have flight, but quicksilver and sal ammoniac more, and sulfur less, less yet the comrade of sulfur, fourth less marchasite, fifth less magnesia, sixth less, finally, and thus less than all others, does each tutia participate in flight, one more, the other less.<sup>31</sup> Therefore, because of their flight, great delusion comes upon certain researchers, in the operations of their preparations, and [64va] likewise in their projections. Thus it is necessary that they themselves argue and destroy as those supposing in sulfur, and we respond as to those supposing in sulfur.

**< 16 > General Discourse on those negating the Art on account  
of the Supposition of it in the Administration of all  
Spirits with Bodies**

There are also others claiming that they fix spirits in bodies during their experiments, with no other preparation attaining to this. But deceit has likewise brought anxiety and desperation to the same; and they have been forced from that to believe that this science does not exist, and to argue against it. For the cause of their confusion and of this incredulity is that the spirits, during the fusion of the bodies, abandon them, do not adhere to them, and flee the fierceness of the fire, only the bodies remaining therein. For the spirits cannot endure the oppression of the fire's impiety, on account of their flight, which has not been removed from them. Delusion likewise occurs sometimes because the bodies flee the

<sup>30</sup>Rewritten from *De re tecta*, pp. 328-9: "Excusamur ergo ne laboremus in destructione adustionis ab eo < argento vivo > tantum."

<sup>31</sup>Note this interesting attempt to determine the relative volatility of the "spirits." I have encountered nothing else like it in the early literature: most likely it reflects the author's own experimentation. The mention of "each tutia" (*tutia utraque*) may refer to the mineral and artificial varieties.

fire with them,<sup>32</sup> and this is when the unfixed spirits have adhered to the depths of the bodies inseparably, since the totality of the volatile overcomes the totality of the fixed.<sup>33</sup> Whence they also argue as the first, and we respond to them as to the first. Their whole refutation of the art is this: if, sons of doctrine, you wish to transform bodies, then, if it is possible for this to happen by means of some medicine, it is necessary that it happen by means of the spirits themselves. But it is not possible for them, unfixed, to usefully adhere to bodies; on the contrary they flee, and leave them dirty. But it is not possible for them once fixed to enter the bodies since they have become an earth which is not melted. And when they are shut up in bodies, they seem fixed, but are not. Either they recede from them while the latter remain, or both flee together. Since it is impossible to find this art in quite closely related material, and since it may not be found in more disparate matter, it may therefore be found nowhere. But our response is this: since they have not known all that is knowable about this, they have not therefore discovered the whole operation of it. Therefore, what is really the error of an insufficient consequent, they consider their strong-point.

**< 17 > General Discourse about these negating the Art  
from Supposition of it in Bodies and First in Tin**

But certain men have posited that to be in bodies, but when they have arrived at the work, they were fooled, considering each of the two tins, namely the bluish and the impure white to be more similar to, and to approach more to the nature of the sun and moon: they considered the bluish to be more similar and to approach more to the sun, and less to the moon, but the white

<sup>32</sup>Darmstaedter (*Die Alchemie des Geber* (Berlin: 1925), n. 22), argues that this may be a reference to volatile metallic chlorides.

<sup>33</sup>This passage is borrowed from *De re tecta*, p. 335: "Ita quod si vicerit summa volatilium summum fixi[t] volabit cum ea."

more to the moon and less to the sun.<sup>34</sup> Therefore, some of these, affirming tin - namely jove - to be very similar to luna, and different only in its sound, softness, and liquefaction, believing it to be easily liquefiable and likewise soft because of a superfluity of its moisture, but to possess its "creak"<sup>35</sup> from the fugitive substance of quicksilver in it separating its particles, [64vb] have exposed it to the fire. Calcining that, they have held it in the fire as long as it could stand, until its calx was white, which they could not reduce when they wished to; rather they considered that impossible.<sup>36</sup> Some of them have reduced something from that calx, and they have found the creak, softness, and speed of liquefaction in it to be as before. Therefore they have believed this to be impossible by this method. And they are drawn into disbelief, so that they impute the art of hardening tin not to be capable of discovery. But of these, some have calcined and reduced, and again calcined and reduced, with the removal of its scoriae, and with the expression of a greater fire. Thus, often repeating their work on that, they saw it hardened and without a creak. But because they did not wholly remove its rapidity of liquefaction, their minds erred, and they considered that they could not arrive at that. Others of these, wishing that retardation of liquefaction and hardness show forth in it with the help of the hard bodies, have fallen into delusion, so that whatever of the hard bodies is mixed with it by them is broken; nor does any preparation aid them in this.

Therefore, since they could prepare it neither with the hard metals nor with fire, they excused themselves from the long tedium

<sup>34</sup>I do not agree with Darmstaedter, n. 24, that this refers to lead and tin. Pliny (*Historia naturalis* Bk. 34, cap. XVI) refers to "plumbum nigrum" (lead) and "plumbum candidum" (tin), but not to two "tins." Albertus Magnus, on the other hand, refers to two sorts of tin, a softer kind coming from Germany, and a harder tin from England (Wyckoff, p. 217). I propose that the *Summa* also refers to these two forms of our Sn.

<sup>35</sup>The "creak" of tin is an auditory phenomenon caused by the rubbing together of microscopic crystals.

<sup>36</sup>Production of tin oxide.

of discovering the art, saying it to be impossible. And they believed - arguing insistently through this against the art - that they could propose it not to exist. Adding many medicines from tin and the hard bodies, they saw them to make no transmutation, nor to be agreeable to it, but in fact to be corruptive, acting against their own goal. Hence they threw away their books, changed their opinions, and said that the art is worthless. Opposing them, we respond with our first response.

#### < 18 > Particular Discourse on those Negating the Art From Supposition of it in Lead

There is also the same manner of delusion to be found in saturn, with this difference only, that it does not break the bodies, and returns from its calx quicker than jupiter does. They cannot, however, remove its lividity because they do not know how. Therefore, they cannot whiten with a good whitening by means of it. Nor could they - through their fantasy - unite it stably in the stable bodies without it happening to recede from the mixture, due to a forceful expression of fire.<sup>37</sup> And this is what especially deceives them in its preparation while considering this science to be able to be found in nothing but in that itself - that it receives, after two reductions from its calx, not more hardness, but rather more softness than it before had.<sup>38</sup> And they did not see that it was bettered in other differences; therefore, when they impute this science to be found better and nearer in that, and they do not find [65ra] it, they are forced by this to believe and to argue that this is not science, but delusion. Therefore they err as the foresaid.

<sup>37</sup>Darmstaedter, n.28: this separation of lead from its alloys would be due to its oxidation and conversion to litharge, and also to its vaporization.

<sup>38</sup>Darmstaedter, n. 29: any softening of lead due to calcination (i.e. oxidation) and reduction would have to result from its increased purity.



**<19> Discourse about those negating the Art from Supposition  
of it in a mixture of the hard Bodies with the Soft**

But others compounding hard bodies with hard and soft with soft according to their agreement, have wished the bodies alternately to be transmuted by them and to transmute. And they could not do this, thanks to their ignorance: for example mixing sol and luna with venus or with any other of the metals, they do not transmute them into sol and luna with a firm transmutation so that the fire does not, with a strong expression, arrange that each of them be separated from the mixture, burn up, or return to its prior nature. Rather, some of them remain in the mixture more, some less, as we have sufficiently determined. Thus, these delusions arriving thanks to their ignorance make such men despair of this art, and argue that it does not exist.

**<20> Particular Discourse on those Negating the Art from  
Supposition through a further Treatment of the  
Hard with the Soft**

But others inquiring into this have pondered more deeply and profoundly, and have exercised their ingenuity; they have wished to find a way so that the hard united to the soft would stably harden them, and the perfect united to the imperfect would lead them back to perfection, and generally so that they would be mutually transmuted and transmute, with a firm transmutation. Thus they wished to discover the similitude and affinity of those bodies, both by means of medicines and with the aid of fire, namely with a thinning of the gross, such as venus and mars, and a thickening of the subtle, as in jupiter and the like. Some of them believing this method to perfect, have also been fooled in the commixture of these two bodies, either because they made something wholly

breakable, or entirely too soft (not having been changed by the hard), or too hard (not having been changed by the soft). Thus they did not find this agreement, and therefore they have denied that the art exists.

**<21> Discourse on those negating the Art by Supposing  
It to Lie in a Final Treatment of the  
Hard with the Soft**

But others examining still more deeply, have wished to alter the bodies by extracting their souls, and to alter them all with the extracted soul.<sup>39</sup> They could not arrive at that with their experience and they were cheated of their intention, so they consider that the art cannot be found. But others trying to perfect the bodies themselves with fire alone have been deluded in their opinion because they have not known how to arrive at their goal. And they imputed, from this, that it [65rb] does not exist. All of these we oppose as those before.

**<22> Discourse on those negating the Art from Supposition of  
it in Gems, Glass, and the Like**

But others have posited it to be in glass and gems.<sup>40</sup> They have attempted to make alterations in bodies through the use of glass and gems, and they could not, because that which does not enter does not alter. And neither glass nor gems enter the bodies, therefore they do not alter them. But even if they have tried to unite glass with them, since they can hardly do this, they still do not have their proposition, since they turn the bodies into glass. On

<sup>39</sup>The technical term "anima" usually means "oil" in medieval alchemical literature, and is defined as such in the *De investigatione perfectionis*, p. 145 of our edition.

<sup>40</sup>The use of glass to make an elixir is described on pp. 100-2 of the *De investigatione perfectionis*. The *Liber septuaginta* (342) speaks of "quidam" who say that a tincture can be made from hyacinth or pearls.

account of this error, they consider error to fall upon the whole, and thus that it does not exist. We respond to them that they work with improper material; therefore improperly concluding, they cannot oppose the art from their errors.

**<23> Discourse on those negating the Art from supposition of it in salts and alums**

There are also others supposing that it is found in salts, alums, niters, and boraces. And indeed they can attempt it in these, but we assert that they cannot have it therefrom. Therefore, if after their attempt they find little useful transmutation, namely with dissolution, coagulation, and cooking, they do not destroy this divine art, since it is necessary and known. But it is possible to find some alteration in all these, although it is very remote, and extremely hard. It is proven to be still more difficult to work in all other growing things. Therefore they who posit it to be in all vegetables certainly posit something possible, but not for them, since they are more lacking in their labor than it is possible to perfect the labored for. Therefore, even if such as these do not find the art with their labors, it is not legitimate for them to argue that it cannot be found by any labors.

The foresaid errant practitioners have posited their one medicine and supposed no other beyond it. All these have now been refuted. But many others, as it were infinite numbers, making compositions of all or some of these things under diverse proportion, have been ignorant, and proceed unwisely. Their error is extended into infinity: since the diversity of proportion of miscibles is infinite, and the diversity of the number of miscibles is infinite, and error comes about infinitely in both infinities, sometimes from excess, and sometimes from defect, it is impossible to correct these. But we also, refraining from length and prolixity of discourse, do not wish to dwell upon infinities, since we will

teach the universal science in a few words, by which science they could emend the infinity of their errors, and correct them. But now let us examine the natural principles according to all their causes, as we have made you intent upon from the beginning, in our commemoration of them.

**[65va] <24> Universal Discourse on Natural Principles, According to the Opinion of the Ancients**

We intimate to you, therefore, that the natural principles in the work of nature, according to the opinion of some who were from a sect of those imitating our art, are a fetid spirit and living water,<sup>41</sup> which we grant to be also called dry water. And we have divided the fetid spirit, for each is white, red, and black, in its hidden part, in the magistry of this work, but each in its manifest part tends toward redness.<sup>42</sup> Therefore we will tell with brief, and also sufficiently complete discourse, the generation of each of these, and also the method of its generation. It is therefore useful that we enlarge and dilate our discourse, and that we devote a single chapter to each natural principle. So we will say that each of these *in genere* is of very strong composition and uniform substance. This is so because the particles of the earth are united through the smallest to the aerial, watery, and fiery particles in such a way that none of them can separate from the other during their resolution. But each is resolved with the other on account of the union that they mutually have received through the smallest, resolved by the

<sup>41</sup>I.e. sulfur and mercury. I do not know the precise source of this statement.

<sup>42</sup>The terms "occultum" and "manifestum," "hidden" and "manifest," derive from the *bāṭn* and *zāhir* of the Arabic alchemists. The works of Jābir ibn Ḥayyān especially helped to popularize the theory that minerals contain an inner nature opposed to their exterior one. Jābir often claims that each metal contains its opposite hidden within (cf. Kraus, op. cit., II, p. 2). Since these two terms were taken up by the earlier Latin authors upon whose works the *Summa* has drawn, e.g. the pseudo-Aristotle of the *De perfecto magisterio*, we cannot be sure of the precise source of this locus.

even heat, which is augmented, beaten back,<sup>43</sup> and equalized in the mineral viscera of the earth, according to the proper course of nature, following the requirements of their essence, in agreement with the opinions of certain ancient philosophers.

Others, however, have said otherwise - that quicksilver was not a principle in its own nature, but only if altered and converted into an earth; likewise sulfur only if altered and changed into earth. Whence they said that a principle, in the intention of nature, was something other than a fetid spirit and a fugitive spirit. The reason by which they were moved was that they did not find anything in argentiferous mines, or in those of the other metals, that was quicksilver in its own nature, or anything that was sulfur, similarly. But they found each of them per se, separate; and they were found in their own mine, in their own nature. And similarly, they also affirm this by another method, namely that there is not transit from contrary into contrary except through a medium disposition.<sup>44</sup> Therefore, since it be thus, they are forced to confess and believe that there is not a transit from the softness of quicksilver into the hardness of any other metal except through a disposition which is between their hardness and softness. But they do not find anything in which this medial disposition is preserved. Therefore they are for this reason compelled to believe that quicksilver and sulfur in their own nature are not the principle

<sup>43</sup>I have translated the peculiar expression "calore...conculcato" in accordance with a usage supplied by Urso of Calabria (*Aphorismorum*, ed. Rudolf Creutz, in *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin*, V (1936), p. 30): "Unde vapor ignis exire prohibetur, retentus conculcatur, conculcatus ingrossatur et sic a suo superiori motu impeditus extinguitur. Quod manifeste videtur in candela accensa in pixide inclusa, in qua dum ignis libere surgit et moveri nequeat, inclusione conculcatus perimitur." Here as elsewhere, the *Summa* has imbibed the terminology of the Salernitans.

<sup>44</sup> Albertus Magnus makes use of this Aristotelian maxim in a different context, where he attempts to explain the formation of *media mineralia* such as salts and atraments: "Sapiens enim et diligens natura quae omnis materiae complet aptitudinem, ab extremo ad extremum non transit, ut dicit Aristoteles, nisi compleat omne medium" (*De mineralibus*, ed. Borgnet (Paris, 1890), vol. V, p. 98A).

from nature's intention, but that there is another, which follows from the alteration of their essences in the root of nature into an earthy substance. [65vb] The method of this - as before - is that each of them is converted into an earthy nature, and a very subtle vapor is resolved from both these earthy natures by the heat augmented in the viscera of the earth. This double vapor is the immediate material of the metals. But this vapor cooked by the tempered heat in its mine, is converted into the nature of a certain earth. Thus it receives a certain fixation, which the water flowing through the viscera of the mine, and through the sponginess of the earth, dissolves. And it is united to that with a firm and natural union. Hence, as they said before, opining that the water flowing through the pores of the earth encounters a soluble substance from the substances of the earth in its viscera, it also dissolves the earth, and is uniformly united with it. This continues until whatever has been dissolved of the substance in the viscera of the earth and the flowing, dissolving, water become one with a natural union. All the elements arrive at such a mixture according to a proper, natural, proportion, and they are mixed through the smallest particles until they make a uniform mixture, this mixture is compacted and hardened by gradual cooking in its mine, and it becomes a metal. These philosophers are also close to the truth, but they still do not conjecture the pure truth.<sup>45</sup>

#### <25> Particular Discourse about the Natural Principles of Bodies

We have just determined the natural principles of the metals in a universal discourse. It remains, therefore, that we now set down a chapter on each one. Therefore, since there are three, namely sulfur, arsenic, and quicksilver, we shall first add a chapter

<sup>45</sup>Cf. our discussion of this passage in "The Genesis of the *Summa perfectionis*," *Les archives internationales d'histoire des sciences*, 35:1985, pp. 284-287.

on sulfur, second on arsenic, and third, on quicksilver. Then we shall set down a specific chapter on each of the metals - which are their effects - according to the work of nature. Now we must pass to those principles that are the foundation of this magistry, assigning all their causes.

### <26> Particular Discourse Concerning Sulfur

We say, therefore, that sulfur is a fatness of the earth, compacted in the mine of the earth by a temperate cooking until it be hardened and become dry; when it is hardened, it is called sulfur.<sup>46</sup> Sulfur, to be sure, has a very strong composition, and is likewise uniform and homoeomerous in its particles, because it is homogeneous.<sup>47</sup> Thus its oil is not borne away from it by distillation, as it is from other things having oil. Those who seek to calcine it without any loss of the substance of that which is treated, work in vain, since it is calcined only with great diligence, and with much dissipation of its substance. For from one hundred parts, you retain hardly three sufficiently, after this calcination.<sup>48</sup> It cannot be fixed, moreover, unless it be calcined first. But it can be mixed, its flight somewhat retarded, and its burning repressed, and with a substance mixed into it, it is calcined easier. [66ra] Whoever therefore seeks to elicit this work from sulfur with a preparation of itself alone, may not elicit it, since it is perfected only with another mixed in.

<sup>46</sup>The inspiration for this description of sulfur may be Avicenna's *De congelatione, ed. cit.*, p. 51: "Aquaitas (!) vero sulphureorum mixta est cum terra forti commixtione confectione caloris donec facta sunt unctiosa et postea coagulata ex frigore."

<sup>47</sup>The expression "omniomera," a transliteration of *homoiomera*, occurs in some manuscripts of Henricus Aristippus's translation of the *Meteors*, Bk. IV. It appears in the version printed with the commentary of Thomas (*Sancti Thomae Aquinatis...opera omnia* (New York: 1949), XIX, p. 427A) but has been replaced in the well-known Venice edition with "similarium partium [corpora]" (*Aristotelis opera cum Averrois commentariis* (Venice: 1562), V, 479va).

<sup>48</sup>This seems to be an original observation. Darmstaedter, n. 33, points out that the residue would not be our sulfur at all, but extraneous matter.

Without that, the magistry is delayed up until desperation. And along with its comrade, it becomes a tincture, gives the complete weight to each of the metals,<sup>49</sup> purges it from fetidness, and brightens and perfects with the magistry, without which it performs none of these things, but rather corrupts and denigrates. Let you not, therefore, use it without the magistry. He who knows how to mix it in its preparation, and to make it friendly with bodies, will know one of the greatest secrets of nature, and one way to perfection, since there are many ways to one effect, and to one intention. Whatever body is calcined with sulfur doubtless acquires weight. Copper also takes from it the effigy of the sun. It is also united with mercury, and if associated through sublimation, uzifur is produced.<sup>50</sup> Finally, all the bodies except sol and jove are easily calcined by it, but sol with great difficulty.<sup>51</sup> And quicksilver is not coagulated by it with feeble artifice, into a sol or luna that are useful, as certain fatuous philosophers have imputed. Thus we say that whatever bodies have less humidity are calcined more easily by sulfur than those which have much. This brightens every metallic body, by God the Highest, for it is both alum and tincture.<sup>52</sup> It is

<sup>49</sup>Throughout the *Summa*, the "comrade of sulfur" (*compar sulphuris*) refers to arsenic sulfide. The reference to the augmented weight of a metal treated with sulfur or its "comrade" could therefore be interpreted to mean the increase in total weight of a given sample of metal due to the formation of metallic sulfides. However, since the *Summa* is not talking about *natural* sulfur or arsenic sulfide, but speaking rather of an *alchemically produced* variety, it is at present impossible to determine the exact product.

<sup>50</sup>Reference to artificial production of cinnabar (= Arab. *uṣfur* or *aṣfar*) from heating of mercury and sulfur.

<sup>51</sup>Gold does not enter into a chemical combination with sulfur on heating, but it is possible that a sustained heating might produce an alteration of physical state, converting thin gold leaves into powder: cf. Darmstaedter, n. 257.

<sup>52</sup>This seems to be a pun. Since alum was customarily applied as a mordant to cloth during the dyeing process, the *Summa* could be saying that sulfur acts both as mordant (*alumen*) and dye (*tinctura*). A related pun is contained in "Geber's" *De investigatione*, where he states that *alumina illuminant*, a reference to the role of alum in dyeing. Ruska has found this wordplay in Isidore of Seville, who says that *alumen vocatur a lumine*. Cf. Julius Ruska, "Übersetzung und Bearbeitungen von al-Rāzī's Buch Geheimnis der Geheimnisse," *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin*, 6:1937, p. 66.

also dissolved with greatest difficulty, since it does not have salty parts, but oily ones, which are not easily dissolved in water. But what things are dissolved into water with ease or difficulty we shall show openly enough in the chapter on solution. But it is sublimed because it is a spirit, and if it be mixed with venus, then burned with it, a miraculous violet is produced.<sup>53</sup> And if it be mixed likewise with mercury, a delectible blue color also comes into existence, from their decoction.<sup>54</sup> Let no one impute that sulphur *per se* may complete the work of alchemy, for it would only be vain to believe that; but we prove this clearly in the following. The thick, bright kind is preferred. But let these instructions suffice as regards sulfur.

<sup>53</sup>Darmstaedter, p. 36, translates "mirabile violaceum" as "eine wunderbare blaue Farbe," then proceeding to explain this product as the so-called "copper-indigo," CuS. This, however, is not probable, since the *Summa* normally uses "celestinum" to denote "blue," and "violaceum" to mean "purple." It is true, however, that Cu<sub>2</sub>S can assume a violet color. Cf. Allison Butts, *Copper...* (New York: 1954), pp. 791-2. The same criticism applies to D.'s alternate interpretation of this substance as blue copper sulfate. Perhaps the *Summa* has regurgitated an incorrect source here, as in the following recipe.

<sup>54</sup>Here too Darmstaedter (p. 36) has employed the dubious technique of mis-translating a passage to make it more conformable to chemical practice. He renders "celestinus color et delectabilis" as "eine köstliche Farbe," though in other passages (e.g. p. 38) he translates "celestinus" as "blau." By here interpreting "celestinus" to mean "precious" ("köstliche") and thus obviating the problem of color, he can safely infer that the *Summa* is referring to vermilion. This is entirely incorrect, for the *Summa* indubitably means "blue" in every other case where it employs "celestinus" (e.g. 83va,14; 83vb,30, 42). The *Summa* has here fallen into the old pitfall of the Latin *de coloribus* writers that Daniel Thompson refers to as "the azure-vermilion tangle" (*The Materials of Medieval Painting* (New Haven: 1936), p. 155). These writers evidently confused the Arabo-Latin terms *uzifur* and *azenzar* (both meaning vermilion) with *azurium* ("blue"), with the result that a perfectly normal recipe for vermilion, usually employing mercury, sulfur, and sal ammoniac, became an unworkable process for making "azure." The usual form of the recipe - with sal ammoniac - is found in the *Semita recta* of pseudo-Albertus Magnus (ed. Borgnet, vol. XXXVII, p. 336), and more importantly, in the *De investigatione* (p. 239). The presence of sal ammoniac in the *De investigatione*'s recipe and its absence in the *Summa*'s once again illustrates Paul of Taranto's mature position, in which he tried to eliminate all reagents but the "principles of the metals" from the alchemist's laboratory.

### <27> Discourse on the Principle which is Arsenic

It remains now that we inspect arsenic. We therefore say that it is of subtle material, and similar to sulfur. But it differs in this from sulfur, in that it is easily a tincture of white and also red, whereas sulfur is a tincture of red easily, but of white with great difficulty.<sup>55</sup> Still, there is a yellow and red version of both sulfur and arsenic, which are both useful to this art. But there are many other genera which are not. Arsenic, moreover, is fixed just like sulfur. But the sublimation of each of the two is better if done with the calces of the metals. [66rb] However, sulfur and arsenic are not the perfective material of this work, for they do not complete it. But they are an assistant to perfection on occasion. Arsenic is preferred bright, flaky, and brittle.

### <28> Discourse on the Principle which is Quicksilver

Quicksilver, which to be sure is called mercury in the custom of the ancients, is a viscous water united in a total union through its smallest particles by the very temperate heat in the viscera of the earth to a subtle, earthy, white substance, until the humid be tempered by the dry, and the dry likewise by the humid. Hence it flees a flat surface easily, on account of its humidity. But it does not stick, although its humidity be viscous, because of its dryness,

<sup>55</sup>Here too Darmstaedter (p. 36) has wrought disastrous simplifications on the text, condensing the entire passage from 66ra,39-40 to "er die Tinktur für Weiss ist, der Schwefel die für Rot." Obviously the *Summa* wishes to employ "arsenic" as both a white and red (or yellow) dye; the former color is attributable to the lightening of reddish metals by the presence of metallic arsenic (e.g. the alloy of copper and arsenic). The reddening by arsenic is an attempt to use realgar and orpiment as dyes of the noble metals. Whether such a process would involve real chemical change or the mere introduction of reddish material into or onto a metal, is unclear. The *Summa*'s statement that sulfur is difficult to use as a white dye results from the fact that no such "white sulfur" exists in nature.

which tempers it, and prevents it from sticking.<sup>56</sup> It is also, as some say, the matter of the metals, along with sulfur. It adheres to three of the minerals easily, namely to saturn, jove, and sol, but it adheres to luna with more difficulty, and with still more to venus than to luna, and it adheres to Mars in no way, except by artifice.<sup>57</sup> From this you may elicit a very great secret. For it is friendly and appeasing to the metals, and a means of joining tinctures. And nothing is submerged in quicksilver except sol. But jupiter, saturn, luna, and venus, are dissolved by it and mixed with it; without it, none of the metals can be gilded.<sup>58</sup> If it is fixed, it is a very pleasing tincture of red, of shining brightness. And it does not recede from mixtures as long as it exists. It is not, however, our medicine in its own nature, but it can also aid on occasion.

**<29> General Discourse on the Effects of the Principles,  
which are the Metallic Bodies**

We speak of metallic bodies, which are the effects of those principles of nature. They are, moreover, six in number: gold, silver, lead, tin, copper, and iron. Therefore we say that a metal is a fusible, mineral body, extensible in every direction under the hammer's blows. A metal is, as we have said, of dense substance, and of very strong and firm composition.<sup>59</sup> And all metals have a

<sup>56</sup>This passage is rewritten from Avicenna, *De congelatione, ed. cit.*, pp. 51-2:

"Argentum vivum vero ut aqua commiscetur cum terra nimium subtili sulphurea mixtione forti ne quiescat in superficie plana / et hoc est ex siccitate magna que inest illi et ideo non adheret tangenti..."

<sup>57</sup>These statements are correct and interesting (cf. Darmstaedter, n. 40). I have not found a similar attempt to compare the metals' ability to form amalgams with mercury in earlier sources.

<sup>58</sup>This refers to the old method of gilding by means of gold leaf and mercury. The mercury was applied to the metal to be gilded, the gold leaf spread on, and the whole heated. The mercury would amalgamate with the gold, then evaporate, with the result that the gold would be firmly attached to the metal beneath.

<sup>59</sup>Note the similarity of this definition with that given by the *Liber Hermetis* quoted by us in Chapter I, App. II: "corpus compositum, in igne fusibile, non combustibile, sub malleo extendibile."

great mutual affinity. But a perfect one does not perfect a defective one by mixture with it. For if gold be mixed with lead during fusion, the lead does not become gold, but disappears from the mixture, and burns up. The gold, however, remains throughout the test. By inducing in the case of the others, we see that their mixture occurs according to the common course. But according to our magistry, the perfect helps the imperfect be perfected, and the imperfect in our magistry is perfected *per se*, without admixture of any extraneous thing. The imperfect also perfects by means of this same magistry. [66va] And by God they alter each other and are mutually altered. And they perfect each other and are mutually perfected. But each is perfected *per se*, without the assistance of any other.

**<30> Particular Discourse on Sol**

We have given you a summary of the intentions of the metals in a general chapter. In the same way, we will make a special discourse about each one. First, let us speak of gold. We say thus that gold is a metallic, yellow, heavy, silent, brilliant body, temperately digested in the womb of the earth, and washed for a very long time by a mineral water, extensible under the hammer, fusible, and able to withstand the tests of cupellation and cementation.<sup>60</sup> From this you should gather that nothing is gold unless it have all the causes and differences listed in the definition of gold. However, anything that radically yellows a metal, leads it to equality of qualities, and cleanses it, makes gold from any genus of the metals. Thus we discern copper to be able to be changed into gold by both the work of nature, and by artifice. For we see in mines of copper from which water goes forth carrying with it very thin scales of copper, that it also washes and cleans them with a

<sup>60</sup>The assaying tests of cupellation and cementation will be described in detail at the end of Book III, part II of the *Summa*.

gradual and continual falling. Then, when the water ceases to flow, we see these scales to be cooked for three years with dry sand in the heat of the sun, among which is found the truest gold.<sup>61</sup> We have determined them to have been cleaned with the help of water, and having been digested by the heat of the sun and dryness of the sand, to have arrived at equality of their qualities. Although we can alter similarly by imitating nature, we still cannot follow nature in this particular method. Gold is also the most precious of the metals, and it is a tincture of red, because it tints and transforms every body. But it is calcined and dissolved without utility; it is also a joyous medicine keeping the body in youth.<sup>62</sup> It is broken very easily with mercury, and it is triturated with odor of lead.<sup>63</sup> There is none *in actu* which agrees with it more in substance than jupiter and luna. There is none which agrees more in weight, muteness, and putrefiability than saturn; none more in color than venus; none more *in potentia* than venus, then luna, then jupiter,

<sup>61</sup>This is a puzzling passage, since native copper, unlike gold, is not found in alluvial deposits. It is possible, however, that the *Summa* here refers to copper pyrites containing a fraction of gold. Such pyritic ores were known to Albertus Magnus, for which see Dorothy Wyckoff, "Albertus Magnus on Ore Deposits," *Isis*, 40:1958, p. 121. The idea that hot sand leads directly to the formation of gold may be found in the *De mineralibus* of Albertus. Cf. Wyckoff, *Albertus Magnus: Book of Minerals* (Oxford: 1967), p. 184.

<sup>62</sup>The assertion that gold is calcined "without utility" is curious. Darmstaedter, n. 47, speculates that the "uselessness" of calcining gold refers only to the fact that the gold is already "perfect." In other words the role of calcination in "cleansing" the metals of their "impurities" is rendered otiose in the case of gold: since gold has no earthiness, unfixed quicksilver, or unfixed sulfur, there is nothing to be gained from calcining it. This explanation seems specious, however, for a few lines later, at 66vb, 12-13, "Geber" states that silver too is calcined and dissolved "without utility." But according to the *Summa* silver does have the earthiness and unfixed principles that calcination and solution could remove. It is therefore likely that "Geber" has something else in mind than "perfection" alone.

<sup>63</sup>Cf. pseudo-Rāzī, *De aluminibus et salibus* (ed. Steele), p. 41: "... et ventus eius plumbi frangit aurum." Although lead boils at 1740° C., considerable quantities of vapor are given off while it is still at a red heat (600-800° C.), accounting for some of its loss during refining (Carl Schnabel, *Handbook of Metallurgy* (London: 1898), I, p. 274). Leaves of gold held over molten lead at high temperature would thus be subject to superficial alloying: if this continued long enough, it would no doubt lessen the structural integrity of the leaves, reducing their malleability and ductility.

then saturn, and finally mars; this is one of the secrets of nature.<sup>64</sup> The spirits, likewise, are mixed with that and fixed by it, by means of the greatest ingenuity, which does not come to the artificer of hard or stony head.

### <31> Discourse on Luna. Rubric

Therefore, with the chapter on Sol having been dispatched, we will relate our discourse on luna, in common parlance "silver". We say that silver is a metallic body, with a pure whiteness, clean, hard, sounding, withstanding cupellation, capable of firing, fusible, and [66vb] extensible under the hammer. It is a tincture of whiteness; it hardens jove by means of artifice, and converts it to itself.<sup>65</sup> It is mixed with sol and does not break it, but without an artifice it does not remain with it during the test. But he who knows how to subtilize it, and to compact it after sublimation, and to fix the thing associated with it, remains with it in the combat, and does not lose it at all.<sup>66</sup> Upon a vapor of sharp things such as vinegar and sal ammoniac and sour plants, it becomes a marvellous blue color.<sup>67</sup> It is a noble body, but removed from the nobility of

<sup>64</sup>The series "in potentia" is extremely puzzling, since no justification is given thereto. I suspect that this list is derived from an earlier source.

<sup>65</sup>Darmstaedter, n. 51, points out that silver-tin alloys are in fact harder than pure tin, and that the melting point of these is higher than that of tin alone.

<sup>66</sup>This sentence is revealing of the alchemical *modus operandi*. If a tin-silver alloy gives tin some of the properties of silver, it should be possible to effect a complete transformation of tin into silver by repeating or improving on the original process. The physical explanation given is that the particles of tin will be diminished in size by their repeated sublimation, thus making them ever more similar to the particles of silver.

<sup>67</sup>This recipe is a *locus classicus* mentioned by many writers on pigments up to and including the XVIIIth century. Despite the reservations of Daniel Thompson (*op. cit.*, p. 154), the recipe is workable, due to copper found in the silver of commerce. This has been demonstrated by Mary Virginia Orna, OSU, Manfred J.D. Low, and Maureen M. Julian, "Synthetic Blue Pigments: Ninth to Sixteenth Centuries. II. 'Silver Blue'," *Studies in Conservation*, 30:1985, pp. 155-160. Orna, *et al.*, managed to produce blue copper(II) acetate (verdigris) by means of recipes similar to the *Summa's*. The *Summa*, interestingly, employs this reaction as a test for the existence of silver in alloys, distinguishing clearly between the blue of the silver

gold. Its ore is found distinct, and it sometimes has an ore mixed with other bodies; this is not so noble. It is calcined similarly, but it is dissolved with the greatest labor, and with no utility.

### < 32 > Discourse on Saturn. Rubric

Let us transmit a chapter on lead, and say that lead is a body metallic, bluish, earthy, heavy, silent, participating little in whiteness, with much humidity, fleeing cupellation and cementation, soft, easily extensible in every direction by means of a small blow, and easily fusible without firing.<sup>68</sup> As some fools say, lead much approaches gold in its nature.<sup>69</sup> But since they have hard heads devoid of all reason, they can infer no truth from very subtle things; but instead they judge of them according to sensation. Since they see lead to be heavy, mute, and not to putrefy, they believe it to be very similar to gold, but this is also erroneous, and disproved by us more thoroughly in the following section, openly. Lead also has much earthy substance; therefore if it is washed, it is turned into tin, by the washing. Through this, therefore, tin appears more to approach the perfect. And if lead is burned, likewise, it becomes minium.<sup>70</sup> And if it is put upon vapors of vinegar, it becomes ceruse. And though it does not

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efflorescence and the green of copper (83vb,25-37). Whether this test would be reliable or not would have to be determined in the laboratory, but it is true that the color of the verdigris depends on whether it is basic or neutral, and varies with the degree of its hydration.

<sup>68</sup>The term "firing" (*ignitio*) refers primarily to the application of intense heat, though it sometimes bears the connotation of "glowing" or "incandescence," in reference to the red heat and white heat produced in hot and molten metals. The verbal form is used in Aristotle's *Meteors*, whence "Geber" may have derived it - "Quapropter & igniuntur omnia <metalla>, & terram habent. siccam enim habent exhalationem." (*Meteorologicorum*, Venice, 1567, vol. V, 460v).

<sup>69</sup>This commonly held doctrine is maintained by the *Liber septuaginta* (ed. cit., p. 348), *De aluminibus et salibus* (ed. Steele, p. 41), *inter alia*.

<sup>70</sup>Minium is the red oxide of lead,  $Pb_2O_4$ , produced by heating lead in the open air. Ceruse,  $PbCO_3$  or  $Pb_3(CO_3)_2(OH)_2$ , a white compound, was created from Antiquity on by means of the action of acetic acid on lead, followed by that of  $CO_2$  on the lead acetate.

approach closely to perfection, we form silver from it easily, by an artifice. It does not preserve its own weight in transmutation, but is changed into another; it acquires all this in the magistry. Lead is also the test of silver in cupellation, whose causes we will relate.

### < 33 > Discourse on Jove. Rubric

Hence, with the teaching about jove not omitted, we signify to the sons of doctrine that it is a metallic body, white but not purely, slightly bluish, little participating in earthiness, sounding a small creak, soft, possessing in its root a rapid liquefaction without firing, not waiting through cupellation and cementation. Therefore jupiter is among the bodies removed from perfection, but closest to perfection in the root of its nature. It is related to sol and luna, but more [67ra] to luna, and less to sol. This will be narrated clearly in the following. Because jupiter has received much whiteness from the root of its generation, it therefore whitens all non-white bodies.<sup>71</sup> Its vice is that it breaks every body except saturn and very pure sol.<sup>72</sup> Jupiter adheres much to luna and sol; hence it will not easily separate from them during tests. It receives a tincture of redness, and that shines forth in it with inestimable splendor,<sup>73</sup> and it acquires weight, in the magistry of this art. It is surely cleaned and hardened easier than saturn, and whoever knows how to remove its vice of suddenly breaking will rejoice in profit from it. Indeed, it combines with sol and luna; nor will it ever be separated therefrom.

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<sup>71</sup>*De aluminibus et salibus* (ed. Steele, p. 39): "Et est gravis tinctura, et fige in ea tincture,(sic) et albeficat es propria..."

<sup>72</sup>A reference to the brittleness that tin gives to many of its alloys, e.g. copper-tin bronze. Darmstaedter, n. 57, reports the following: "Copper is made harder by the addition of a little tin, but also more brittle. The limit of malleability is reached when a tin-content of c. 18% is attained. Bronzes containing more than 10% tin barely allow themselves to be stamped or turned without the addition of heat."

<sup>73</sup>*De aluminibus et salibus* (ed. cit., p. 39): "Et recipit tincturam rubeam, et fit ex eo sol sublimis..."



## &lt;34&gt; Discourse on Venus. Rubric

But let our discourse be of venus now. It is a metallic body, livid, green participating in a dark red, capable of firing, fusible, extensible under the hammer, fleeing cupellation and cementation. Venus, as it has been said, holds forth in the depth of its substance the color and essence of gold. Indeed, it is hammered and fired as silver and gold. Hence let you receive this secret about it - that it is midway between sol and luna, it is easily converted to either, and that this is a good conversion of small labor. It is powerfully united to tutia, and that yellows it with good yellowing, so that you may elicit profit from this.<sup>74</sup> By means of tutia we are surely excused from the labors of hardening and firing copper.<sup>75</sup> Let you therefore take it before other imperfect metallic bodies in the lesser and middle work, but very little indeed in the greater work. But in this it has more vice than tin<sup>76</sup> - in that it easily grows livid, and receives an infection from air and sharp vapors. The cradication of that is not an easy technique, but deep.

## &lt;35&gt; Discourse on Mars

But our description and secret of mars is all from the work of nature. For it is a metallic body, very livid, slightly red,

<sup>74</sup>*Liber de septuaginta* (ed. cit., p. 351): "Medicina vero qui (sic!) in Ere magnam exercet operationem est tucia. Et qui scivit ipsum preparare, cum tucia tinget ipsum colore Auri et faciet proficuum suum ex eo." Tutia, ZnO or ZnCO<sub>3</sub>, was mixed with molten copper and charcoal, whereon the gases passed off and brass was formed.

<sup>75</sup>Since brass is harder than pure copper, the alchemist who wishes to harden the latter can mix it with tutia in order to avoid the labor of hardening it by hammering and firing.

<sup>76</sup>The livid "infection" which copper receives from the air refers, no doubt, to the formation of superficial copper oxide brought about by exposure to the atmosphere.

participating in an impure white, hard, capable of firing, not fusible with a proper fusion,<sup>77</sup> extensible under the hammer, and sounding much. But mars is of difficult treatment, due to the inadequacy of its fusion. If that be melted without a medicine changing its nature, it is joined to sol and luna and not separated therefrom by the test of separation, without great assiduity.<sup>78</sup> But if it be prepared, it is conjoined and not separated by any technique, providing the nature of its fixation has not been changed, the only thing having been removed from it being its dirtiness. It is therefore easily a tincture of red, but of good white with very great difficulty. When it is conjoined to another without having been altered, it does not change the color of that mixed with it, but augments its quantity. [67rb] Jupiter, therefore, among all the bodies, is transformed into the most brilliant, bright, shining, solar and lunar body. But in it the work is of easy treatment and long labor. After that, venus is chosen, being of less perfect mutation, more difficult treatment,

<sup>77</sup>Darmstaedter, n. 60, notes that "wrought-iron, which contains only about 0.5% carbon or less, melts at 1450-1500° C. Pig-iron, which contains about 10% impurities (carbon, silicon, phosphorous), melts between 1050 and 1200° C." But as Wyckoff explains (*op. cit.*, p. 233) the medieval process for producing iron did not involve casting, and hence avoided the production of pig-iron. Since the reduction of iron from its ore was performed at a temperature too low to melt the iron completely, and thus to separate its slag by that means, the slag had to be removed by the mechanical process of hammering and squeezing. The result of this refinement, a "bloom" of wrought-iron, was considerably purer than pig-iron, and so would have had a temperature too high to allow thirteenth century smiths to fuse it.

<sup>78</sup>*Liber septuaginta*, p. 348: "Et scias quod postquam Ferrum adjungitur Auro numquam separatur ab eo. Et cum adjungitur Argento stans cum Auro, tingit ipsum pulcro colore. Et faciet quasi Aurum. Et secundum verificationem quantitatis commixtionis erit coloratio Ferri in Argento." Also *De aluminibus et salibus* (ed. Steele, p. 33). Darmstaedter, n. 61, reports that alloys of 11 parts gold and 1 part iron are "yellow-gray, extensible, and hard." Alloys of 1 part gold and 4 parts iron are silvery-white. Alloys of silver and iron are apparently more difficult to produce: "Upon mixing the two metals, one receives an upper layer of iron which contains 1/80 silver, and is very hard." The statement that gold and silver are hard to separate from iron is at least partially true, since the iron cannot be removed from silver by simple roasting in air or by cupellation, but must be fused with borax and saltpeter. For this information, Darmstaedter has drawn on Gmelin-Kraut, *Handbuch der Anorganischen Chemie*, V, 2.

and briefer labor than jove. But saturn has a perfection less than that of venus. Although it is of easy treatment, it is of very long labor. Mars has the least perfection of all the bodies in transmutation, also being of very difficult treatment and of the longest labor. Hence, whatever bodies are removed from velocity of liquefaction, are found to be of difficult treatment in the work of transmutation. Venus and mars are of this sort, while those which are more removed from velocity of liquefaction are more difficult to transmute; and those which are most removed are most difficult.

Those which are of greater lividity are participants in infection, and these are found to be of longer labor, and of less perfection. But whatever differences there are in the perfections determined by us a little earlier, are found in the lesser and medial technique of the work, but in the greater they are all of one perfection, though not of one treatment or labor. For the facility and difficulty which remain and the brevity and length of labor, are found to derive from the innate root of the bodies.

We have just written about natural principles with a true teaching concerning nature's goal for those bodies. We have also truly related determinate discourses about those bodies in individual chapters - both according to the opinion of those who could see the depths of nature, and according to our own, we who have arrived at them with perserverance of labor. But now it is expedient to fill out the defect of this art according to what we have found, and to teach all the principles of this magistry in the final part of our discourse, and to demonstrate the perfection which we see according to its need, and with its causes.

<36> Book II, on the Principles of this Magistry  
and of its Perfection.

General Discourse on the Principles  
of the Magistry. Rubric

What must be determined are the principles and perfection of this magistry. The principles of this art are, therefore, the *modi operandi* of that, by which the artificer is brought to this magistry, which are mutually diverse. For one method is sublimation, and decension another, but a third is distillation. And one of the methods is calcination, but another solution; a sixth is coagulation. A seventh is fixation, an eighth ceration, about each of which we will prepare an individual discussion. Perfection depends on the consideration of the things with which it is arrived at, [67va] and on the consideration of adjuvants, and on the consideration of the thing itself which finally perfects, and fourthly it is known from the consideration of whether the magistry arrives at perfection or not.<sup>79</sup> The consideration of those things with which the fulfillment of the work is arrived at, is the consideration of the manifest substance, the manifest colors, and the weight in each of the bodies to be mutated, and of those which cannot be mutated from the root of their own nature - without any artifice. And it is the consideration similarly of those which can be mutated in their root, with artifice. It is also the consideration of the principles of bodies according to their hidden depth and their manifest, and according to their nature with artifice and also without artifice. For if the

<sup>79</sup> Here the *Summa's* remaining organization is spelled out. The "consideration of things with which <perfection> is arrived at," refers to the nature of the metallic principles and metals being perfected, in other words, the "subjects" of perfection. The "adjuvants" are substances that aid incidentally in the perfecting process, for example by cleansing and purifying the metals. These two categories of substances are described in Books II and III. The "thing itself which finally perfects" is the "medicine" or "elixir": different types of medicines are described in Book III, part II. "The consideration of whether the magistry arrives at perfection or not," finally, refers to the assaying test also given in Book III, part II.

bodies and their principles were not known both in the depth and manifest of their nature, both with artifice and without, it would not be known what was superfluous and what deficient in them. Whence it would be necessary that we never arrive at the perfection of their transmutation. But the consideration of adjuvants to perfection is the consideration of the natures of those things that we see to adhere to bodies without artifice, and to make a mutation in them. They are marchasite, magnesia, tutia, antimony, and lapis lazuli.<sup>80</sup> And it is the consideration of those things that clean the bodies without adherence to them. They are namely salts, alums, niters, boraces, and other things of their nature. And it is the consideration of vitrification, cleansing by like nature.<sup>81</sup>

#### <37> General Discourse on the Magistry's Perfection

But the consideration of the thing that perfects is the consideration of the choosing of quicksilver's pure substance. For the medicine is that which has drawn its origin from the matter of quicksilver, and which is created from it. But quicksilver in its own nature is not this matter, nor in its whole substance, but a part of it was. Nor is it now our stone, but when that is made, a part of it is.<sup>82</sup> For that itself brightens and preserves from burning, which is the signification of perfection.

<sup>80</sup> The introduction of lapis lazuli into this group may stem from a recipe on p. 349 of the *Liber septuaginta* which calls for "azulo in quo sunt vene Auree" (i.e. lapis lazuli with pyrite crystals), used to make gold from silver.

<sup>81</sup> Probably a reference to the use of glass as a flux during the reduction of metallic oxides.

<sup>82</sup> The intent of these rather cryptic utterances is that the alchemist must make the philosophers' stone out of the *mediocris substantia* of quicksilver. This became one of the *loci classici* of the "mercury alone" theory.

#### <38> General Discourse on the Consideration of the Test of the Magistry's Perfection. Rubric

But the consideration of the thing from which it is known whether the magistry be in perfection or not, is the consideration of cupellation, cementation, firing, fusion, exposure to the vapors of sharp spirits, extinction, mixture with burning sulfur, reduction of the bodies after their calcination, and reception of quicksilver.<sup>83</sup> But we will describe all these with their causes and with easy demonstrations by which you will be able to recognize openly that our discourses have been truly propounded; and thus these demonstrations will be wholly known to you.

#### [67vb] <39> General Discourse on Sublimation. Rubric

Pursuing our proposed topic, we speak now about sublimation. And the cause of its discovery was that neither our forebears, nor we, nor those who will come after us find anything that would be united to bodies except spirits alone, or anything that would comprise in itself the nature of body or spirit. And they have seen these projected upon bodies without the latter being cleaned, or without giving perfect colors, or entirely to corrupt, or to burn, blacken, and defile them; and this was according to the spirits' diversity. For some are burning, such as sulfur, arsenic, and marchasite, and these corrupt entirely. But others do not burn, such as every genus of tutia; and this certainly gives imperfect colors. This is because those which burn, blacken, and defile, do this from a double cause. The first is that the burning oiliness of the sulfureity whose property is to be easily ignited, and through inflammation to be blackened, and consequently to blacken others, was not removed from them. But the second cause is earthiness,

<sup>83</sup> Here we find mention of the whole battery of assaying tests that will be applied in Book III, part II.

which also had not been removed from them. Among those in which a perfect color is not given, earthiness alone is a cause of lividity in the body, though burning can also create a livid color. Therefore we have devised a way to cleanse all these from burning unctuousity and earthy superfluity. And we could arrive at this by no magistry except sublimation alone. For when fire rises, it always raises the smaller particles with it; hence it leaves behind the larger. And this appears through sublimation - that the spirits are cleansed of earthiness, which also impeded ingress and gave a dirty color. But experience makes known enough to you through your own practice that the spirits are absolved of that earthiness. For you see them to be more spotless, more pervious,<sup>84</sup> and more easily to penetrate and steal into the density of bodies and not to cause filthiness as before. But that the burning of a spirit is removed by sublimation, is shown by demonstration. For arsenic, which is impure due to combustibility before its sublimation, does not allow itself to be inflamed after its sublimation; it merely sublimes off. And you find this same demonstration in sulfur. Therefore, because we see adherence to the bodies accompanied by alteration to occur in no other material but the spirits, we cannot therefore be freed from their use, nor may we escape their preparation by cleaning, which is accomplished by sublimation. Hence this was the necessary cause of sublimation's discovery.<sup>85</sup>

<sup>84</sup>The term *pervius* here is puzzling. The *De re tecta* employs *rebus adurentibus facientibus pervium* for *ma'a l-ashya'i l-muḥarriqati n-nashifati*: "with burning, dry things" (p. 329, #14 = 304, #14); *facere ipsum pervium* for *tanshifuhu*: "its drying out" (p. 330, #18 = 304, #18); and *cum rebus adurentibus et facientibus pervium* for *ma'a l-ashya'i l-muḥarriqati n-nashshāfati(?)*: "with burning, absorbing things" (p. 333, #37 = p. 307, #37). In all three cases, the Arabic root is *nashafa/nashifa* - respectively "to suck, absorb," or "to dry up." The Latin *pervius* thus has all the appearance of a mistranslation carried over into the *Summa* from the *De re tecta*. If we suppose, at any rate, that *pervius* had an active sense as well as a passive one to the Latin alchemists, it could simply mean "penetrating."

<sup>85</sup>The scholastic habit of introducing sentences with such formulae as "causa inventionis," "intentio," or "utilitas," is already present in an alchemical context in the early *Liber luminis* attributed to Michael Scot. See our introduction to the possible sources of the *Summa*.

Therefore, let us describe its whole method [68ra] and essence, without anything lacking.

#### < 40 > Particular Discourse on the Sublimation of Sulfur and of other Dry Matter

We say therefore that sublimation is the elevation of dry matter by means of fire, with adherence to its vessel. But sublimation is distinguished according to the difference of the spirits to be sublimed. For one sublimation occurs with a greater fire, another with a medial, and another with a remiss fire. If, therefore, arsenic or sulfur be sublimed, it is necessary that these be sublimed by a remiss fire. For, since they have very subtle particles conjoined uniformly to the gross, their whole substance would ascend without any purification, but rather burnt and blackened. Therefore, in order for anyone to separate the dirty, earthy substance, it is necessary to find ingenious techniques of two genera - namely the proportion of fire, and the cleansing with an admixture of dregs. For admixture with dregs unites the gross particles and holds them down at the base of the aludel,<sup>86</sup> not permitting them to ascend. Whence it is also necessary for the artificer to use a triple degree of fire for sublimation, and to proportion one fire in such a way that with it the altered sublimanda ascend, but cleaner and brighter; and through this he should see them to be cleaned from the sedimentary earth. But the second degree is that what has remained of their pure essence in the dregs be sublimed with greater force of fire, namely with firing of the aludel and of their dregs, which the artificer will be able to see with his own eyes. But the third degree is that a very weak fire be applied without the addition of dregs to that which was already sublimed from its dregs and purified, for by this way hardly

<sup>86</sup>The "aludel" (= Arab. *al-uthāl*, from Gr. *aithalē*) was a two part sublimatory. Its construction is described at length later in the text.

anything may ascend from that. And what will ascend from that becomes a very subtle matter which is not good for anything in this work. For that is the matter with whose help the burning in sulfur is perfected. Hence the whole intention of sulfur's sublimation is this - that with the earthiness of it removed by the due management of the fire, and also with its very subtle and smoky part - which induces burning along with corruption - thrown off, the part which consists of equality is thus left for us. This produces a simple fusion on the fire, without any burning, and it flees from the fire without inflammation. But that the very subtle be burnable is proven with very manifest arguments. For fire converts everything that is rather close to it to its own nature. But taking any combustible matter, what is subtle [i.e. composed of small particles] is close to fire, and what is subtler is closer: therefore the closest of all is the subtlest. [68rb] It may also be proved from practice, since sulfur or arsenic not sublimed is inflamed very quickly, though sulfur more easily than arsenic. Once sublimed, however, it is not inflamed directly, but flies and diminishes without preceding inflammation, but with fusion. From these things, our discourse appears to be true. But the proof of the aid of dregs in their proper proportion, is that that material be chosen with which the spirits to be sublimed agree more, and to which they are mixed more deeply. For that to which they are more united is more powerful in its retention of the dregs of those to be sublimed than that to which they are not united. The manifest proof of this is rational enough. But the proof that the aid of dregs be necessary is that if the sulfur or arsenic to be sublimed is not conjoined with the dregs of something fixed, then it would be necessary for that to ascend with its whole substance uncleaned. But they who are skilled in sublimations know from practice that we speak truly. But the proof that the aid of such dregs as those with which the things to be sublimed agree and are united in their depth be necessary is that if they were not mixed with them through the smallest particles, then it would be as though they had

themselves no dregs, so that the whole essence of those would ascend without any cleansing. For if they ascend in their whole substance without dregs added, then it is also necessary that they likewise ascend if sublimed from dregs to which they are not united. He who has seen and learned from practice, knows this to be necessary, since when he has sublimed them away from matter strange to the nature of the bodies, he has sublimed in vain, with the result that he has found them purified not at all, after their ascent. But if he has sublimed them with the calx of any of the bodies, then he has sublimed well, and he could perfectly clean them, with ease. The intention of the dregs, therefore, is that sublimation be executed with the calces of the metals, for in them, the sublimation is of easy operation, but with other things it is very difficult. Thus there is nothing that could take or obtain their place. But we do not say that sublimation is impossible without the calces of the bodies, though it is very difficult and of the longest labor, of a delay up to desperation. But the goodness of sublimation varies according to the following degrees: what is sublimed without dregs or without the calces of bodies is of great quantity, but what is sublimed with dregs is of less, while what is sublimed with the calces of the bodies is of least quantity, but of the easiest and briefest labor. But that which frees us rather well from the dregs of the bodies is every prepared genus of salt, and the like of this [68va] in its nature; with them, the sublimation is of great quantity for us, and the separation of the left-over dregs of the sublimanda from them is possible by solution of the salts, which does not occur in any other things. But the proportion of the dregs is that their quantity be equal to the quantity of matter to be sublimed. For in this, even the unskilled artificer will be incapable of error. But it is sufficient that the ordinary artificer put in dregs weighing half as much as the matter to be sublimed; in this he ought not err. But a very small amount of dregs suffices for the greatly practiced and expert. For the less the quantity of dregs is,

the more exuberance there must be in sublimation, so long as a diminishment of the fire be made in accordance with the diverse diminishment of the dregs. For with a small quantity, a small fire should be drawn out for the perfection of the sublimation, but with a great quantity, a great fire, and with a still greater, a still greater. But since fire is not a thing that can be measured, it happens that he who is not skilled in that very often errs, both in the diverse ways of preparing the dregs, and in the diversity of furnaces, burning woods, vessels, and their joining-together, in all of which the artificer must be anxious and attentive. But we adduce a common rule for you: that it is first of all expedient to extract the wateriness alone from the matter to be sublimed, with a little fire. For when that is removed, if anything ascends by means of that fire, then this fire need not be increased in the beginning, with the result that the subtlest part, which is the cause of burning, be elevated, and once separated, it be put aside. But when nothing or almost nothing ascends further, which can be determined by inserting lint or cotton into the upper hole of the aludel, the fire may be strengthened beneath it; the test of the lint shows you what strength the fire ought to have.<sup>87</sup> For if little of the sublimandum ascends, and it is clean, then the fire is small, so let it be increased. But if there is much and it is dirty, then the fire is excessive, so let it be diminished. But if there is much and it is clean then the right proportion has been found. But whether it be dirty or clean, much or little, can be discovered by removal of the lint, which was put in the hole of the aludel. For according to what quantity the artificer notices dirtiness or cleanness from the sublimandum to have

<sup>87</sup>The origin of this section is probably the *Liber secretorum de voce Bubacaris* (BN 6514, 103rb). The *De investigatione* has recapitulated the entire section from the *LS* (pp. 19-20): "...pone desuper alembic recipiens humiditatem eius in receptaculum. Et quando cessaverit distillatio, levetur alembic et ponatur coopertorium. Et fiat ignis sub eo fortior priore.... Coopertorium aludel habeat foramen superius per quod possit immiti acus grossa induta bombace. Et videas si aliquid de sublimato adhererit ei. Et cum nihil adherebit ei, scias quod totum sublimatum est."

adhered to the lint, he can syllogize necessarily the proportional fire, and from this, find the fire's correction without error. But a rather good method for the dregs is that scales of iron be taken, or of burnt copper, since these, [68vb] due to their privation of humidity, easily drink up sulfur or arsenic and unite with them. But only the skilled worker knows the truth of this.

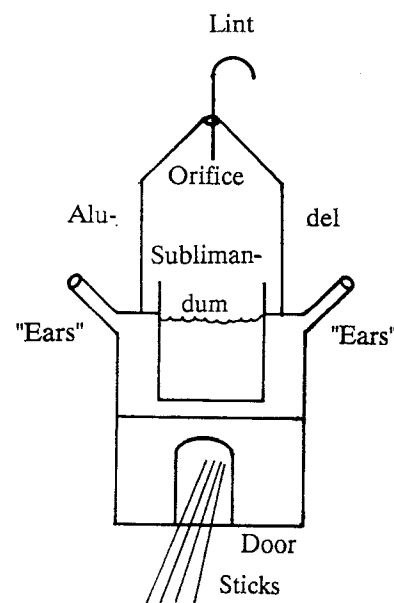
**< 41 > Discourse on the Rectification of Sulfur and  
of the Sublimation of Arsenic. Rubric**

It is therefore expedient that we correct the artificer in all things in which he might ignorantly err, during the sublimation of these two spirits. We therefore say to him that if he has put in many dregs, then, unless he augments the proportional fire, nothing will ascend from the matter to be sublimed. But how he may find that has been sufficiently related to you. And if he uses a small quantity of dregs or those not from the calx of the bodies, then if he does not also diminish the proportion of that fire, the matter to be sublimed will ascend with its whole substance, and we have taught the discovery of this proportion sufficiently also. But error also arises from the furnace, for a large furnace gives large fire, but a small furnace a small fire, providing the wood and the ventilation holes of the small ears are proportioned to them. So if he puts a large quantity of the matter to be sublimed into a small furnace, he will not be able to produce a sufficient fire for elevation. But if he puts a small quantity into a great furnace, he will end the sublimation, due to excess of fire. A thick-walled furnace gives a strong, concentrated fire, but a thin-walled furnace gives a thin, weak one, in which error also may occur.<sup>88</sup> Similarly, a furnace

<sup>88</sup>The term *spondilium* for "wall" is probably an assimilation of the homonymous *spondilium* or *spondylium* ("spinal vertebra") to the meaning of *sponda* ("bed-frame," or in Late Latin, "dike"). In modern Italian, *sponda* means "side", as in the *Summa*. Cf. Barbara Reynolds, *Cambridge Dizionario Italiano - Inglese* (Milan, 1985), p. 866.

with wide ears gives a great, clear fire, but a furnace with narrow ones a weak fire. Likewise, if in the joining of the vessel to the furnace, the distance from its walls is greater, it will give a great fire; but if smaller, a smaller fire, in which error can above all occur. Hence the correction of these is that the furnace be erected according to the purpose of the fire which he needs. Namely, a thick-walled one with unrestricted ears is used, with a large distance of the "aludel" from the sides of the furnace, if he desires a great fire. But if he desire a moderate fire, let him find a proportional mean in all these. And if he wish a weak fire, let him find the corresponding proportion in these same. We will teach you to find all these proportions with true proportion and determinate experience. If you wish to raise a large amount of sublimation, then let you find the vessel called "aludel" of such capacity and joining that it hold that material up above its base to the height of one palm; let you join the furnace itself to this vessel. The furnace should hold the aludel in its middle, the distance from its walls being two fingers. The furnace having been made, make ten equidistant ears for it, with true proportion, so that there be a true equality of fire for all its parts. Then, once an iron bar has been supported in the middle of the furnace from its walls, which bar extends from the furnace floor to the extension of one [69ra] palm with its thumb, and to the width of one finger, the vessel "aludel" may be supported on it, and luted to the furnace. The description of this is now shown. Then, if it frees itself well and unimpededly from smoke, and the flame passes freely through the whole furnace around the aludel, then the furnace is well proportioned; otherwise badly. If badly, then widen its ears. If it be improved, good. If not, then it is given that the distance of the aludel from the walls is small. Let the walls be scraped then, the distance widened, and the test made again. Let it be repeated with widening of the ears and scraping of the walls, until it freely separate itself from smoke, and the flame around the aludel be

<Illustration of the aludel and calcinatory furnace>

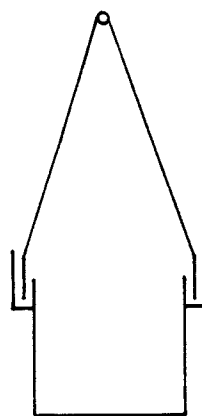


clear, and it freely exit through the ears. This is a sufficient test for any amount of sublimation, as regards the discovery of the furnace's size, the width of its ears, and the distance of the aludel from its walls. The discovery of the proper thickness of the furnace is that if you seek a great fire, let the thickness of it be rather great - to the measure of a palm's extension with the thumb. But if you seek a medium fire, then let its thickness be the measure of the palm alone. And if a lesser fire, then let it be formed to the thickness of two fingers. Let a proportion be observed similarly in the wood. For solid wood gives a strong fire, spongy wood a weak fire, dry wood a large, short-lived fire, green wood a small, long-lasting fire. Similarly, solid wood gives a long-lasting fire while spongy wood gives a fire very easily put out. Therefore, from the consideration of the distance of the aludel, the greatness and smallness of the ears, the thickness and thinness of the furnace, and the diversity of the wood, it happens that the differences of all fires are examined, with their true practice. But from the greater or lesser blockage of the ears or window of the furnace through which the wood is inserted, and from the management of the different types of wood with their addition and subtraction, it happens that a determinate space of time for the duration of the fire is discovered, so that it may be known with determinate knowledge how much each fire in its degree can persist in equality. This investigation is above all useful and necessary to you, since you will be freed by it from a multitude of unending labors. Let you therefore exercise in that and in all the things just now determined by us, since he who trains himself to find will find, but he who does not, will not. The discovery of the vessel "aludel" is that a thick vessel of glass be made. For other matter would not be adequate unless perhaps it were of substance similar to glass. For only glass and the like of it, since it lacks pores, is able to hold spirits so that they not flee, and be driven off by the fire. But other vessels are not adequate, because they gradually escape through their pores, and are

lessened in quantity. [69rb] Nor are metals useful in this regard, since the spirits, due to their friendship and agreement, penetrate into them, and are united therewith. Passing through them by this means, they escape. That it is proven by those things which by us were openly determined, that we have described this truly, is proven both necessarily and from practice. Therefore we are not freed by anything from the use of glass in the construction of the aludel. So let a rounded, glass, *concha* [a vessel] be made, with a slightly curved base. In the midst of its cylinder let a glass ring be made, circling it. Upon this ring, have a circular glass wall fixed, equidistant from the wall of the *concha*, up to the thickness of the cover of the *concha*, so that the wall of the cover will fit into this space freely, without pressure. The height of the wall of this cover should be equal to the height of the wall of the *concha*, plus or minus a little. But let two covers be made; equal to the measure of this concavity with two walls, whose length should be equal, and of one span. Let their shape be one shape, namely conical, in whose tops there should be two equal holes, one in one vessel, the other in the other. In each of the holes, the rather large feather of a hen should be able to fit, as is shown in the present drawing. The whole design of the vessel is, therefore, that its cover can be moved according to the technique being used or at the will of the artificer, and that the joint be of clever design, through which there may occur no escape of the spirits, even without luting. So let even him who can devise most cleverly in this not thereby excuse himself from physical labor through our teaching. It is the special purpose of this that the lower *concha* enter, with its whole cylinder, into its cover up to the middle. For since it is the role of vapors to ascend and not descend, we find by this with the first discovery that the spirits do not have an exit for their consumption and that this excels over the other methods which we have sought out in our process of discovery. We see by this practice that we have judged truly of that. But one purpose of this method is also that the head



< Illustration of the aludel >



of the aludel may often be emptied, lest because of the too great accumulation of matter to be sublimed, the latter fall into the bottom of the aludel, and lest a multiply reiterated sublimation keep you occupied for a long time. There is also a second purpose - that what ascends upward to the area near the hole in the aludel's head, as a powder, be separated from that which is found fused, dense, bright, and pervious, adhering in clumps to the sides of the vessel near the bottom, since the latter has less burning than what is found to have mounted to the area of the hole.<sup>89</sup> But this is shown openly above, both by reason and by practice. The proof of sublimation's goodness and perfection was just said. [69va] And it is that the sulfur is found bright and clear, and it does not burn with inflammation. This therefore is the goal of the completion of sulfur's sublimation, and also that of arsenic. And if it has not been found, the work must be repeated with a consideration of all its goals, until it be found.

#### < 42 > Discourse on the Sublimation of Mercury

But now we will determine the entire goal of quicksilver's sublimation. The complete totality of that is the cleansing of its earthiness, and the removal of its wateriness. We are freed from the work of removing its burning since it does not have any.<sup>90</sup> Thus we say that the technique of separating its superfluous earth is to mix it with things which have no affinity with it, and to repeat its sublimation from them multiple times. The genus of these is talc, calx of egg shells and also of white marble, glass very finely ground, and every prepared genus of salt, for it is cleaned by

<sup>89</sup> From a modern perspective it seems strange that the *Summa* prefers the less volatile component sublimed from native sulfur, while denigrating the purer "flowers." But this is precisely what the theory of *mediocris substantia* dictates. The more volatile fraction will be more inflammable of necessity, since it is composed of smaller corpuscles: hence it should be disposed of.

<sup>90</sup> *De re tecta, ed. cit.*, pp. 328-9: "Excusamur ergo ne laboremus in destructione adustionis ab eo tantum."

these.<sup>91</sup> But it is not cleaned by the others, with which it has an affinity, unless they be bodies in perfection. Rather, it is corrupted, because all of such have sulfureity, which, ascending with it in sublimation, corrupts it. You may witness an experiment in this, since if you sublime it from tin or lead, you will see it after sublimation dyed with blackness. Hence a sublimation through those things with which it does not agree is better; but if with those things with which it agrees, then it would be better if they had no sulfureity. Therefore a sublimation of it from talc is better than from all other things, since that agrees little with it and does not have sulfureity. But the method of removing its superfluous wateriness is that when it is mixed with the calces from which it ought to be sublimed, it is triturated and mixed with them by means of imbibitions, until nothing more appear of it. Then the wateriness of its imbibition should be removed, above a very mild fire. When that humidity from the imbibitions disappears, the wateriness of the quicksilver disappears with it. But let the fire be mild enough that the whole substance of the quicksilver not ascend because of it. Thus, from multiple repetition of the imbibition with grinding and gentle roasting, the greater part of its wateriness is abolished, the rest of which may be removed by repeated sublimation. And when you see this very white excellent snow adhering to the sides of the aludel, with its whiteness and as it were "dead," then repeat its sublimation, but without dregs. For part of it adheres, fixed, with its dregs, and may never be separated from them, by any sort of techniques. Or after that you may fix part of it; we will transmit the method of its fixation to you manifestly narrated, in the following. [69vb] And when you have fixed that,

<sup>91</sup>There are several possible sources for this list of "feces." The *L. secretorum de voce Bubacaris* gives "alumen, attramentum, sal, sulfur, calx, vitrum, cinis querci, cinis galle, ossa combusta, marchasita, et tegule crite [BN lat. 6514, f. 103rb, 11-4]." The *L. septuaginta* gives "sal et alumen et galle, et cortices granatorum, et sumbetiz (?) [352]," "salis gemma et talc [360]," and "calcucecumenon, talc, limatura plumbi, limature ferri, limature eris rubei [361]." I have found no source that agrees precisely with the list given by the *Summa*.

then repeat the sublimation of the remaining part upon it, so that it also be fixed. Preserve the product, and then test it on the fire. If it gives good fusion, then you have repeated the sublimation upon it sufficiently. But if not, then add some part of the sublimed quicksilver to it and repeat the sublimation until it becomes fusible. If it also has a very white, bright, pure color, then you have cleaned it well; if not, then not. Let you therefore not be negligent in cleaning it, which occurs by sublimation, since its cleanliness is proportional to the perfection that will follow its projection upon any of the imperfect bodies, and upon quicksilver itself, living and not prepared. Whence it also happens that some produce iron with it, some lead, others venus, and others tin, which variance comes about because of their negligence in purification. Sometimes this negligence is in the purification of it alone, and sometimes of the sulfur mixed into it, or of its comrade, arsenic. Therefore, if you directly sublime, clean, and perfect that quicksilver, it will be a firm and perfect tincture of whiteness, to which there is no equal.<sup>92</sup>

#### < 43 > Discourse on the Sublimation of Marchasite

Thus, with the totality of quicksilver's sublimation having been taught, let us now pass to the sublimation of marchasite. There are, however, two sublimations of that; the first is perfected without firing, the second with. This is because it has a double substance, namely one which is pure sulfur in its own nature, and another which is mortified quicksilver.<sup>93</sup> The first is usable just as

<sup>92</sup>The fact that the *Summa* describes the product of this sublimation, "killed" quicksilver, as "white as snow," and "fusible," suggests that it was mostly mercury chloride (HgCl<sub>2</sub> = corrosive sublimate), a white powdery or granular substance that melts at 277° C. and volatilizes at 300° C. This could only be produced if a source of chloride was present, but since the *Summa* specifies that "every prepared genus of salt" be used as dregs, that would be quite possible.

<sup>93</sup>A parallel passage occurs in the *De investigatione* (p. 102): "Alia sublimatio marcasite. Teras ipsum, lava bene, et impasta cum sui ana vitri et funde vel cum sapone et nitro, et erit frustum argento simile, quod tere. Et habeas vas altum bene cuius fundus non sit vitreatus, sed latera et cooperculum. Et in fundo pone

sulfur, but the second is usable as mortified quicksilver, prepared for its medial substance. Let us therefore take the latter, since we are freed by it from the use of quicksilver, and from the work of killing it. Thus the whole method of its sublimation is that it be ground and put in an aludel, then that its sulfur be sublimed without firing. That which is sublimed from it should always be removed, which occurs very often, for the already said cause, and the strength of the fire should be augmented up to the firing of the aludel, and until all of it that consists of sulfur go off. You will be able to inspect this with manifest tests. For when all of its sulfur has been elevated, you will see the color of that which after this will be sublimed, changed into purest white, with a very clear, lovely, bluish color mixed in. For what will otherwise be of the nature of sulfur will be burned up and will produce a flame, as sulfur does. But what is sublimed secondly, after that, [70ra] will not be inflamed, nor will it show any of sulfur's properties, in the repetition of its sublimation, but rather those of mortified quicksilver. Let us therefore collect it by means of its own method of sublimation, which is that a very solid, earthen vessel, well-cooked, be made to the length of half a man's height, but to a width which the hand can enter. Let a base be made for it which can be separated and attached, similar to a small dish but of great depth.<sup>94</sup>

marcasitam ad sublimandum; quod primo sublimatur est sulphur nigrum; quod postea sublimatur cum forti igne est album et est mercurius. Quod si tenetur in phiala obturata super ignem per diem, dealbat es in lunam frangibilem, cuius pars et marchasite pars si simul involute super iasset ponitur fiet bonum et firmum sed frangibile."

<sup>94</sup>I know of only one Arabo-Latin source that describes this special aludel for marchasite - the *L. secretorum de voce Bubacaris* (BN 6514, 102vb, 2-14): "Aludel est vas quod pro distillatione specierum sicatarum(!) <est> et dicitur sublimatorium et sunt eius due forme una enim que est [que est] acuta in inferius et superius et illud est cum quo sublima<n>tur que non defacili sublimantur ut thucia et corpora et marcaside alia que reput (? fortasse requirunt) magnum <ignem> de carbonibus usque ad medium ut hic. Et olla debet esse ... et circa fundum allatoribus (? fortasse corrigendum ad a lateribus) perforata et superius tracta ad modum actanor. Alia enim forma et manieres admodum duarum sunt scutellarum laterum illud operatur cum lignis ad sublimandum spiritus defacili volantes et hec est forma."

Let the area from the mouth of that vessel to its base be measured so that it equals the measure of one hand's length with its fingers. From there up to its top, have the interior of the vessel glazed, with a very thick glaze, and have an alembic with a wide nose put on top of it; for in such a vessel, this is sublimed. The base should be joined to its vessel with a lute of great tenacity. The marchasite should be sprinkled on the base. A wide-nosed alembic should then be put on top of that. This is put into a furnace whose property it is to give a strong fire for fusion, as of silver or venus, if the artificer need it, which we will describe for you sufficiently in the *summa* of our work, where we will narrate the difference of all the instruments. You should close the top of this furnace with a disc having a hole in its middle equal to the width of the vessel, through which the said vessel can enter, and you should seal the joints in the walls of the vessel and the furnace, lest the fire going forth impede you and prevent the adherence of the sublimation product. Only four small windows in the disc should be left unsealed, which can be opened and closed so that coals may be thrown into the furnace. In the sides of the furnace, likewise, should be four intermediates, as it were, under those in the disc, through which coals may also be thrown. There should also be six or eight holes equal to the size of the smallest finger, which may never be closed, so that the furnace may free itself easily from smoke by means of them. These holes should be at the joint of the furnace with its disc. But the furnace of great firing is a furnace whose sides are equal in height to two cubits, and in its middle there should be a disc perforated with very tiny and frequent holes, connected tightly with lute. The tops of the holes are narrow above, but wide below, so that cinders and coals can freely fall from them, while leaving those themselves continually open to the free reception of air. [70rb] For much free reception of air through the lower holes is one cause of great firing with the furnace. So let you be practised in this, and you will find it. But the reason for the length of the

vessel is so that a great quantity of it be extended and cooled off, so that the vapors of the sublimation product find a place of cooling and adhere, rather than finding a way of flight and of their banishment. But he knows this who, when he has sublimed in a short aludel, finds nothing after the sublimation, for the aludel, on account of its shortness, was through its entirety fire. Hence the sublimandum, having been converted to vapor, remained always in that form and did not adhere, but gradually escaped through the pores of the vessel. So let the greater part of the vessel be extended out to a place of cooling in all sublimings. But the reason for the vessel's glazing is lest the rising vapors find the wall of the aludel to be porous in the place of their ascent, and penetrating through it, flee. Therefore the place of their ascent is glazed, so that the way of flight be kept from them. But the base of the aludel is not glazed, since the base of that remains in a great fire, which would melt its glazing: if that were fused, the sublimandum would also be melted, and become glass. For it is the property of glass to overcome all, and convert all to itself. All these things having been considered with their reasons, let there be a fire under the base of the aludel until you have determined with a truthful test that the whole has ascended. The test is, moreover, that a well cooked earthen rod, having a small passage running from its end to its middle, approach the matter from which the sublimation is made to within the length of one's smallest finger. And if something of the sublimation product adheres, the whole has not been sublimed, but if it does not, it has been sublimed. And by this same practice, you will be able to be certain in all sublimings. But the description of the vessel "aludel" for the sublimation of marchasite to the final degree, with its furnace, and with the rod of its test, is this.

<Hollow Rod for Sublimation of Marchasite>



## &lt;44&gt; Discourse on the Sublimation of Magnesia and Thutia

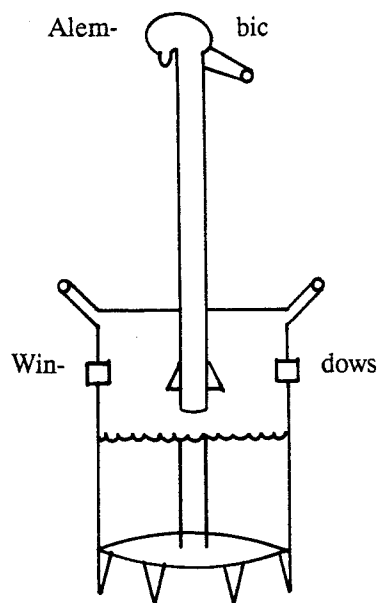
But the goal of the sublimation of magnesia and thutia is the same as the goal of the final sublimation of marchasite. For none of these can be sublimed without firing; thus all have one design, with the same reasons and the same tests. They also have one general order, since they ought to be sublimed without dregs. It happens to be necessary that each be sublimed with firing since they have in themselves sufficient - even superfluous - dregs. And the sign of this [70va] is the difficulty of their sublimation. And all bodies removed from perfection are similarly sublimed in this same order, no diversity encroaching except that the fire of sublimation is stronger in bodies than in magnesia, marchasite, or thutia.<sup>95</sup> And bodies do not differ in their own sublimations, except that some need admixture of matter lifting them up so that their ascent be made easier, while others do not.<sup>96</sup> But one special consideration in the sublimation of bodies has been found good from experience; namely that there not be much quantity of the body to be sublimed in the base of the aludel, since a multitude impedes the sublimation. And let the base of the aludel be a plane, not a concavity, so that, having been sprinkled equally and thinly over the base, the body may be elevated upward in all its parts.<sup>97</sup> The bodies needing admixture of elevating matter are venus and mars,

<sup>95</sup>The putative sublimation of the metals is not a commonplace topic in medieval Latin alchemy. It is described at length, however, in the *L. secretorum de voce Bubacaris* (BN 6514, f. 107rb-va, 111va-b). The passage above may have been influenced by the following statement from the *L. Bubacaris* (111vb, 36-9): "Marchasita sic sublimari oportet et eciam magnesia et edaus sicut ferrum nec differunt ab eo..."

<sup>96</sup>The intermixture of "rei sublevantis ea corpora" is also described in the *L. secretorum de voce Bubacaris*, *Ms. cit.*, 111va. This passage is taken up in the *De investigatione* pp. 95-6. Most of the *L. secretorum's* comments on the sublimation of the metals are regurgitated between pp. 90-106.

<sup>97</sup>This advice stems from the *LS* (BN 6514, 107va, 1-4). It is taken up by the *DIP* at 92,7-10: "Postea pone in aludel et accende fortem ignem sub eo a principio. Hoc facias secundo vice. Et non dimittas totam commixtionem coadunatam in uno loco aludel, sed expande per totum fundum equaliter."

< Illustration of the long alembic for subliming marchasite >



thanks to the slowness of their fusion. Venus by all means needs tutia, but mars needs arsenic, and they are elevated easily with these, since they greatly agree with them. After their consideration, therefore, let there be a sublimation as in tutia and in those things that sublime like it. And let their sublimation be disposed in this same order, with its reasons and tests.

<45> Discourse on Descension. Rubric

Hence, with the goals of sublimation and all its causes related, it remains that we show the method of descension, likewise with its causes and its determinate, complete order. The cause of its discovery was triple, namely first that when some medicine is shut up in its vessel, which is called a descensory or chimina,<sup>98</sup> it descend after its fusion through the orifice of the descensory. Through its descension, we are sure to have acquired its fusion.<sup>99</sup> But another cause was that weak bodies be saved by it from combustion, after their reduction from calces. For when we try to reduce the weak bodies from their calces, we cannot reduce every part at once. Therefore, if that part which was first reduced into a body should await the reduction of the whole in the same place, then most of its quantity would escape, due to the fire. It was

<sup>98</sup>"Chimina" is a rough transliteration of the Arabic *qinnina* = "flask." The term appears, for example, in the *De re tecta* with that Arabic equivalent (*ed. cit.*, p. 338, #63 = 312, #63). In this printed version the Latin has been deformed to *Kima*, but the Palermo codex 4QqA10, f. 160r/179r, 24, gives the more correct form *kimina*. Hence Darmstaedter's (n. 73) derivation from *thymiafer* is completely baseless.

<sup>99</sup>The process of "descension" of a metal involved its reduction from a metallic oxide (in the case of sulfide ores, the sulfide would first be converted to an oxide by roasting) by heating. In the case of too much oxidation, the reduction could be prompted by the addition of carbonaceous matter, such as charcoal or green wood, accompanied by further heating. The carbon would combine with the erstwhile oxide to form CO<sub>2</sub>, then passing off as gas and leaving the metal in its free state. If the double-pot descensory like that described in the *Summa* were being used, the molten metal would then "descend" into the lower of the two vessels.

therefore necessary to devise a way so that as soon as part of it was reduced, it would be removed from the fire: this is done with the descensory. The third cause of its discovery is the cleansing of bodies from all extraneous matter. For a molten, clean, body descends and leaves everything extraneous behind, in the concavity of the descensory. With descension having been found on account of these three necessities, the method of it with its forementioned apparatus and with its causes must be decided. [70vb] We say therefore that its shape should be such that its base be pointed and its walls, likewise, be without roughness, terminating in the sharpness of the base, so that any fusible matter can descend without adherence, to the hole in its base. Its cover, if it be necessary, should be like a flat dish, and it should fit it well. Let these be of good, firm earth, not melting easily due to the pressure of fire. So let the thing whose goal it is to descend be put within that upon round rods made of earth, in such a way that it be closer to the bottom than to the top. The cover should be put on, the joint secured, and all put on a fire of coals. Let it be blasted until the whole descend into the vessel placed under it. If the matter be of difficult fusion, however, it can be put upon a flat plate or one of slight concavity, from which it can easily descend with a slight tilting of the descensory's top. For in that it will remain firm and gradually take up the fire; it will also give better fusion and it may very often be tested whether it has melted or not by an inclination of the descensory. The bodies are purified by this, but better by means of a pastille - whose method of purification is the same as that of the descensory; thus we are freed by the former from the latter, for it holds the dregs of the bodies as the descensory does, and better.<sup>100</sup> Therefore we describe the method of it with its

<sup>100</sup>This passage is not clear; the *Summa* seems to suggest that the pastille be used *instead of* the descensory, but the process would make better sense if the two were employed together. The whole passage could represent the author's misunderstanding of a rather confusing section of the *Liber secretorum*: "[102va,4-15] *Dissolutio ferri et eius fusio*. Sume limaturam ferri et combure eam cum quarta

cause. Thus we say that we take a body whose goal is to be cleaned. Let us make this into very tiny granules or into a calx, which is more perfect, and let us mix with it some calx whose intention is not to be melted. Then let us melt the former, for we will find that the bodies are cleaned by this process, with much repetition, but not with the perfect cleansing which we know to be perfection *per se*, rather with a useful cleansing, so that once the medicine of perfection has been received, the body may be transformed by it better and more perfectly. For there is a treatment preceding that reception. But we will describe every treatment to you sufficiently in the following. Now let us impart an illustration of the descensory.

#### <46> Discourse on distillation

It is therefore reasonable that, following our proposal, we transmit our discourse on distillation, with its causes. Therefore, a distillation is an elevation of watery vapors in their vessel. Yet it is diversified: one is with fire, another without. The method with fire is found to be of two genera. One is by elevation in an alembic, the other by descent with the vessel "chimina." The general reason for the discovery of any genus of distillation is the purification of liquid matter from the dregs of its cloudiness, and the preservation of it from putrefaction. For we see matter distilled with any genus of distillation to be made more pure, and to be guarded better from

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parte eius arsenici ... impaste illum cum oleo et commisce cum [cum] sexta parte vitri rubei et pones illud in bodge fundum et si velis ut fiat album, paste illum cum vitro albo quantum fuit vitrum et hoc totum impastetur cum oleo et fiant inde magdaliones et cum funditur in unaquaque fusione proice ipsum in terram vel in cuncali ferreo...." The magdaliones here, synonymous with pastilli, are conglomerations of metallic oxides, oil, and glass; the latter two substances are included respectively as reducing agent and flux. The passage does not make it absolutely clear that these pastilli should be put in the descensory (the bodiga or boctica), but that is the author's intent all the same.

<Illustration of the Descensory>

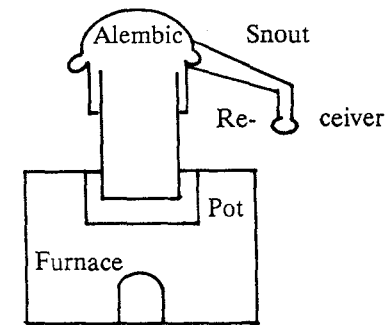


putrefaction. [71ra] The special cause of that which is done by ascent in an alembic is the seeking out of pure water without earth, whose proof is that you see twice distilled water to have no dregs. But the cause for the discovery of pure water was the imbibition of spirits and clean medicines, so that if we should need imbibition, we would have pure water, which after its resolution would not deposit dregs. For our cleansed spirits and medicines could be infected and corrupted by these dregs. But the cause of the discovery of that which occurs by descension was the extraction of a pure oil in its own nature, since the oil could not be had in its own combustible nature by means of ascent. And the intention of this was that its color, which is thoroughly mixed with its substance, be had; for this can help on occasion. But the cause of the discovery of the distillation which is done with a filter without fire, was the clarity of water alone. Let us therefore relate the method of all distillations, with their causes. The method of that which is done by ascent is double. For one is completed in an earthen pot filled with cinders; but the other, set up for its order with water in its vessel and with grasses or wooly things, lest the cucurbit or alembic of distillation be broken, is thus brought to completion. But that distillation which is done with a bath of cinders, is completed with a greater, stronger, and sharper fire, while that which is done with water is completed with a moderate one, Mulciber having been tamed. For water does not take up the sharpness of firing in the manner of cinders. Thus it happens that the colors and grosser earthy parts are elevated by means of that which is done with cinders; but the subtler parts and those without color are elevated with that which is done with water, and these approximate the nature of simple wateriness more closely. Thus a subtler separation may be drawn forth by means of that distillation which is carried out in water. But he knows this from practice who, when he has distilled oil by means of cinders, has received the oil in the recipient in a hardly altered state. Indeed, wishing to separate its

parts, he arrived at this by necessity - that he happened to distil by means of water. And then by repeating this, he separated the oil into its elemental parts, so that he extracted a very white, clear, water from the very red oil, with the redness of the latter remaining in the bottom of the alembic. Through this magistry, therefore, it is necessary to arrive at every distinct separation of all the elements of vegetable matter, of that which derives from vegetable matter, and of every like matter. Through that which is done by descent, it is possible that the oil of whatever matter, namely of all vegetables and their like, may be arrived at determinately. Through that which is done by a filter, the clarity of every liquid matter is arrived at. But all these things are known even to the little knowledgeable. Indeed, he who does not know them, knows nothing of this magistry. Let him therefore be practiced and he will easily learn them. So, the disposition of that which is done by means of cinders [71rb] is that a strong earthen pot be taken and fitted in a furnace like the furnace for sublimations, with its same distance from the walls of the furnace, by means of the same investigation, and with similar ears, upon whose floor should be put sifted cinders, to the thickness of one finger. The vessel of distillation should be put on the cinders, and its walls covered with the same, until the cinders reach up to the alembic's neck. Then the matter whose goal it is to be thus distilled should be poured into the vessel of distillation. Finally, let the alembic be set on the cucurbit: the neck of the cucurbit should reach up to the interior gutter of the alembic itself, lest the distillandum find a way of escape. Then let the alembic be luted to its cucurbit, so that their joint be secured, and a fire be set under, until it distil. The alembic and its cucurbit should be made of glass. But let its fire be increased according to the need of the distillation, until the whole *distillandum* be seen to have been distilled by the great force of the fire. The disposition of the distillation for the second goal, which is done by means of water, is similar as far as the vessel and alembic.

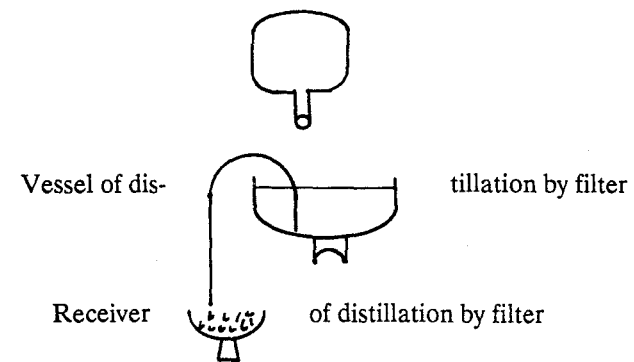


But it differs in this - that in this case, an iron or copper pot is taken and fitted to the furnace as was said. Then a layer of grass or wool, or something similar, to the thickness of three fingers, is made upon the bottom of that pot, lest the cucurbit be broken. The cucurbit should be covered with the same grass or the like in its circumference, up to the neck of the alembic; thin sticks should be spread over the straws, and heavy stones should be put on the twigs. These should press down the cucurbit, alembic, and the straws themselves, and hold them firmly and stably depressed upon the base of the pot, lest they float up through the water, having been lightened, and this lightening, in turn, be the cause of the vessel's breaking, and of the loss of the matter to be distilled. But then let water be poured between the straws up to the fullness of the neck, and let the fire be put under until the whole distil. But the disposition of that which is done by descent is that a glass descensory be made with its cover, and each luted. That which one intends to distil should be put within, and the fire should be made on its top, for its distillation product will descend. The disposition of that which is done by a filter is that the liquor to be distilled be put into a stone shell, and the wider part of a washed, wet filter be put into the said liquor up to the bottom of the shell. But the thinner part of it should hang down from the orifice of the shell, and the vessel receiving the distillation should be put under the end of that filter. So, when the filter begins its distillation, the water with which it was made wet will first pass over. [71va] When this ceases, the liquor to be distilled will succeed it; if this is not clear, it may be returned to the shell so many times until it be distilled over very clear. Because all these things are easy, they do not need much proof. Therefore we pass over their testing. But let us now transmit an illustration of all the vessels of whatever distillation.



The vessel of distillation with cinders. It is the same as that with which distillation without cinders is performed except that straws are put under the latter and then the distillation is carried out with water.

Vessel of distillation by descent.



## &lt;47&gt; Discourse on Calcination. Rubric

After our description of distillation, let us therefore deliver our discourse on calcination. The calcination of a thing by fire is, therefore, its conversion into powder, due to the removal of the humidity consolidating its particles. It is diversified according to the difference of the things to be calcined. Bodies are calcined, and spirits and things strange to the nature of the latter are also calcined, but with a diverse intention. For the imperfect bodies are of two genera, namely the hard, such as venus and mars, and the soft, such as jupiter and saturn, all of which are calcined. It is necessary that these bodies be calcined with a diverse, special intention, and this is that the sulfureity corrupting and defiling them be eliminated by fire; for the burning sulfur is burnt out of whatever thing, which sulfur cannot be eliminated without calcination. This is because the body itself is solid, and due to the solidity, and to the concealment of the sulfureity in the continuity of quicksilver's substance, it is protected by the former from combustion. Thus it was necessary that its continuity be separated, so that the fire freely arriving at each of its smallest particles, could burn the sulphureity out of it, and the continuity of the quicksilver in that body not protect it. The common goal in calcination is likewise the cleansing out of earthiness. For it has been discovered that the bodies are cleaned by a repetition of the calcination and reduction of the said bodies, as will be shown in the following. But the special intention of the soft bodies is that with these two goals there be a further goal, namely to harden and fire them by means of it. This is arrived at with an ingenious repetition of calcination upon them, which it is expedient that we discuss in the following delivery. We find that they are openly hardened by this ingenious technique, but jupiter is hardened more openly and quickly. The cause of the discovery of the spirits' calcination is that they may be better fixed and dissolved in water. For every genus of calcined

matter is more fixed than the same not calcined, and of easier solution, since the particles of the calcined matter having been made smaller by the fire, may more easily be mixed with waters, [71vb] and they are converted into water.<sup>101</sup> If you try this, you will find it to behave thus. But the calcination of other things was according to the need of the spirits' and bodies' preparation, which will be determined by us more thoroughly in the following. But it is not something for the perfection of such as these. The method of the calcination itself is diverse, according to the diversity of things to be sublimed. For bodies are calcined otherwise than spirits or other things. And the bodies, being mutually diverse, are also calcined in diverse mode. The soft bodies have one general method according to the intention of calcination, namely that the two can both be calcined by fire alone and by the acuity of prepared or unprepared salt. The first method is that an iron or earthen vessel be taken, formed like a small dish, whose structure should be firm. Let it be fitted to the furnace for the calcination of the soft bodies, such that the coals may be shoved under it and blasted. Have lead or tin projected into the bottom of this vessel, which should sit<sup>102</sup> firmly upon an iron tripod, or on three stone columns. Let the tripod also be supported by three or four stones pressing it against those walls, lest the vessel be subjected to jarring. But the shape of the furnace should be the same as the form of the furnace of great firing, which has already been described and similarly will be described in a more complete discourse. Have a fire lit in this under the vessel of calcination,

<sup>101</sup>The idea that calcination "fixes" a substance while also reducing its particle size seems at first to contradict the many statements throughout the text that small particles are more volatile than large ones. It is clear, however, that the *Summa* believes the fixation brought about by calcination to be due to the driving out of unfixed sulfur and mercury by the force of the fire. Once this elimination is accomplished, the metallic particles *per se* will obviously be reduced in size, having lost some of their agglomerated sulfur or mercury. Hence the particle of metal will be smaller than before, but still large enough to be non-volatile. This could be seen as another example of the concept of *mediocris substantia*.

<sup>102</sup>Production of lead or tin oxide.

capable of fusing the body to be calcined. When that body has created a black skin over itself from the heat of the fire, let it be removed therefrom with an iron spade or stone which may not allow itself to be burnt by infection from the calx. This should, however, continue to be stripped of its skin until the body be reduced into powder. If that body was saturn, let it be exposed to a greater fire, until its calx be changed to a very yellow color. But if it was jupiter, let it be exposed likewise, and left until it be changed into complete whiteness. But in this we relate to the concerned artificer that saturn easily returns from its calx, but jupiter with great difficulty. So let him not happen to err during the exposure of saturn to a greater fire after its first calcination, lest its calx return to the metallic state rather than being perfected.<sup>103</sup> For it needs temperance of fire and a graduated, careful increase of that by degrees until it be established in its calx, lest it easily return to the metallic state, and in order that a greater fire can be used on that for perfecting its calx. Nor let him happen to err on account of the difficult [72ra] reduction of jove, so that if, when he put the calx into its reduction it happen that it not reduce, but rather that he find it to be of its earlier disposition, or brought into glass, and he

<sup>103</sup>It is not true that further heating of lead oxide will cause the metal to reduce, unless a reducing agent, such as charcoal, is added. Darmstaedter, n. 82, explains this error by assuming that the original lead still contained much sulfur. Continued heating of this might then lead to the formation of lead oxide and lead sulfate, according to Darmstaedter. The following reactions could then account for the reduction of metallic lead:  $2\text{PbO} + \text{PbS} \rightarrow 3\text{Pb} + \text{SO}_2$ ,  $\text{PbS} + 3\text{PbSO}_4 \rightarrow 4\text{Pb} + 4\text{SO}_2$ . This explanation seems overly complex to me. If we consult the *De mineralibus* of Albert, we find a similar piece of information, now attributed to the *Liber alchimie Hermes* (Wyckoff, p. 212): "But nevertheless Hermes believes that if a still stronger fire is applied to all these, and they are strongly roasted in the fire ..., the substance of the lead returns to what it was at first; but it is not of the same weight and purity, nor of the same quality, as at first." It is therefore possible that the *Summa* has borrowed this information from Albert. A third possibility has been suggested to me by Dr. Lawrence Principe. If the calx were subjected to a very strong fire with insufficient air, a reducing atmosphere of carbon monoxide would then exist in the furnace, and the lead oxide could reduce easily according to the formula  $\text{PbO} + \text{CO} \rightarrow \text{Pb} + \text{CO}_2$ . Such reducing atmospheres are not uncommon in furnaces.

so consider its reduction to be impossible. We say that if he does not employ a great fire, it will not reduce. But if he employ a great fire, it does not necessarily happen that it will reduce; rather, it is possible to bring it into the state of vitrification.<sup>104</sup> This is because jupiter has a fugitive substance of quicksilver closed up in the depth of its nature. If this makes a long delay in the fire, it will flee, and leave behind its body, deprived of humidity, which will be more suited to vitrification than to the fusion of a metallic body. For everything deprived of its own humidity gives no fusion except for vitrification. Thus it is necessary that a fire with very great, swift impetus, hasten quickly to reduce that, for otherwise it is not reduced. Let the artificer therefore be practiced at that, and it will be known. The method of calcination of these two bodies brought about by the sharpness of salt is that often during their fusion salt be projected bit by bit upon their surface and they also be mixed with much agitation by an iron rod, upon the fire. This should continue until they are turned into cinder by the intermixture of the salt. Then let their calx be perfected by the same method, with its respective requirements of perfection. But in this there is also a difference in the calcination of these two bodies, since lead is converted from the first work of its calcination to a powder more easily than jupiter. But its calx is not perfected easier than that of jupiter. The cause of this depends on the fact that saturn has more fixed dirtiness than jupiter, and also a greater quantity of earthiness than jupiter. But the method of venus and mars is similar, though diverse from the first; this is due to the difficulty of their liquefaction. Hence they should be subjected in leaves to a strong firing, whose goal should not be to melt them. For, on account of their great quantity of earthiness, and large measure of burning, fleeing sulfureity, they are easily brought into a calx by this method. This occurs because the continuity of the quicksilver is broken, due

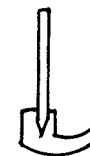
<sup>104</sup>Darmstaedter, n. 83, reports that upon strong heating, tin oxide is converted to a reddish glass, which is employed by artisans in the production of "milk-glass."

to the abundant earthiness mixed into the substance of the said quicksilver; therefore a state of porosity is created in them, through which the sulfureity, passing, can escape. Fire, on account of this reaching up to it, can burn and elevate it. Through this it is also given that the particles become rarer, and are converted into cinder because of the discontinuity due to this rarity. The manifest proof of this is that leaves of venus exposed to firing will give a sulfurous flame and will create scales on their surface capable of pulverization. [72rb] This is because it is necessary that the combustion of the sulfur be brought about easier from its more exposed particles. But the design of the furnace for this calcination is the same as that of the furnace of distillation, except that it ought to have only one great orifice in its top, whence it may freely rid itself of fumes. The place of the matter to be calcined should be in the middle of the furnace, so that it freely receive the fire around it. But let its vessel be earthen, and made in the form of a small dish. The method of the calcination of spirits is that the fire be administered gradually and with an augmentation of it by degrees, lest they flee when they are approaching their fixation, until it happens that they can withstand the greatest fire. Let their vessel be round, completely sealed, and let the furnace be the same as that just described. Everything else is calcined with a similar furnace and similar vessel. But in other cases we are freed from the greater labor which is employed in guarding against flight, since nothing but spirit flees, and whatever is close to being spirit. An illustration of all the things just described follows.

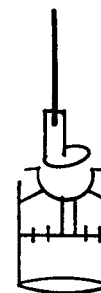
< 48 > Discourse on Solution. Rubric

Our expanded discourse on solution intimates that solution is the rendering of any dry matter into water. We say therefore, that the perfection of every solution is brought forth with subtle waters, especially the sharp, pungent, pontic ones having no dregs. Of this

Spade

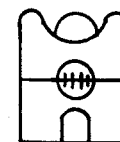


Spade



Furnace

in which saturn and jupiter are first calcined.



Furnace in which saturn and jupiter are calcined after their first calcination <and in which> mars, venus, the spirits, and all other things can be calcined.

sort are distilled vinegar, pungent grape, pungent plum, pear of great sharpness, and pomegranate, all distilled similarly, and the like of these. The cause of its discovery was the subtilization of those things which have neither fusion nor penetration, on account of whose absence much utility of the fixed spirits and of those which have the same nature, was lost. For it is necessary that all that is dissolved have the nature of salt, alum, or the like of these. But their nature is that they give fusion before their vitrification; therefore the dissolved spirits will show a similar fusion. Therefore, since they mutually agree much in their nature with the bodies, when fusion is had they necessarily penetrate the bodies, and with this penetration they transmute them. But the latter is not arrived at without a magistry, which is that after the solution and coagulation of that fixed spirit, one of the spirits - purified and not fixed - should be ministered to it, and the unfixed spirit should be sublimed from that until it remain therewith, and until that discharge quicker fusion, preserving that fixed spirit in fusion without vitrification.<sup>105</sup> For it is of the nature of spirits and bodies not to be vitrified, and to save a commixtum from vitrification as long as they are in it. [72va] Therefore the spirit that retains the nature of spirit more, protects more from vitrification. But the spirit only purified has retained this more than the purified, fixed, calcined and dissolved one. Hence it is necessary for the latter to be mixed with the former. For good fusion, penetration, and a

<sup>105</sup>The origin of this procedure of subliming the fixed spirit with the unfixed is not at all clear, though quite characteristic of the *Summa*. It is possible that the technique is a derivation from the *Liber secretorum's* recipes for sharp waters. The following recipe appears at page 74 of the *De investigatione*, and comes from the *LS* (BN 6514, 106rb,39-45: "Inceptio dissolutionis argenti vivi secundum dictum philosophorum. Sume ipsum mercurium sublimatum et imbue cum mercurio dissoluto semel, et pone in igne fimi donec sudet et desiccet. Deinde imbue et impasta, et stude super opus sicut fecisti multotiens. Postea dissolve sicut volueris. Sic enim dissolves mercurium, sulphur, et arsenicum sublimatum." The *mercurius dissolutus* is probably quicksilver dissolved by means of a sal ammoniac solution. The *Summa* may also have been influenced here by the *Liber septuaginta's* recipe for preparing *argentum vivum solum* (333). It is quite likely that the *Summa* has here borrowed from existing artisanal practices as well as literary sources.

constant fixation results from them when mixed. We can prove from the works of nature that only those things retaining the nature of salts, alums, and the like, are soluble. For inquiring into all her works, we do not find any but those to be separated and dissolved. So whatever are dissolved, are necessarily dissolved through the nature of the former. But because we see all calcined matter to be dissolved by a repetition of calcination and solution, we thus prove by this that all calcined matter approaches the nature of salts or alums. Hence they must be joined to each other in their properties. The method of solution is two-fold, namely through warm dung and boiling water, of which the intention and effect are the same.<sup>106</sup> The method using dung is that the calcined matter be put into a glass flask, and upon that should be poured a double quantity of distilled vinegar or the like. Let the top be well sealed lest it breath out, and have the flask left under warm dung for three days. Then let the dissolved matter be removed by distillation via a filter, but the undissolved be calcined again. After the calcination, let it be dissolved again, until completely dissolved by repetition of this process upon it. But the method which is done by boiling water is faster. This is that the calcined matter likewise be put in a flask with vinegar, while the orifice is stopped up lest it breath out. This is buried in straws, in a hot bath full of water, as we announced the rule in the process of distillation by water. Then have a fire lit under it until the water boil for an hour. After this, have the dissolved matter distilled, and preserved apart. But let the undissolved be calcined again and again dissolved by the same process, until the whole is dissolved by these repetitions. This is an illustration of what we have just said.

<sup>106</sup>The *De investigatione* contains a very detailed treatment of different methods and apparatus of dissolution between p. 145 and 165. One of these (pp. 155-156) describes the inverted basket shown in the *Summa's* illustration of a flask to be buried in dung (BN 6514, 72v).

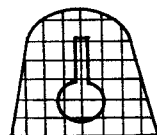
## &lt;49&gt; Discourse on Coagulation. Rubric

Coagulation, therefore, is the reduction of a liquid thing to a solid substance, by the privation of its humid part. The reason for the discovery of this is therefore two-fold, first for the hardening of quicksilver itself and second for the elimination of the quicksilver's wateriness from dissolved medicines. But it is diversified according to the multiplicity of the things to be coagulated. Thus, quicksilver needs one coagulation, but dissolved medicine another. The coagulation of quicksilver itself is also two-fold; one is certainly through the removal of all its innate humidity. The other is by the thickening of the humid until it be hardened.<sup>107</sup> But it will happen to be very difficult and laborious to coagulate this: so with the depth of clear-sighted ingenuity [72vb] we will relate every clever technique of its coagulation. Some, therefore, have thought it would be a clever technique of coagulation to have that remain in a temperate fire. Those same men, considering that to have coagulated, found that after its removal from the fire, it flowed just as before.<sup>108</sup> They have therefore been drawn into stupor and wonder by this, while arguing that this coagulation could not be arrived at. But others, supposing from natural principles that any humidity is necessarily converted into dryness by the heat of fire, have attempted with constant preserverance to continue its preservation in the fire. By continuing that, they have arrived at this - that some of their samples turned into a white stone and others into a red, others still into a yellow one, in which there was neither fusion nor penetration: they could not determine the cause

<sup>107</sup>This dichotomy may have been suggested by the following passage from the *Liber secretorum de voce Bubacaris* (103ra,73-b3): "in tamen unaquaque sublimatione argenti vivi sunt duo secreta - [ut] unum est ut recipiatur humiditas. Aliud est ut facias illud durum et siccum et sic deperditur eius humiditas." The passage is incorporated into the *De investigatione* at p. 18.

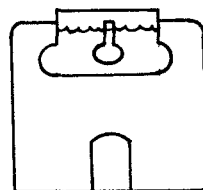
<sup>108</sup>Perhaps a reference to mercury II oxide (so-called red precipitate), which is indeed produced by slow heating alone, and does in fact return to the state of metallic mercury if reheated - or further heated - to 500° C.

Dung



Flask

Bath

with straws,  
water, and  
flask.

from the medicine's purity, and from a consideration of its colors. For it is coagulated from its frequent precipitation with violence due to the harshness of fire. For the harshness of fire easily removes its humidity. This is done by a vessel whose shape should be of great length. Finding a cooling-place in that, it may find a place for its adherence and rest on the sides of this apparatus, due to its length. And it may not find a way of escape until, when that is repeated, it be precipitated at its base, with abundant repetition of great heat and firing, until it be fixed.<sup>111</sup> It is likewise coagulated by long repetition in its own fire with a glass vessel whose neck should be of great length, and whose belly should have the shape of a flask. Its neck should be continually open, so that its humidity can escape through it. But it is coagulated also by a medicine agreeing with it. And we will describe it to you more openly in the following, but here also, so that we may describe our complete intention about it, according to what we have found by our practice. And that which unifies therewith is a medicine which strongly adheres to it in its depths, and which is mixed with it through the smallest particles, before its flight. Thus it is necessary to collect the former from things agreeing with quicksilver. But all bodies, [73rb] as well as sulfur or arsenic, are of this sort. But because we do not see any of the bodies to coagulate it in its nature, but that it flees from them, whatever their agreement be, we have therefore determined that no body adheres to it in its depth. So this

<sup>111</sup>This procedure, it seems to me, could only produce mercury oxide. It is true that the oxide of mercury does not sublime, but it decomposes into free mercury at 500° C., and this would immediately sublime upon its decomposition (Hg = Bp. 356.58° C.). The volatilization of red mercury sulfide or cinnabar (at 583.5° C.) - a substance mentioned repeatedly by the *Summa* - is somewhat higher than the decomposition temperature of mercury oxide. The emphasis throughout the *Summa*, however, is on mercury fixed by means of sublimation with "drying" medicines such as "prepared salts." The product in such cases would probably be corrosive sublimate, HgCl<sub>2</sub>, which melts at 277° C., before subliming at about 300° C. This would provide the alchemist with the desired "metallic fusion" - a type of melting followed by resolidification upon cooling - which would be absent in the case of either mercury oxide or mercury sulfide.

medicine must be of subtler substance and more fluid fusion than the bodies themselves. And we do not see a firm, stable coagulation of mercury to be made from spirits remaining in their own nature, but rather a fugitive one of much infection, which happens either because of the spirits' flight, or from the admixture of their earth and burning substance. Thus it is openly given from this that no matter what its medicine be elicited from, the medicine itself ought to be of very subtle, pure substance, adhering of its own nature to the quicksilver, of very easy, subtle liquefaction like water, and fixed during the attack of fire. For such a medicine will coagulate it and convert it into a solar or lunar nature. We have imparted to you the methods of clever techniques for the medicine, to which medicine you can arrive through them. We have finished the discourse properly about them. So let you be carefully practiced at it, and you will find it. But so that you cannot scold us for being insufficient, we say that this medicine is drawn from metallic bodies themselves, prepared with their own sulfur or arsenic. It can be drawn both from those prepared with arsenic or sulfur alone, and also from those bodies alone. But it is found easier, nearer, and more perfectly in quicksilver, since a nature embraces its own nature in a more friendly way, and rejoices in it more than it does in a strange nature.<sup>112</sup> And in quicksilver there is an easy extraction of that subtle substance, since it already has a subtle substance *in actu*. The methods of its discovery are by

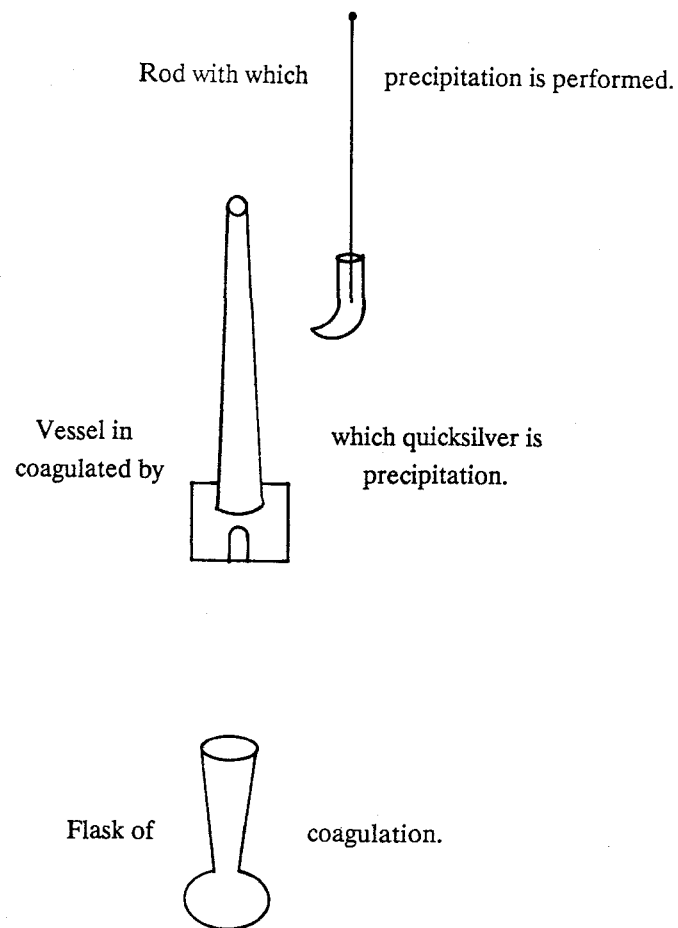
<sup>112</sup>The expression "naturam propriam natura amplectitur amicabilem, et ea gaudet magis quam extranea" finds its ultimate origin in the aphorisms following the recipes of the *Physika kai mystika* of pseudo-Democritus, a work perhaps written in the Roman Imperial period. The recipes are followed either by *hē physis tē physis terpetai*, *hē physis tēn physin nika*, or *hē physis tēn physin krateri* (M. Berthelot, *Collection des alchimistes anciens grecs* (Paris: 1887), vol. I, pp. 41-53. Since these maxims are quoted extensively by the Arabo-Latin *Turba philosophorum* (ed. Julius Ruska, in *Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin* (Berlin, 1931), pp. 119-120), one might be tempted to argue that the *Summa* has used that work. But that would be an unnecessary assumption, since the aphorisms occur in other texts as well (e.g. *De investigatione*, p. 56).

sublimation, as has been described enough by us already. But the method of its fixation and fusion are described in their own chapters. Yet the method of coagulating dissolved substances is by means of a flask put in cinders up to its neck, with a temperate fire, until its wateriness escape. This, indeed, is an illustration of long vessels and of those in which all coagulation is performed.

#### < 50 > Discourse on Fixation

Fixation is the agreeable adapting of a volatile thing to fire. But the reason for the discovery of fixation is so that every tincture and every alteration be perpetuated in the altered, and not be changed. Fixation is differentiated according to the multiplicity of things to be fixed, which are certain bodies removed from perfection, such as saturn, jupiter, and venus, and according to the diversity of the spirits themselves, which are sulfur and arsenic in one degree, and quicksilver in another, but marchasite, magnesia, tutia, and the like in a third. The bodies removed from perfection are fixed [73va] by their calcination, since they are freed by that from volatile, corrupting sulfureity. We have described this adequately in its own section. Hence sulfur and arsenic are fixed with two methods, and first by repeated sublimation upon them in the vessel "aludel", until they stand firm. The goal of the quickening of their fixation is arrived at from this - that you devise an invention for much repetition of sublimation in a short time. This is done by means of two alembics with their own covers, according to this process - namely that they never desist from the act of sublimation until the spirits are fixed. Therefore, when they have ascended in one aludel, they are projected into the other aludel.<sup>113</sup> Let this

<sup>113</sup>This does not necessarily refer to a reflux condenser or "pelican," as Darmstaedter, n. 89, assumes. The passage could mean simply that two aludels are employed in sequence, the contents of one being poured into the other as soon as all the reagent has sublimed.





occur alternately, and they should never be allowed to adhere freely to the walls of the aludel without being in a continual state of elevation by the fire, until their elevation cease. For the more you can multiply the multiple repetitions of their sublimation in briefer space of time, the quicker the time of their fixation will be shortened. Thus the second method of fixation was discovered, which is by precipitation of the sublimandum by heat in such a way that it be subjected to heat continually until fixed. This is done by means of a long glass vessel, whose base should be earthen and not glass, since the latter would be splintered into parts. Let the former be connected to the latter with a good seal. And as soon as the sublimandum adheres to its walls, let it be knocked down to the hot base with an iron or stone spoon: do this repeatedly, until it be fixed. But the method for fixing quicksilver is the same as that for sulfur and arsenic, and they are not mutually differentiated except in this - that sulfur or arsenic cannot be fixed by this method of fixation unless their inflammable, very tenuous particles be separated from them first by means of a subtle technique of division. Quicksilver, however, does not have this consideration. In addition, the former need more temperate heat than quicksilver does, and their fixation by this method takes more time than that of quicksilver. Since they are elevated higher than quicksilver thanks to their rarity, they need a longer vessel than it in the same process. But the fixation of marchasite, magnesia, and tutia is such that after we acquire the first sublimation from them, we repeat the sublimation upon them with their dregs removed; what has ascended upwards from each is reverted onto that remaining below as many times as necessary, until they [73vb] are fixed. The illustration of these vessels has already been presented.

<51> Discourse on Ceration. Rubric

Ceration is the softening up to liquefaction of hard, infusible matter. From this, it is therefore manifest that the reason for its discovery was so that what did not have ingression into a body up to the latter's alteration, due to its own privation of liquefaction, would be softened, so that it would flow and have ingression. Therefore some have imputed that ceration ought to be induced with oils, liquids, and waters. But that is erroneous, and wholly removed from the principles of this magistry, and also disproved by the manifest works of nature. For we do not see nature to have put a quickly terminable humidity in the metallic bodies, necessary for their fusion and softening. For if she had put such in them, it would necessarily have been given up, so that the bodies would be totally deprived of their humidity very quickly, namely by one firing. Whence it would have followed from that that any body would neither be malleable nor fusible after one firing. Wherefore it is necessary that we, imitating the works of nature inasmuch as we can, must follow the method of nature in cerating. But she herself cerates in the root of the fusible bodies' creation, with a humidity which above all other humidities withstands the heat of fire. Hence it is necessary that we also cerate with a similar humidity. Yet this cerating humidity is found in no other things better, more possibly, or more at hand than in these - namely close at hand in sulfur and arsenic, but still more close at hand, and better, in quicksilver. For we do not see the earth of these to give up its humidity, due to the strong union which they have had in the natural operation of mixture. But in all other things having humidity, you will find by practice that it is separated from their earthy substance, and that after the solution or separation of that humidity, they are deprived of all humidity. But in the foresaid spirits this happens very little. Hence there is nothing by which we can be freed from their ceration and use. But the method of

ceration by them is that their sublimation upon the thing to be cerated be repeated until they show good fusion with their humidity remaining within that. But this may not occur before their perfect cleansing from every corrupting thing.

**< 52 > Third Book, Divided from the Second, Part of  
Which is a General Discourse on Perfection and on  
Those Things that pertain to Perfection**

It is therefore necessary from our earlier promise, since the discussion of the principles of this magistry has been treated, that we pursue the goal of this art of ours completely, and with a discourse agreeing thereto. [74ra] And this is the consideration of everything through which the perfection of this work may be made known openly, as also the consideration of the necessity of the perfecting medicine, so that we may investigate the matter from which this can be drawn forth better and more at hand for every perfection of the imperfect, and finally the consideration of the techniques of that magistry through which we may know whether the perfection be complete. Once these things are taught, the whole cognition of perfection will be also delivered, according to the need of our art.

**< 53 > General discourse on the Cognition of the Principles  
of Bodies, and also on their Natures**

It is not possible to become acquainted with the transmutation of bodies or of quicksilver itself unless a true knowledge of their natures, according to their roots, enter into the mind of the artificer. First therefore we will relate the principles of the bodies, namely what they are according to their causes, and what they contain in themselves of good or bad. Then we will teach the natures of all the bodies, with all their properties, namely

proving what the causes of their corruption are by means of their tests.

**< 54 > Particular Discourse on the True Cognition of Sulfur  
and Arsenic**

Therefore let us first of all report the nature of the spirits which are the principles of the bodies themselves; the former are to be sure sulfur, quicksilver, and its comrade <i.e. arsenic>. We say that sulfur and arsenic are a fat of the earth, as related by us earlier. You may draw forth the proof of this by a manifest test, namely by its easy inflammation, and by its easy liquefaction through heat. For nothing is inflamed unless it be oleaginous, nor is anything liquefied easily by heat unless it also have that nature. And so sulfur and its comrade have the cause of corruption, namely an inflammable substance and earthy residue. But they also have a perfecting cause mid-way between the latter and the former. Earthiness is thus the cause of corruption in the latter because of this - that it has neither fusion nor penetration. But the inflammable substance is also a cause of corruption, because it neither stands firm nor causes others to stand firm, and gives blackness from each of its genera. So the cause of perfection in them is their middle substance, because it is not prevented by earthiness from the penetration which is perfected through good fusion, and because its impression is not easily removed on account of the flight due to an overabundance of subtlety. But the middle substance of them is not the cause of the bodies' or of quicksilver's perfection unless it be fixed, because when it is not fixed, although its impression may not be removed easily, it may not be made stably permanent.<sup>114</sup> From these causes, it is elicited that the

<sup>114</sup>The *mediocris substantia* of sulfur and arsenic, though less volatile than their smallest particles, is still not wholly fixed. See our introduction to the *Summa's* corpuscular theory (Chapter IV).

artificer must divide the middle substance of that fat. And certain men have imputed it to be impossible to divide that, thanks to its strong mixture, but they have surely opposed their own manifest works. For they too have calcined sulfur, although not much, [74rb] which therefore yielded neither fusion nor inflammation. But this necessarily would have had to happen through division, since sulfur remaining in its natural commixture is necessarily inflamed and burnt up. Therefore it is necessary that the inflammable portion of it is separated from its non-inflammable particles by the artificial division of its diverse components. For if it is possible to arrive at the removal of of all its flammable particles by calcination, they must confess that they arrive at every division of the particles by their own natural operations. But because this depends on a very subtle technique, they have considered that it would be impossible. It is therefore manifest from the things set forth in this chapter that sulfur is not of our art in its totality, but rather part of it. And we have just led you to the recognition of the technique by which it is possible to arrive at its division. But in arsenic, since many of its particles are resolved in the root of its mineral by the action of nature, the technique of its separation is therefore easy. Arsenic itself is a tincture of whiteness, but sulfur of redness. Hence, in the division of sulfur one must exercise great caution.

#### < 55 > Discourse on the Cognition of Mercury's Nature

In quicksilver it is also necessary to remove superfluities. For it has the causes of corruption, namely an earthy substance and one of combustible humidity without inflammation, from which it may be purified by subliming it. But some have imputed that it does not have a superfluous earth or the dirtiness associated with that. What they have considered is, however, vain. For we see it to be of great lividity, and not whiteness. Therefore we likewise see a

black, residual earth to go forth easily from it by means of art, namely by washing, whose method we will relate. But because it is one thing to bring forth perfection by means of that and another to perfect that itself, therefore it is necessary to prepare it with a double degree of cleaning. For if we wish to make a medicine from quicksilver, then it is necessary to clean it from the residue of its earthiness, lest it create a livid color in its projection. And it is necessary to remove its volatile aqueity, lest it also make the whole material volatile in its projection. It is also necessary to preserve its middle substance, whose property and nature is not to be burned up, and to protect from burning, and which does not flee, but makes others fixed.<sup>115</sup> We therefore prove it to be perfective from manifest tests. For we see quicksilver to adhere more to quicksilver, and to be more united to the same, but gold after that, and silver in turn after that. Thus it is given from this that they are more of its nature, but we see others to have not so great conformity; therefore we truly intimate that they participate less in its nature. And whichever [74va] we see to be more saved from burning we have considered more to possess its nature. Hence it is given that quicksilver is perfective, and a preservative from burning, which is the height of perfection. But the second degree of its cleansing is for the coagulation of the quicksilver itself, and you should let a washing of its earthiness through one day only suffice for this, whose method is the following. Let an earthen pan be taken and into it be put quicksilver, upon which a small amount of very strong vinegar or the like should be poured. This should suffice to cover it, after which it should be put on a mild fire, so that it boil. Let it continually be stirred with the fingers above the bottom of the pan, so that the quicksilver be divided into something like very subtle white powder, until all the vinegar evaporate and the quicksilver be left. Then after this, you will see that which is

<sup>115</sup>The *mediocris substantia* of quicksilver, unlike that of sulfur and arsenic, is already relatively "perfect."

residual and black to have emanated from it: wash and discard the former. Repeat this until you see the color of its earthiness to be changed perfectly into a clear mixture of white and blue color.<sup>116</sup> This, moreover, is the sign of perfect washing. When it has arrived at this, let the medicine of its coagulation be projected upon it, and it will be coagulated into a gold- or silver-producing body, according as the medicine itself is prepared. And we will put the description of that in the following. From the foresaid it is also clear that quicksilver is not perfective in its own nature, nor in the nature to which its own mine leads it, but rather in that to which our artifice brings it. And one must also induce the same in sulfur and its comrade. It is not possible, therefore, to follow nature in these things naturally, but through our natural artifice.

**< 56 > Discourse on the Cognition of the Natures of Marchasite, Magnesia, and Tutia**

It is necessary that we prepare a natural lesson on the other spirits, namely marchasite, magnesia, and tutia, which make a great impression on the bodies. Let us therefore say what they are with manifest proofs, in a special chapter. We therefore say that marchasite has, in its creation, a double substance - namely of mortified quicksilver approaching fixation and of burning sulfur. We ascertain that it has sulfureity from open practice. For when it is sublimed, a palpable burning, sulfurous, substance emanates therefrom. And its sulfur is likewise recognized without sublimation, for if it be subjected to firing, it does not glow before it bursts into flame and burns with the inflammation of sulfur. But that marchasite has the substance of quicksilver is shown to the senses. For it gives the whiteness of genuine silver to venus just as

<sup>116</sup>This method of cleansing mercury with vinegar is described in the *Liber secretorum*, BN 6514, 104va, 14-18. It is recapitulated on p. 35 of the *De investigatione*.

quicksilver itself does.<sup>117</sup> And we see it to manifest a blue color in its sublimation [74vb] and to have a metallic, visible, brightness, which render the artificer sure that it contains these substances in its root. But you will be able to prove manifestly and by the same practice that magnesia has a dirtier sulfur and earthier, more residual quicksilver, and likewise that it has the sulfur itself more fixed and less flammable, and that magnesia approaches more to the nature of mars. But tutia is a vapor of the white bodies. This is shown by a manifest test, for the vapor emitted from a mixture of jove and venus, adhering to the walls of a workshop, makes the same impression when projected <onto a metal> as tutia, which a metallic vapor alone does not do, nor tutia, without the admixture of another metallic body.<sup>118</sup> Therefore since it is a vapor of the white bodies, it does not yellow the white bodies, but the red ones. For yellowness is nothing but a determinate proportion of red and white. Hence tutia penetrates deeper on account of its subtlety and therefore alters more than its body alone would, and also adheres more in the test, with the small process which was just related to you. Therefore it is necessary to alter whatever bodies are altered by the virtue of quicksilver, sulfur, or the like, since only these communicate in nature with the bodies.

**< 57 > Discourse on the Cognition of the Bodies, and First Sol**

Thus let us relate the deepest essence of the bodies with an expanded discourse on them; first of sol, then luna, and finally the

<sup>117</sup>This information is found on p. 102 of the *De investigatione*: cf. our note 93 *supra*.

<sup>118</sup>Tutia, mainly zinc oxide, was in fact deposited on the walls and chimney flues of workshops when brass was made from copper and calamine. One could argue that the *Summa* has confused the production of brass here with that of bronze, for the reference is to a metal made of tin and copper. But the bronzes of the Middle Ages were sometimes alloys of copper, tin, and zinc. Thus Albertus says in the *De mineralibus* (Wyckoff, p. 250) that tutia "is made from the smoke that rises upwards and solidifies by adhering to the hard bodies, where copper is being purified from the stones and tin which are in it."

others, according to what seems expeditious, along with their tests which are had from practice. Sol, therefore, is made from the most subtle, fixed, and brightest substance of quicksilver, and from a little of the substance of clean, fixed sulfur of little redness, changed from its own nature, and tinting it. Hence because diversity occurs in the colors of the sulfur, it is necessary that the yellowness of the gold also have diversity. Some gold is more intense in yellowness, while other gold is less. That it be from the subtlest substance of quicksilver is shown because quicksilver easily amalgamates with it. For quicksilver does not amalgamate with anything but that of its own nature. Gold manifests that it has that substance bright and clean by its splendor and radiance, not only showing itself in bright day, but also in shadows. That it has this substance fixed, without sulfureity, is made obvious by every operation of it upon fire, for it is neither diminished nor inflamed. That the sulfur itself is tinting is shown by this, that when mixed with quicksilver, we see it to transform that into a red color, and that if sublimed with strong firing from the bodies, so that their subtlety ascends with it, it creates a very yellow color. [75ra] It is therefore clear that with a pure substance it generates a pure color, but with an impure one, an impure one. Whoever needs a demonstration of the proof of its yellowness, does not have sense, which is perfected by sight. Therefore the very subtle substance of quicksilver led forth to fixation, and the purity of the same, along with the very subtle, fixed, unburning matter of sulfur, is the whole essential matter of gold. But the quantity of quicksilver is proved to be greater than that of sulfur in it, because of the easy penetration of quicksilver into it. Therefore, whatever you wish to alter, alter according to the example of this, so that you lead them to its equality; we have just given you a method for that. Because it had subtle, fixed particles, its particles could therefore be much compressed; and this was the cause of its great weight; a good resolution and compaction of it has been gradually made through

the long and temperate cooking down by nature; and finally a mixture is made so that it liquefy upon firing. From the foregoing, therefore, it is clear that great quantity of quicksilver is a cause of perfection, but great quantity of sulfur is a cause of corruption. And uniformity in substance is a cause of the perfection which comes about through mixture during the natural cooking-down, but diversity a cause of corruption. Both the compaction and hardening that are perfected by long, temperate decoction are a cause of perfection, but the opposite a cause of corruption. If therefore the sulfur falls upon the quicksilver unduly, it is necessary that diverse corruptions be adduced according to the diversity of the latter. For the sulfur that contacts it can be fixed and entirely unburning, or wholly burning and volatile in the nature of sulfur, or have part volatile and part fixed, or have the nature of sulfur in part, and in part not, or be wholly clean, unclean, or in between each, or of great quantity and thus predominating in the commixture, or of small quantity, and so predominated in that, or neither predominating nor predominated, or white, red, or in between. From all these diversities, therefore, it was necessary that bodies and the like of these be created in diverse nature. It is necessary that we relate all these with manifest tests.

**< 58 > Discourse on the Cognition of Luna's Nature.  
Or Discourse on the Principles Composing Luna  
According to Nature**

It therefore appears from the immediate foregoing that if a clean, fixed, red, clear sulfur fall upon the pure, fixed, brilliant substance of quicksilver, the former not exceeding, but of small quantity, and so exceeded, pure gold is made from this. But if it is clean, fixed, white, brilliant sulfur that falls upon the clean, fixed, brilliant substance of quicksilver, [75rb] and if the former does not predominate in quantity, then pure silver is made, but it has a

purity removed from the purity of gold, and grosser compaction than gold, whose sign is that its particles are not pressed together so much that it would weigh more than or as much as gold, nor has it so fixed a substance as that. The sign of that is its diminution through fire; its sulfur, which is neither fixed nor unburnable, is the cause of this. That the sulfur in it be of this disposition is proven by its slight inflammation. But it must not be said that it is impossible for this to be fixed and unfixed when compared first to one and then to another. For the sulfureity of Luna compared to that of gold, is not fixed and is burning, but compared to the sulfur of others, it is fixed and unburning.<sup>119</sup>

#### < 59 > Discourse on the Cognition of the Nature of Mars

But if a fixed, earthy, sulfur is mixed with an earthy quicksilver, and both of these are not of a pure whiteness, but rather a livid whiteness, and a very great quantity of sulfur predominates, iron comes to be out of these. For the predominance of fixed sulfur impedes fusion. From this it is given that sulfur more quickly loses its haste of liquefaction through the process of fixation than does quicksilver. But we do not see fixed sulfur to liquefy more quickly than fixed quicksilver.<sup>120</sup> It is

<sup>119</sup>This passage reveals that "fixity" in the *Summa* is relative rather than absolute. This is an important fact, as it helps to explain how the *Summa* can treat substances such as "mortified quicksilver" (HgCl<sub>2</sub>) and "red precipitate" (HgO), for example, as "fixed" even though we know that they are still capable of being sublimed (HgCl<sub>2</sub> boils at 302° C; HgO decomposes to free mercury and oxygen at 500° C, whereon the mercury would sublime). The same *modus operandi* occurs when the *Summa* speaks of homogeneity. Although the principles of the metals are called "homogeneous" and "homoeomerous," as at 62vb,32, 65vb,36, and elsewhere, it is obvious that the whole theory of *mediocris substantia* is built on the assumption that they are not profoundly so. Their homogeneity is one of appearance only, as when ordinary mercury is sublimed without leaving a residue. The clever alchemist, who can see beyond such trivial appearances, will perceive that the *mediocris substantia* of the quicksilver can be "divided" by means of his artifice.

<sup>120</sup>This problematic sentence could also be translated "But we see the unfixed sulfur to liquefy more quickly than quicksilver," on the assumption that the author

manifest from this what is the cause of rapidity or tardiness of fusion in every body. For what has more fixed sulfur is fused slower, but what has more burning sulfur more easily, and the latter receives fusion more rapidly. This is going to be shown clearly enough by us. Therefore, that fixed sulfur causes a slower fusion is shown by this - that it never is fixed unless calcined, and once calcined, never gives fusion. Hence it ought to impede that in all things. But that it may not be fixed unless calcined appears to the practiced at this who fixes it, since he discovers that it always flees until turned into an earth, whose likeness is the likeness of a true calx. But this happens very little in the case of quicksilver, since it can be fixed without being turned into an earth, and also fixed with conversion into an earth. For by rapidity of its fixation, which is perfected through precipitation, it is fixed and turned into an earth. But through successive, reiterated sublimation of it, it is also fixed and yet not turned into an earth, but rather gives a metallic fusion.<sup>121</sup> This is manifest and proven to him who has witnessed both its fixations up to the consummation thereof. For he sees and finds it to be just as what he has received written down by us. This is because quicksilver has a viscous, dense substance, whose sign appears during its grinding upon imbibition and mixture with other things. For the viscosity in that is [75va] openly perceived, due to its great coherence. That it has a dense substance a one-eyed man may openly see from its appearance and the preponderance of its great weight; for it is heavier than gold when it is in its own nature.<sup>122</sup> It is also of very strong composition, as related before. From these considerations it is given that it can be fixed without the consumption of its humidity and conversion into earth. Due to

is referring to fixed quicksilver. The subsequent statements could support either translation.

<sup>121</sup>Here the *Summa* openly expresses its preference for corrosive sublimate over red precipitate, as the former has the ability to undergo "metallic fusion."

<sup>122</sup>Mercury, with a specific weight of 13.546, would have been heavier than any other metal known in the XIIIth century *except* gold, whose specific weight is 19.32.

the good coherence of its particles and the strength of its mixture - providing its particles be compacted as by fire - it does not eventually permit itself to be corrupted, nor does it permit itself eventually to be elevated into vapor by the penetration of vaporous flame, since it does not suffer rarefaction of itself, on account of its compaction and absence of combustibility, the latter of which we know to be brought to completion by sulfureity. Through this a wonderful genus of two secrets was discovered with truthful discovery. One of these secrets, namely the cause of whatever metal's corruption by fire, is threefold. One of these corruptions is the confinement of burning sulfur in their substance, diminishing and driving them forth into fumes, with an eventual consumption by means of inflammation, however much quicksilver of good fixation was in them. A second is the multiplication of an exterior flame penetrating them from above and resolving them with itself into vapor, no matter what fixation they have. But a third is their rarification by calcination. For then a flame or a fire without flame can penetrate into them and drive them forth. If all the causes of corruption come together, then it is inevitable that the bodies be corrupted. But if not, then the speed of each sort of corruption in each of the bodies is remitted, according to the remission of these causes. The second genus of secrets is the goodness that is seen in the bodies by virtue of their quicksilver. Therefore, since quicksilver permits itself to be divided into the parts of its composition by none of the causes of extermination, either because it recedes with its whole substance from the fire, or because it remains permanent in that, the necessary cause of perfection is found to be in it. So let the blessed and glorious God the highest be praised, He who created this and gave it the substance and properties of substance which nothing else in nature can possess, so that in that substance can be found this sign of perfection by a certain technique, which we find almost *in actu* in quicksilver itself.

For that itself is what conquers fire, and is not conquered by it, but rather rests quietly in the fire with friendliness, and rejoices in it.

**< 60 > Discourse on the Principles Composing Venus According to Nature**

Returning to our proposed subject, we say that if there is a dirty, gross sulfur fixed according to its greater part, but according to its lesser part unfixed, red, and livid, according to its whole neither exceeding nor exceeded by quicksilver, and if gross quicksilver falls upon this substance [75vb], it is necessary that copper be created therefrom. One can adduce a proof of all these things through the substances in their own nature. For when venus is subjected to inflammation, you will be able to perceive a sulfurous flame from it, which is a sign of unfixed sulfur, as is the loss of its quantity by exhalation. The fixed sulfur in that substance is signified by means of frequent combustion of it, for from that the hardening of its substance and retardation of its fusion come about, which are signs of much fixed sulfur. That this is red, dirty, and joined to an unclean quicksilver, is signified through the senses, wherefore it needs no other proof. So you may elicit a secret from practice. For you see everything that has been changed into earth by the action of heat to be easily dissolved and returned to the nature of water. But this occurs because of the subtilizing of the particles by fire. So matter more subtle in its own nature, having also been reduced to this earthy nature, is subtilized more, and so dissolved more. Therefore what is most subtle, is dissolved most. Therefore the cause of the corruption and infection of these two metals appears from these considerations, since it is brought about by fixed sulfur of great quantity and by unfixed of small quantity in venus, but of extremely small quantity in mars. So when the fixed sulfur arrives at its fixation through the heat of fire, and at the subtilizing of its particles by that, it arrives by this means at the

aptitude of its substance for solution. The sign of this is the exposure of these two bodies to the vapor of vinegar, for by that means an aluminosity of their sulfur effloresces on their surface, created by the subtilizing heat in that. If you put these two bodies into pontic liquor, their many particles are dissolved by boiling in it. And if you look into the mines of these two, you will find a manifest substance of aluminosity to drip down from them and to adhere to them. This is proved to be aluminosity by its ponticity and easy solution into a water. For nothing but alum and what is of its nature is found to be pontic and easily soluble. But the blackness in each of these two bodies upon their exposure to fire is created by the unfixed sulfur which is closed up in them. There is certainly much in venus, but little in mars, and that approaches the nature of fixed sulfur. Hence it is not easily possible to remove such an impression of sulfur from mars. Whence it is clear that fusion occurs on account of the unfixed sulfur, and that fusion is aided thereby, but that fusion does not come to be from the fixed, and that fusion is thereby impeded. But it is not necessary that fusion not come about from fixed quicksilver, nor that fusion be impeded thereby. He knows this necessarily to be true who has fixed each, since [76ra] he could keep the sulfur in fusion after its fixation by none of the techniques of fixation. But he has fixed quicksilver by frequent repetition of sublimation on that, with it receiving good fusion. From this it is manifest that bodies containing more quicksilver are of greater perfection, and that those which contain less are of less perfection. Let you therefore be eager in all your works for quicksilver to predominate in the commixture, and if you can perfect with quicksilver alone, you will be an investigator of the most precious perfection, and of that which overcomes the work of nature.<sup>123</sup> For you will be able to clean profoundly, to

<sup>123</sup> Here again the *Summa* enunciates one of the fundamental principles of the "mercury alone" theory - the notion that quicksilver is the cause of metallic perfection in nature, and that the alchemist should therefore follow nature in using mercury to bestow such perfection on the base metals.

which nature does not arrive. But the proof of this - that those bodies which have a greater portion of quicksilver are of greater perfection - is their amalgamation with quicksilver. For we see the bodies of perfection to take up quicksilver in a friendly fashion. From the foregoing discourses, it is therefore granted that there will be a double sulfureity in the bodies, one enclosed in the depth of quicksilver in the beginning of its mixture, the other added on. One of these is removed with labor, but it is not possible that our work can fittingly and usefully arrive at the other by any of the techniques brought about by fire, since it has already been united with that quicksilver during the creation of the same. And from this experience it is proven that we see the burning sulfureity to be removed by fire, but the fixed sulfur very little. So if we said that bodies are cleaned by calcination, let you understand that they are cleaned from their earthy substance, which is not united in the root of its nature, since it is not possible to clean the united by the clever technique of fire, unless a medicine hiding and tempering that substance of quicksilver arrive, or one separating it from the commixture. But the separation of the earthy substance united to the metal in the root of its nature from the commixture comes about in one of two ways. First it can be separated through elevation with things elevating the substance of quicksilver and leaving behind the sulfureity, on account of the former's agreement with them. This is the case in tutia and marchasite, since they are vapors composed of a greater part of quicksilver than of sulfur. You may see the proof of this if you conjoin these to the bodies in a sudden fusion, since the spirits lead forth the bodies with themselves in their flight; therefore you can elevate with the former. The second method of separation comes about with a washing, by intermixture of quicksilver, which we have related. For quicksilver retains that which is of its nature, but leaves all else behind.



<61> Concerning the Essence and Creation of Jove

With this investigation having been propounded, we therefore intimate, following our proposal, that if there is a sulfur participating little in fixation in the root of the commixture, [76rb] white with an impure whiteness, not exceeding in quantity but rather exceeded, in a commixture with quicksilver fixed in part but unfixed in part, and white but impurely so, tin follows therefrom. You will find the evidence of these if you calcine tin, since you will smell the stench of sulfur going forth from it, which is a sign of unfixed sulfur. Let you not impute that it be fixed because it does not yield a flame, since it does not yield a flame not on account of fusion and fixation but on account of the predominance of quicksilver in the commixture, preserving it from combustion. Therefore, a two-fold sulfureity is proven to exist in tin, and also a two-fold substance of quicksilver. One sulfureity is made known to reason by the first test. The other is proven by the persistence of it in its calx which it has upon the fire, since a more fixed sulfureity does not stink. But a two-fold substance of quicksilver is also proven to be in tin, one of which is not fixed. This is because it creaks before its calcination, but after its double calcination, it does not creak, which is due to the fact that the substance of the fugitive quicksilver causing the creak has escaped. But that the substance of fugitive quicksilver adduces the creak is proven by the washing of lead with quicksilver. Since if you melt lead with quicksilver after its washing with the same, and the fire does not exceed that of its fusion, part of the quicksilver will remain with it, which will adduce a creak from the lead, and convert it into tin. On the other hand, you can convince yourself of this by the mutation of tin into lead. For through multiple repetition of calcination upon tin, and through the aid of a fire well suited to its reduction, it is turned into lead, but above all when it is calcined with a great fire, with the removal of its scoria. You may become sure of the diversities of

these substances with the ingenious techniques of their preservation - with their own instruments and with the method of the fire dividing them - to which preservation we arrive with diligence; and we see by our certification that we have judged truly about this. Therefore it is expedient that we make you know what there may be that remains after the removal of the two unfixed spirits, namely of unfixed sulfur and quicksilver, so that you know completely the composition of jove itself. It is therefore livid, and heavy, like lead, but participating more in whiteness than lead. Thus it is a very pure lead, and in it is equality of fixation of the two components quicksilver and sulfur, but not equality of quantity, since quicksilver predominates in their mixture, the sign of which is the easy penetration of quicksilver in its own nature into that. Therefore, if the quicksilver in that were not of greater quantity, it would not - having been taken up in its own nature - have adhered to that easily. [76va] For this reason, quicksilver does not adhere to mars or venus except by means of the subtlest craft, due to the paucity of quicksilver in them in their intermixture. From this it is clear that it adheres to mars with very great difficulty, but more easily to venus, thanks to the greater quantity of quicksilver in the latter, the sign of which is the easy fusion of this, but the very difficult fusion of mars. But the fixation of these two substances approaches firm fixation; however it is not firm perpetually. The proof of this is the calcination of the body itself, and the exposure of that after calcination to a very strong fire. For division will not occur by means of that, but the whole substance will ascend, purified still more. Therefore, we see the burning substance of sulfur to be more easily separated from tin than from lead. And you see the proof of this in the easy hardening, calcination, and brightening of tin. Hence we have decided that these corruptors did not exist in its root; rather they arrived later. And because they were not much conjoined with it in their first commixture, they can easily be separated. Hence the alterations in it are rapidly worked

- namely its cleansing, hardening, and fixation; and you can consider their causes, just taught openly by us. And because after these operations, namely calcination and reduction, we have regarded its smoke elevated with a great expression of fire and we have seen it to tend toward yellowness, since this is a property of calcined sulfur, we have considered with a true consideration in which we become sure that that contains in itself much of the nature of fixed sulfur.<sup>124</sup> Whoever therefore wants to witness the investigation of all these things in this science of ours, should study with earnest labor until he discover the principles of the bodies themselves and the property of the spirits, with a certain, non-conjectural discovery by means of science,<sup>125</sup> which we have passed on in this volume of ours sufficient to the need of art.

**< 62 > Discourse on the Principles Composing  
Saturn, According to Nature**

It thus remains that we put forth a description of Saturn, and so we say that it is not differentiated from jove led back to its own nature by repeated calcination, except in that it has a dirtier substance composed from two grosser substances, namely sulfur and quicksilver, and in that the burning sulfur in it is more adherent to the substance of its quicksilver, and in that it has more of the substance of fixed sulfur for its composition than jupiter. We will adduce the proof of these with manifest tests. That saturn is of more earthy filth than jupiter, is manifested both to sight and by its washing with quicksilver, inasmuch as [76vb] more of the filth flows forth from it upon such washing than from jove. And saturn

<sup>124</sup>It appears probable to me that such expressions as "estimavimus estimatione vera..." and "inveniant inventione certa non coniecturali," represent stylistic reworkings of the cognate accusative so common in Arabic prose. The fact that the *Summa* has put the cognate expression in the ablative should not surprise us, given the author's extensive reformulation of other Arabic expressions.

<sup>125</sup>Cf. the foregoing note.

receives the first degree of calcination easier than jupiter, which is a sign of much earthiness. For we find bodies of much earthiness to be of easier calcination, and those of little earthiness to be of more difficult calcination. The very difficult complete calcination of sol is a proof of this, as is the fact that saturn's filthiness is not rectified by repeated calcination, as in the case of jove; this is a sign of greater filthiness in its principles from its own nature than in those of jove. But that the quantity of combustible sulfur in it is more adherent to the substance of its quicksilver, is signified by this - that no perceptible quantity is separated from it into smoke unless it be yellow with a color of great yellowness.<sup>126</sup> The sign of this similarly is that some of it has remained in the bottom of the instrument, which is necessarily granted to be the sign in turn of one of these three: either of no quantity of combustible sulfur in it, of very little, or of a quantity much conjoined in the root of the commixture due to the affinity of principles. But we are assured by the odor of that that it is not of a small but rather of a large quantity, since the odor of sulfur is not removed from it in a brief time. Hence we have considered with a consideration by which we are assured, that the burning sulfur of that is uniformly mixed into its quicksilver along with an unburning sulfur that approaches the nature of fixity. Thus when its vapor ascends, it necessarily ascends with the unburning sulfur, whose property is to create yellowness. But that there is a greater quantity of unburning sulfur in it than in jove is shown to us truthfully through this - that we see its whole color to be mutated into yellow in its calcinations, but that of jove into white. So there is for us in this an open way of investigating this work, by which jupiter is changed into a hard body more easily than saturn in calcination. But it is not changed more quickly to the state of slow liquefaction than is saturn, and this is because the cause of hardness of nature is fixed sulfur and fixed quicksilver. But the cause of liquefaction is two-fold, namely quicksilver and

<sup>126</sup>A reference to yellow litharge, PbO.

combustible sulfur, neither of which suffices for the perfection of fixation, in each of the degrees of liquefaction, namely with firing and without firing of the quicksilver. Because there is in jove a great quantity of quicksilver, but not fixed, a great speed of liquefaction remains in it, and is not removed therefrom easily. Indeed, the cause of softening is also two-fold, namely quicksilver and combustible sulfur. Therefore, because the burning sulfureity is removed from jove more easily than from saturn, it is necessary that it be quickly hardened, as one of the causes of softness has been removed therefrom. [77ra] But saturn, because it has the causes of each sort of softness strongly united, is not easily hardened. Indeed, there is a difference between softness due to quicksilver and softness due to sulfur, since the softness due to sulfur is yielding and the softness due to quicksilver is extensible. This is necessarily proven by the fact that we see bodies of much quicksilver to be extensible, but bodies of little to be little. Hence jupiter is more easily and thinly extended than saturn, saturn more easily than venus, venus than mars, but luna more thinly than jupiter, and sol more thinly than luna. Therefore it is manifest that the cause of hardening is fixed quicksilver or fixed sulfur, but the cause of softness is the opposite. The cause of fusion is also double - unfixed sulfur and quicksilver of any genus. But unfixed sulfur is necessarily the cause of fusion without firing; you may see the proof of this affair openly, by projecting arsenic upon bodies of difficult fusion, for it makes them have an easy fusion even without firing. But the cause of easy fusion is also quicksilver, while the cause of fusion with firing is fixed quicksilver, and the cause of the impediment of any metal's fusion is fixed sulfur. Through this you can therefore elicit a very great secret. For, since bodies of a very great quantity of quicksilver are found to be of very great perfection, therefore it is necessary that bodies of a rather great quantity of quicksilver but of less than the former, though removed from perfection, nonetheless approach the perfect rather closely.

Hence it happens that bodies of much sulfureity are also of the most corruption. Whence, from the above said, it is manifest that jove more approaches the perfect, as it partakes more of perfection. But saturn approaches less, while venus still less, but least of all mars, wherefore it withdraws from the perfective. But it happens that they are related otherwise if a perfective medicine completes and rectifies the defective, while attenuating the thickness at the depth of the bodies and covering the darkness of the same under a substance of brilliant shining. For with this medicine, venus comes forth most perfectible, but less mars, still less jupiter, and least of all saturn. It is therefore necessary on account of these - it having been found out by means of the truthful searching out of labor - that diverse medicines with their own preparation be found, due to the diversity of the bodies. For a hard, fireable body needs one medicine. But a soft, non-fireable body needs another, the former medicine softening and attenuating in the depths of the body, and making its substance temperate; the latter medicine hardens and thickens its hidden part. It is therefore expedient that we pass from these things to the medicines with their manifest tests, while we posit the causes of the discovery of the medicines, what they reject as defective, and what they lead to completion.

[77rb] <63> **A Certain Proof that the Spirits are Much  
Like the Bodies**

We therefore prove that spirits become similar to bodies on account of this - that they are united more to bodies and are friendlier to them than other changeable things. It is therefore adduced by us from the first discovery that these are the true medicine of the bodies' alteration. Thus we have exercised ourselves in every genus of techniques that we could, so that we might by them transmute every one of the imperfect bodies into a

perfect lunar or solar body, with firm mutation. Whence it is necessary that a diverse medicine be made from the same, according to the diverse intention of the bodies to be altered. Since therefore the alterable is of a double genus, namely quicksilver coagulable with perfection and bodies removed from perfection, and the latter certainly diverse - some being hard and fireable, others soft and not fireable, the hard and fireable being mars and venus, but the soft being jupiter and saturn, it is therefore necessary that the perfective medicine be diverse. Quicksilver needs one perfective medicine, but the bodies to be transformed need another. But the hard, fireable bodies such as venus and mars need one, and the soft, un-fireable bodies such as saturn and jupiter need another. And it necessarily happens that each of these of each genus needs a different medicine, since they differ from one another in nature. For mars and venus are of one genus, namely hardness, but they differ in a certain special property of their nature; for the former is not fusible, but the latter is. Thus mars is surely perfected by one medicine and venus by another. And the former is surely dirty in its entirety whereas the latter is not; the former participates in a certain dark whiteness, while the latter in redness and greenness which also provide the necessity of diversity in the medicine. But it is necessary to treat the bodies of the other genus - namely that of softness, such as jupiter and saturn - with a different medicine, since they also differ. For the former is surely clean, but the latter not. But all these mutable bodies at one time are made lunar and at another solar bodies. Therefore it is necessary that there be a double medicine of each - a yellow mutating into a solar body, and another, white and similarly mutating into a lunar body. Therefore, since there is a double medicine for each of the four imperfect bodies, namely that of the solar and of the lunar, there will thus be eight medicines in all, perfecting all the bodies in good form. Quicksilver is likewise perfected into a solar and lunar body; hence there is also a double

difference in the medicine altering it. Therefore all the medicines that we find will be ten in their totality, [77va] for the complete alteration of any imperfect body. But with continual application of labor and with great diligence of investigation we are freed from the work of discovering these ten medicines, by the benefit of one medicine. For we find one medicine with long and also highly laborious searching, as also with determinate practice, by which the hard body becomes soft and the soft is hardened, the fugitive is fixed, and the filthy is brightened with an unerring brightness that even surtops nature. Therefore it is expedient to adduce a single discourse on all these medicines with their manifest causes and the practice of their tests: first therefore the series of ten medicines. And first after that we must pass to the medicine of all the bodies, then of quicksilver, and finally to the magistry of the final perfecting medicine. Now since the imperfect bodies need preparation, lest we be hurt by jealous men on account of our insufficiency in teaching the art, let us first impart a narration on the preparations of the imperfect bodies, positing the necessity of the cause of their discovery. By these preparations of our artifice they are made fit to receive the medicine in every degree of perfection, so that they may be perfected by the same. Then a sufficient and suitable narration of all the medicines must be added.

**< 64 > Less General Discourse on the  
Preparations of the Bodies**

That which nature leaves superfluous or deficient from her works in each of those bodies which are imperfect appears sufficiently from the discourses already related by us. But as to the goal, we will here complete what we omitted above, totally and with sufficient discourse. First therefore, when it happens that mutable bodies have a double genus of imperfection, for example

when they are soft and also incapable of sustaining firing, as saturn and jupiter, or hard but not fusible, or only fusible with firing, such as mars and venus - for the former is not fusible to be sure, but the latter is with firing - nature, informing us about the diversity of their essences in their nature and in the root thereof, has taught us to administer diverse preparations according to necessity. Hence two of the bodies to be transformed are necessarily of one genus of imperfection - namely lead, which is called *melan* [from Greek *melas*, "black"], [77vb] and by art "saturn," and creaking lead, which is called "white," and by this science "jupiter". These are mutually diverse in the depth of their hidden part from the innate root of their nature, and likewise in their manifest part. For saturn is dark, livid, heavy, and black, wholly mute and without a creak. Jupiter on the other hand, is little livid, but creaking much and emitting a ringing with a moderate sound. We have shown you the difference in their depth with manifest tests and their necessary causes, from which it comes about that the artificer of good mind better gathers the order of their preparation. First therefore let us relate the preparation of the bodies according to their order, and then that of coagulable quicksilver, but first that of the genus of softness, afterwards that of the other. As far as the first genus of bodies, the preparation of saturn and jove may be put down, and then that of the others according to their own determinate order.

**< 65 > General Discourse on the Preparations of the Two Soft Bodies, namely Saturn and Jove**

But a multiple preparation is administered to the essence of saturn and likewise to that of jove, according to the degree of their multiple approach to perfection or elongation from it, since one of the corrupters arrives at their depth from the innate root of the nature of their sulfureity - namely earthiness - and an impurity of the earth of quicksilver, mixed into their essential nature with the

principles in their creation, while another, added on after their first mixture, also causes corruption. The things of the first genus are a burning sulfureity with its impurity, and a dirty substance of quicksilver, which are all corrupters of the substance of saturn's and jove's perfection. But it is impossible to remove the first of these by a medicine of the first order with whatever diligence. But it happens that the other can be removed with a little help. It happens to be impossible that the former be removed on account of this - that they are mixed into the true essence of the bodies of this genus in the principles of the bodies' nature, and become true essences themselves. Hence, since it is not possible to remove the true essence of any thing in nature with the thing remaining, it was not possible to remove these corrupters from them. Whence certain philosophers have also imputed that the art could not be arrived at, on account of this. But we and others seeking this science in our time have arrived at the same thing, namely that we could brighten the bodies with the completion of their brilliant shining by none of the ingenious techniques of preparation alone without it happening that they be utterly infected and blackened in their entirety. On account of this, we, [78ra] having also been brought into stupor, hid for a long space of time under the shadow of desperation.<sup>127</sup> Returning into ourselves therefore, and torturing ourselves with the afflictions of endless meditation's cogitations, we considered that the bodies removed from perfection are dirty in the depth of their nature, and that nothing bright is found in them, since it is not in them according to nature. So it happens that a bright substance is not to be brought forth from them, since it is not in them. For that is not found in a thing which is not therein.<sup>128</sup> Therefore, since nothing of the perfect is

<sup>127</sup>The formulaic passage that follows is rather similar to one found in the *De re tecta* (ed. cit.), p. 330: "Et illae res ante experimentum fuerunt nobis notae cogitatione subtili vehementi longa."

<sup>128</sup>"Non enim invenitur in re quod in illa non est" - a famous "Geberian" *dictum* quoted by many 14th century readers of the *Summa*.

found in them, it is necessarily given that nothing superfluous is found remaining in the same in the depth of their nature, during the separation of the diverse substances in them.<sup>129</sup> Through this we find that there was something deficient in them, which must necessarily be filled out with a medicine agreeing with them and completing the deficient. The deficient in them is therefore the paucity of quicksilver in them, and the improper compaction of the same. Hence the goal in them will be the good multiplication and compaction, and permanent fixation of quicksilver. But this is perfected by a medicine created from that. For this medicine, since it is drawn forth into being from quicksilver, hides and covers their darkness by the aid of the brightening and shining of that with a covering, leads it into brilliance, and converts it into brightness. Since the quicksilver prepared by our craft in a medicine is cleansed and led back into a very pure, bright substance, if projected onto bodies removed from perfection it will brighten them and perfect them with its fixation. But we will describe this medicine in its own section. It therefore follows necessarily from the preceding that the necessary discovery of perfection is double, so that this perfection is either one achieved through a medicine that separates the filthy substance from the commixture, or another achieved by a medicine that covers it, cloaking it in the splendor of its brilliance, and so decorates it with a brightening. Since it happens that nothing superfluous, but rather deficient, is found in the depth of the bodies, if it is expedient that something superfluous be removed, it is necessary that that be supervenient and from the manifest part of their nature, and that it be abolished and removed with diverse preparations which it is expedient that we relate in this section, first those of jove and saturn in the same section, then those of the others, according to their order.

<sup>129</sup> This reasoning seems elusive, but is probably based on the fact that *perfectum* in Latin does not correspond exactly to the English "perfect" (though it frequently does in the *Summa*) but also has the connotation of "complete" or "finished." What is not even complete or finished can hardly be considered superfluous.

### <66> On the Multiple Preparations of Saturn and Jove

Jupiter and saturn are therefore prepared with multiple preparations, according to the necessity of their greater approximation to perfection, to be sure with a common and special method of preparation. The common method is for multiple degrees of approximation to perfection. [78rb] For brightness from a clean substance is one degree of such approximation. The second is hardness, with firing necessary for its fusion. But the third is fixation brought on by the removal of fugitive substance. Therefore those that become brilliant are cleaned triply - either by cleansing things, by the method of calcination and reduction, or by solution. They are doubly cleansed by purifying things - either in a prepared calx, or in the nature of the bodies. In a prepared calx, they are purified in this way - either by salts, alums, or glass. The method is that when a body, namely jupiter or saturn is calcined, a water of alums or salts is then poured upon their calx, or ground glass is mixed with it, and the calx is reduced into a body. This process is repeated upon those bodies so many times as necessary until they show themselves completely clean.<sup>130</sup> For since salts,

<sup>130</sup> Darmstaedter, n. 117, notes that this process of purification has remained in use up to modern times - "... for example, molten lead is heated with chlorinating and oxidizing substances, such as common salt, abraum salt, sea-salt, saltpeter, chalk, etc. (cf. Roessing, *Gesch. d. Metalle*; John Percy, *Metallurgie*; Schnabel, *Metallurgie*). The refining of copper is also performed with common salt, abraum salt, etc. The refining is effectuated by the oxidation of impurities, such as zinc, antimony, and arsenic. The supernatant layer, which contains the impurities - the "scabs" - is skimmed off. The fusion of impure lead with salt can bring about the removal of zinc, among other things, in the form of zinc chloride. Copper, or rather copper-rich pyrite, can be converted into copper chloride by an oxidizing roasting followed by a chlorinating roasting with sodium chloride or abraum salt; this is then leached out. The copper can then be precipitated from the lixivium with the help of iron. On roasting of sulfide-rich ores, sulfates are formed, which are converted - in the presence of sodium chloride - into metallic chlorides and  $\text{Na}_2\text{SO}_4$ . The same goes for silver. The fusion with glass mentioned here and elsewhere by Geber should be considered a "slagging fusion," as it is still called today. One uses natural and artificial silicates, slags, sometimes fluorospar, and

alums, and glass are melted with a fusion differing from that of the bodies, they are therefore separated from the bodies, and they lead forth the earthy substance with themselves, while only the purity of the bodies remains. But the metals are purified by the same method when in the nature of bodies, also. And that is that these two bodies be filed very finely, and after this that they be treated with alums, salts and glass, then reduced into a body; this should be repeated until they show themselves cleaner. They are also cleaned by a washing of quicksilver, whose method we have supplied. But these and also the bodies of every genus are cleaned by the multiple repetition of calcination and reduction upon them, also with sufficiency of their fire, until they show themselves cleaner. For by this, these bodies removed from perfection are cleansed of a doubly corrupting substance, on the one hand surely flammable and fugitive, on the other an earthy residue. This is because the fire elevates every fugitive substance and consumes it. And the same fire in the method of reduction also divides the substance of the earth, with its due proportion. We have described this proportion in our other volume, which is entitled *De perfectionis investigatione*, which volume precedes this book according to order; for in that we wrote down whatever we investigated, according to the reason of our mind. [78va] But here in the *Summa* we have determined what we have seen and touched completely, according to the order of science. These are also cleaned by the solution of their substance, whose method we have already described, and by the reduction of that which was dissolved. For this is found cleaner and more perfect from this method of preparation, than from any other genus of preparation. And no method is considered equal to this method, except that which is perfected by sublimation, and which therefore is the equal of this. Another preparation of them is the hardening of their soft

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rarely borax. By this means, oxides and like matter bringing about impurity are carried off, that is, taken up by the silicates."

substance, with the induction of its fusion upon firing: this is namely that we figure out how to mix the fixed substance of quicksilver with them in their depth, or the substance of fixed sulfur, or its comrade, or that from diverse infusible things such as talc, marchasite, and tutia. For when the latter are made friendly and united with the former, they harden them until they may not be melted before firing. The same is also accomplished by a perfecting medicine, which we shall describe. The second method of preparation is by the removal of their fugitive substance. This is accomplished by preserving them in a fire proportional to them, after the first degree of their calcination. Because it is necessary that an order exist in the methods of preparation, let us set down a complete series for them. First, therefore, all fugitive, burning, corrupting substance should be cleansed from the bodies. Then let the earthy superfluity be removed, and after this let them be dissolved and reduced. Or let them be completely washed by a washing of quicksilver. This is a useful series.

#### < 67 > Particular Discourse on the Special Preparation of Jove

But the special preparation of these bodies is multiple, so first let us treat that of Jove. One preparation occurs through calcination; through this its substance is hardened more, which does not happen to saturn. Its preparation is also effected by alums, for these properly harden jove. The second preparation occurs through the preservation of it in the fire of its calcination, for by this it loses its creak and also its breaking of bodies, which likewise does not happen to saturn, because it neither has a creak nor breaks bodies. And with repeated calcination by the sharpness of salt, it also loses the creak. But the special preparation of Saturn, secondly, is by calcination with the sharpness of salt. For by this it is hardened. And it is hardened and whitened specially by talc, marchasite, and tutia. But we have prescribed all their

methods of preparations [78vb] more completely in the book which is entitled *De perfectionis investigatione* since in this we have abbreviated their *summas*.

**< 68 > Particular Discourse on the Special Preparation  
of Venus**

Imitating the order of the foregoing, let us relate the preparation of the hard bodies, first therefore of venus, and then of mars. The method of venus's preparation is thus multiple. For one is perfected by elevation, and another without. But the method by elevation is that tutia be taken, with which venus agrees quite closely, and with which it may be united by ingenious methods. Then let it be put in its vessel of sublimation, in order to be sublimed. And let its more subtle part, which is found to be of very shining brilliance, be elevated by the most excellent degree of fire. (Or let it be mixed through its smallest particles with sulfur and then be elevated by the above said method of its elevation. But it is prepared without sublimation either by means of things causing a cleansing, whether in its calx, or in its body - just as tutia, salts, and alums - or by a washing of quicksilver, whose method we have reported, or by calcinations and reductions as related in the others, or by solutions and reductions of that which has been dissolved to the nature of a body, or it is cleaned by quicksilver, just as the remaining bodies removed from perfection.

**< 69 > Discourse on the Preparation of Mars**

The preparation of mars is also multiple, for one is completed by sublimation, but another without sublimation. But that which is done by sublimation is done with arsenic, whose method is this. Let us devise a way to unite unfixed arsenic as deeply as we can with the same, so that it liquefy upon fusion with that. Then let it

be sublimed in the vessel of its own sublimation; this preparation is found better and more perfect than the others. There is also another preparation of mars by means of arsenic sublimed from it many times, until a certain quantity of the arsenic itself remain with it. If this is then reduced, it will go forth white, clean, fusible, and prepared. There is also a method of the whole preparation of the same by fusion of it with lead and tutia, for it flows forth from these clean and white. But lest we seem insufficient, since we promised that we would prescribe concerning the ingenious softening of the hard bodies and the hardening of the soft by the method of calcination, we therefore do not omit that, but first the method of the soft, and then of the hard. The first is that precipitated quicksilver be dissolved, and the calcined body whose goal is to be hardened, be dissolved. Let both these solutions be mixed together, and let the calcined body be mixed with these with an alternate series of triturating, imbibing, [79ra] calcining and reducing, until it becomes hard, and fusible with firing. It happens that the same is perfected with talc, tutia, and marchasite, all calcined, dissolved, and imbibed, and the cleaner these are, the more perfectly they mutate. And the hard bodies are also softened with a similar technique. And it is namely that they be conjoined with arsenic, sublimed, and roasted after the sublimation of the arsenic with a due proportion of their fire - whose method we have related in the *Liber fornacum* - and finally reduced with expression of their fire, in their said order, so many times until they soften in fusion according to the need of the hardness of the body. These alterations are all of the first order, without which the magistry is not perfected.

**< 70 > Discourse on the Preparation of Mercury**

Hence from the foregoing it is necessary to relate the complete cleaning of quicksilver. We say therefore, that



quicksilver is cleaned doubly - either through sublimation, whose method we have introduced - or by washing, whose method is this. Quicksilver should be poured out in a glass or stone bowl and a quantity of vinegar sufficient to cover that should be sprinkled upon it. But then let it be put upon a mild fire, and let it be heated insofar as it allows itself still to be touched by the fingers. Then it should be stirred with the fingers until it be divided into the most minute particles in the likeness of a powder. Let it be stirred continually until all the vinegar that was poured out on the quicksilver be wholly consumed. But then whatever earthiness was found in the latter should be washed out by the vinegar and thrown away. Let this work be repeated on that until its earthiness be mutated into a very perfect blue color, which is a sign of washing in its perfection. It is therefore necessary to pass from these to the medicines.

**< 71 > Second Part of this Third Book, Concerning the Final  
Discourse on Medicines**

Let us therefore first relate a universal discourse on the medicines with their own causes and manifest tests. We therefore intimate that unless the superfluity be removed from the imperfect either by a medicine or by a method of preparation, they may not be perfected, so that it is necessary that all superfluous sulfureity and dirty earthiness be destroyed, namely that they be separated from the commixture in fusion after the projection of the altering medicine. And when you find this, you have one of the differences of perfection.<sup>131</sup> Similarly, unless the medicine brighten and alter into a white color or yellow, according to the goal which you seek, which should draw forth a delightful shining with the brightness of

<sup>131</sup>The author refers here to the five "specific differences" constituting the species of "perfection," namely lack of superfluities such as earthiness or excess sulfur, white or yellow color, the melting point of gold or silver, resistance of the medicine to heating, and the specific weight of gold or silver.

lightning, the bodies removed from perfection are not totally perfected in their completion. Furthermore, unless [79rb] it induce a determinate solar or lunar fusion, it is not in its complement but alterable, since it does not remain in the trials of assaying, but is wholly separated from the commixture, whereon it withdraws. But this is shown in the following, determined more thoroughly. And furthermore, unless the medicine be perpetuated with a firm impression of alteration, its mutation is useless, since the impression does not remain but escapes. And furthermore, unless the medicine induces the weights of perfection, it does not mutate within the firm goal of nature in which there is no fraud due to the error of credulity. For the weight imparted by nature is one of the signs of perfection. It is clear, therefore, since the differences of perfection are five, that it is necessary for the medicine of our magistry to induce these five differences in its projection. It is therefore clear on account of this, from what our medicine may be elicited. For it is elicited through those things that are especially conjoined to the bodies and, altering them, adhere in friendly fashion to them in their depth. Therefore, since by investigating in other things we have not found anything more friendly to the natures of the bodies than quicksilver, on account of that, expending our work on this, we have found it to be the true medicine of alterable things in their completion, with a true and rich alteration. It remains, therefore, that we record the substance of that determinately, and the differences of property of its substance. And since we have not found that to mutate without the aid of an alteration of its nature, we also find necessarily that it must be prepared, since it may not be mixed in the bodies' depth without a method of its preparation, which is that such a substance be made of the quicksilver that it may be mixed in the depth, up to the hidden part of the alterable body, without separation into eternity. And this does not come to pass unless it be subtilized finally with the determinate and certain preparation in its own

chapter. And its impression does not remain, unless it be fixed. Nor does it brighten unless the most brilliant substance be elicited from it with the ingenuity of its method, and with the method of its preparation by a suitable fire. And it does not exhibit fusion unless one is careful during its fixation so that it may soften the hard and harden the soft. Such caution is necessary so that it be preserved with sufficient humidity proportional to the need of that fusion which is sought. From this it is obvious that such a preparation of the quicksilver should be carried out that a very brilliant, clean substance be made from it. Then it should be fixed carefully, in such a way that the artificer be practiced in the administration of the fire and in the method of its fixation (which could remove its humidity) insofar as is necessary to arrive at perfect fusion. And this method is namely that if you want to soften bodies of hard fusion, let the fire be mild in the beginning of its creation. For a mild fire is preservative of humidity and perfective of fixation. But if you want to harden the soft, let a violent fire be made, for such [79va] is consumptive of humidity, and preventative of fusion. And it is necessarily expedient that the artificer of good mind consider all these rules in every medicine. It is also necessary to adduce many other considerations in the mutation of weight, with their causes and congruent order. The cause of great weight, therefore, is the subtlety of the substance of the bodies, and its uniformity in essence. For through this, their particles can be compacted, since nothing may separate them; and the compaction of the particles is the induction of weight, and its perfection. It is therefore obvious that it is necessary to seek for subtlety through the techniques of the work, both in the preparation of the administration of the bodies, and in that of the perfecting medicine. For by the degree that the transmuted bodies are heavier, by the same degree they are also found to be of greater perfection, by investigation through art. Therefore the discourse on medicines is completed, but let us now relate the differences of all the medicines.

### <72> On the Triple Difference of Medicines

We intimate that it happens necessarily that a triple difference of the medicines exists. One is of the first order, another of the second, and still another of the third. But I call a medicine of the first order any preparation of minerals that impresses an alteration if projected onto the bodies removed from perfection, but which does not bring them to the full complement, so that the altered may be mutated and corrupted, with a total evaporation of the medicine's impression. Every sublimation for whitening venus or mars that does not receive fixation is of this sort. And of this sort is every additive of the color of sol and luna, or of venus, put above the vapor of a cement of Ziniar and the like, mixed together.<sup>132</sup> For this mutates in an impermanent mutation, not remaining but rather diminishing through its exhalation. But we call the medicine of the second order every preparation which, when it has been projected upon the bodies removed from perfection, alters them in such a way that one difference of the goal is acquired, but certain of the differences of corruption remain intact. Of this sort is the calcination of the bodies by which everything fugitive is deleted.<sup>133</sup> The medicine perpetually yellowing luna or whitening venus with all the other differences of corruption being left in them, is also of this genus. But I call the medicine of the third order every preparation which, when it arrives at the bodies, destroys all their corruption with its projection, and perfects them with the difference of the whole complement. This is unique and alone, and we are thereby freed from the labors of discovering the ten medicines of the second order. Therefore, the work of the first order is called the lesser

<sup>132</sup>Ziniar is the latinized form of the Arabic *zinjār*, verdigris.

<sup>133</sup>Since the "volatile sulfureity" of the metal will have been expelled permanently by calcining it, one of the five foresaid specific differences of perfection, namely absence of superfluity, will have been acquired.

work, that of the second the middle, and that of the third, the greater. This is the sufficient difference of all the medicines. [79vb]

**<73> Discourse on the Medicines of  
Bodies of the First Order**

According to our promise of a determinate order, therefore, it follows that there be one medicine of the bodies, another of quicksilver, and one of the bodies of the first order, another of the second, and another of the third, as also of quicksilver. Let us therefore relate the differences of all the medicines of the first order, then of the second, and then of the third, starting first with that of the bodies. Then let us pass on the relation of the medicine of quicksilver, with complete discourse and congruent order. We therefore say that the medicine of the first order for the bodies is double - one for the hard bodies and one for the soft. And in that of the hard bodies, there is one for venus and one for mars, but another for luna. That for venus and mars is the pure whitening of their substance, that for luna, its reddening, with the lovely yellow of brightness. For reddening does not come to venus and mars with the medicine of the first order with the appearance of brilliance, for they are completely unclean, and not suited to receive the brilliance of red, until another preparation come about inducing that brilliance in them. Let us therefore first relate all the medicines of venus which fall into the first order, and then those of mars.

**<74> On the Medicines of the First Order whitening Venus**

Therefore, there is one medicine whitening venus with quicksilver, but another with arsenic. The medicine whitening it with quicksilver is completed thus: first, precipitated quicksilver is

dissolved, and the calcination product of venus is also dissolved. Both these solutions are mixed together into one, and then coagulated; their medicine should then be projected upon the body of venus itself; for it whitens and cleans that. But it does not lead it to the final goal, without the altered copper being mutated and corrupted. Furthermore, and in a different fashion - precipitated quicksilver is dissolved and litharge is dissolved; these two solutions are then conjoined into one. The calcination product of the body whose goal it is to be white is also dissolved, and then the above are projected onto its body, for it is whitened thereby. Otherwise a quantity of quicksilver is repeatedly sublimed from the body of that, until part of the quicksilver remain with the body even with full firing. Then let it be ground very often with an imbibition of distilled vinegar, so that the quicksilver be better mixed in the depth of it. Then it should be roasted, and finally the quicksilver should be sublimed from it and imbibed and roasted repeatedly. Let the work be repeated upon it so many times that a great quantity of quicksilver remain in it, even with full firing. For this is a good whitening of the first order. Otherwise let quicksilver in its own nature be sublimed upon precipitated quicksilver so many times that it be fixed in that, and cause fusion. Then it is projected upon the substance of venus, [80ra] for that will also be richly whitened. Otherwise luna is dissolved, and litharge is dissolved; their solutions are conjoined, and with these the substance of venus is whitened. But it is whitened better if the quicksilver be made to remain in all the medicines. It may, however, be whitened by sublimed arsenic, so that if the calcination product of venus be taken, and arsenic be sublimed from the calx of venus until the arsenic remain with it, the former should whiten the latter. But unless you have exercised your ingenuity with the methods of sublimation, the arsenic will not remain in it with any alteration. And the result of your ingenuity is that after the first degree of sublimation, you secondly repeat the second degree, which we have

related in the sublimation of marchasite. It may also be whitened otherwise - let you project sublimed arsenic onto luna, and then all this onto venus, for it whitens it richly. Or, first mix litharge or burnt lead with dissolved luna. Then let arsenic be projected onto this; and all this projected onto venus, whitens it; and this is a good whitening of the first order. Or let sublimed arsenic be projected onto dissolved and reduced litharge alone, and all this upon the fused venus, since it whitens that with the appearance of nobility. Or let luna and venus be mixed together; and have every whitening medicine projected onto these. For luna, more than any of the other bodies, is friendly to arsenic, and hence removes the breaking from it. The second most friendly is saturn, and therefore we mix it with these. Otherwise, we melt sublimed arsenic until it becomes bits. Then we project one bit after the other onto venus. And we prescribe that it be projected in bits rather than in powder, since powder is ignited easier than bits, and thus consumed before it fall upon a fired body. But otherwise, the redness is also removed from venus with tutia, and then it is whitened. But because the whitening of tutia is not sufficient, it therefore only yellows, and whatever yellowing is a relative of whiteness. The method of this, to be sure, is that every genus of tutia be calcined and dissolved, then venus; then let both these solutions be conjoined, and let the substance of venus be yellowed therewith. If you practice with tutia, you will find profit. It is also whitened with sublimed marchasite just as with sublimed quicksilver, and the method is the same.

**<75> Particular Discourse on the Medicines  
of the First Order of Mars**

It remains that we relate the whitenings of mars accomplished by its own medicines that are of the first order according to essence. But since it does not have a proper fusion, it is therefore expedient that we whiten it by repeatedly fusing it with a medicine.

[80rb] Therefore, every medicine whitening venus is the same for mars, with a preparation of the same order. But the special fusing medicine for mars is arsenic of any genus. Lead and dissolved litharge are also a medicine fusing that. With whatever medicine it be whitened and fused, it is expedient that it be conjoined to quicksilver and washed until all the impurity be removed from it, and it become white and fusible.<sup>134</sup> Or let it be heated with strong firing and have arsenic thrown upon it.<sup>135</sup> When you see it fused, project a quantity of luna upon it, for when it is united with that, it is not easily separated therefrom by artifice.<sup>136</sup> Or all the soluble aluminosity inducing an infection of corruption may be calcined and washed from that by the abovesaid method of solution. Then let arsenic cleansed by a certain sublimation be sublimed from that and let it be repeated so many times that something of the former be fixed with it. Then let it be imbibed in an alternating series with a solution of litharge, in a reciprocal series of mixing, stirring, roasting, and finally reducing with fire, which we taught in the reduction of jove from its own calx. For it will go forth from this white, clean, and fusible. Or it may be reduced with arsenic alone, the latter having been sublimed from it while the former was in its own calx. And it will go forth white clean, and fusible. But it is expedient that the same artificer employ care that the arsenic fix itself in the depth of that, just as we taught in the repeated sublimation of arsenic from venus. But it is also whitened by marchasite and tutia, with the ingenuity and diligence that we have

<sup>134</sup>Recipes for fusing iron by mixing it with lead, litharge, or mercury are found in the *De aluminibus et salibus* of pseudo-Rhazes (ed. Steele, pp. 33-5, #49,50, and 52). It is unclear whether these processes could succeed, or whether the author has really tried them. Mercury does not normally amalgamate with iron, as the *Summa* itself tells us at 76va,1-6. The *Summa* may therefore be passing on untried recipes drawn from the *De aluminibus et salibus*.

<sup>135</sup>This process was well known in the Middle Ages. The arsenide  $Fe_2As$  melts at  $919^\circ C.$ , while pure iron has a melting point of  $1535^\circ C.$  (cf. Darmstaedter, n. 149).

<sup>136</sup>The use of silver to whiten iron is described in the *De investigatione* (our edition, p. 11).

related to you. But the whitening of either these or those is not sufficient.

**<76> Particular Discourse on the Medicines  
of the First Order Reddening Luna**

Pursuing the order of the foregoing, let us relate the medicine in the order of the first genus yellowing the substance of luna, with certain truth. And it is every yellow medicine that adheres to the depth of the same, and while adhering, colors, either by its own nature or by the artifice of this magistry. Let us therefore relate the medicine that adheres to it from its own innate root, then those techniques by which we make the matter of any genus adhere with firm penetration. But we elicit this medicine either from sulfur or from quicksilver, or from a commixture of both, but from sulfur less perfectly, while from quicksilver more. It is also extracted, however, from certain mineral matters which are not of this genus, [80va] just as vitriol and copperas,<sup>137</sup> which is also called gum of copper, or the dripping-down of the same. Let us first relate all the methods of those medicines which arise from quicksilver, then those which arise from sulfur or from a mixture of both, finally those which arise from the gum of copper or the like. Therefore the method of that which is perfected by quicksilver is such: let it be taken precipitated, and by its precipitation killed and fixed. Then let it be subjected to the method of great firing for the preservation of calces, which we have taught, until it become red in the likeness of uzifur. But if it does not become red, remove part of the unkilld quicksilver, and repeat its sublimation with sulfur. But let the sulfur be cleaned from all impurity, and likewise the quicksilver. And after you have repeated its sublimation twenty times upon the precipitated quicksilver, dissolve it with dissolving

<sup>137</sup>"Vitriol" and "copperas" here refer to metallic sulfates such as  $\text{CuSO}_4$  and  $\text{FeSO}_4$ , in varying states of hydration.

sharpness of waters, calcine it repeatedly, and dissolve it repeatedly until it suffice abundantly. After this, dissolve part of the luna; when it is dissolved, mix the dissolved solutions and coagulate. Let you project it upon the fused luna, for it will yellow that with a very rich yellowing. But if the quicksilver has reddened during precipitation to the point that it may be projected, the said treatment suffices without admixture of any matter tinting it. It is also reddened by sulfur, but the reddening of this is difficult, and of unending labor. The need of the operation leads us to calcine and fix that first, which is laborious. But then let us proceed with the same preparation and projection: let us pour it upon the substance of luna. And yet a shining yellowness of it does not result, but a dark, livid, and deathly one, due to earthiness. Luna is also yellowed similarly with a solution of mars. The method of that yellowing which is perfected by vitriol or copperas is as follows. A specific quantity of either of them should be taken, and the part of that which allows itself to be sublimed should be sublimed until it is sublimed with a total expression of the fire. After this, what was sublimed should be sublimed again with a suitable fire, so that it be gradually fixed, until the greater part of it is fixed. Then let it be calcined carefully with intension of the fire, so that a greater fire can be administered to it for its perfection. Then it should be dissolved into a red water to which there is no equal.<sup>138</sup> And then let you devise a way so that you may give that ingress into the lunar body. [80vb] And these techniques have been shown to you sufficiently if you are a seeker of the perfect work, which we have described. And because we see things of this sort to inhere in friendly fashion to the depth of luna, we have therefore considered,

<sup>138</sup>This is not a recipe for sulfuric acid, as Darmstaedter's note 155 suggests. Copper sulfate decomposes at  $700^\circ\text{C}$ . to cupric oxide; further heating to  $1050^\circ\text{C}$ . will produce cuprous oxide, a red compound often used as a pigment. The *Summa's* advice that this be sublimed may be a thought-experiment. Alternatively, if the starting product were iron sulfate, iron oxide would be produced by simple decomposition of the sulfate to the oxide, again brought on by heating.

and it is certain, that these are from their root, and therefore it happens to be altered by those.<sup>139</sup> All these that we have introduced are medicines of the first order. But many of their methods can be multiplied, the essence of the pigments remaining the same despite the variety of processes. Certain men have arrived at many medicines, but it happens necessarily that one of two things come about, namely it is necessary that they either create a medicine from the same things or from those having the same nature, or else that they compose a medicine which does not measure up to its alteration, and which will contribute neither to the world nor its parts, until the incorrupt mover in the highest mobile of nature ceases activity.

<77> Discourse on Medicines of the Second Order *in genere*

Thus it remains to pass to the medicines of the second order with true sufficiency, according to the need of their discourse, both with manifest tests and with known practice. Since there is one medicine for the bodies to be mutated, and another for perfectly coagulable quicksilver, let us first completely relate the medicines of all the bodies; then we shall describe the medicine of quicksilver, coagulable into a true solar or lunar body. Therefore, a medicine of the second order is that which completes in a single difference of perfection alone. Indeed since there are many causes of corruption in each of the imperfect bodies - for example in saturn there is volatile sulfureity and flight of quicksilver, through which it happens necessarily that corruption be induced, and also the earthiness of quicksilver - a medicine is made that removes one of them in its totality, or beautifies by veiling the imperfection, with all the other causes of imperfection left alone. Thus, because there

<sup>139</sup>As is often the case in the *Summa*, the antecedents of "these" and "those" are very difficult to track down. The offending phrase probably means the following: "it is certain, that things of this sort are from the same root as the principles of luna, and therefore luna happens to be altered by them."

is something immutable - as it exists innate in the root of the bodies - with regard to a medicine of the second order, therefore all that medicine which removes it from the commixture is said to be not a medicine of the second order but of the third and greater order. And because the superfluity of fleeing things is removed by the method of calcination and the non-innate earthiness by that of reduction, it was therefore necessary to discover a medicine of the second order that would cover the innate, soften the hard, and harden the soft, in hard and soft bodies according to a non-sophistical goal, and establish perfectly a solar or lunar body. Since it is therefore manifest that the haste of liquefaction found in soft bodies alone cannot be removed by the ingenious techniques of this work, nor may the impurity innate in the root of their principles, it necessarily comes to pass that one seek out a medicine which - upon its projection - compacts their tenuity, and with the compacting, hardens them to the point that they liquefy only with firing. [81ra] It should also attenuate the thickness of hard bodies, and with the attenuating bring sufficient speed of fusion along with the property of sustaining firing.<sup>140</sup> It should also mitigate the darkness of each of the two genera of bodies by veiling it, and transform the one into most perfect white, the other into yellow. But this medicine is not different from the medicine of the third order except on account of the lesser imperfection of the latter's preparation. And it is not differentiated as to how it behaves in its projection onto diverse bodies and in the taking up of pigments, but again in the manner of preparation. For the medicine thickening the tenuity of the soft bodies needs one method of preparation, but that attenuating the thickness of the hard needs another. For the former needs the method of consumption by fire, the latter needs the aid of a conserving humidity.

<sup>140</sup>For the significance of attenuation and thickening, see our introduction to the corpuscular theory of the *Summa* (Chapter IV).

**< 78 > Universal Discourse on the Medicines  
of the Second Order**

Let us therefore impart a universal discourse on the medicines of the second order, complete with certain and true determination. First let us describe all the lunar medicines of all the bodies removed from perfection, with the differences of their preparation, then those of the solar, with their own differences similarly. We have already proven from our discourses that sulfur is corruptive of whatever genus of perfection, while quicksilver is perfective in the complete regimens of the work of nature. Therefore, imitating nature in the works in which it is possible to follow her, we also use quicksilver in the medicine of each perfection - namely in the lunar and solar - both of the imperfect bodies as also of coagulable quicksilver itself, during the technique or magistry of this work. Since we have described a double difference of the medicine in the foregoing discourses - so that there is one of bodies, and another of coagulable quicksilver - let us first teach a lesson on the medicine of the bodies, and then on that of quicksilver. The material of this medicine in each of the two genera is *per se* one. It is that which is now sufficiently known.<sup>141</sup> So take that - if you wish for the lunar - according to the order set before you, and prepare it with the known methods of this magistry, whose goal is that you divide the pure substance from that, fix part, and submit part to be cerated, with pursuance until you complete the whole magistry. Attempt its fusion; if it suddenly fuse, it is perfect in hard bodies but the opposite in soft. For this medicine projected upon each of the imperfect bodies, mutates it into a perfect lunar body, if the known preparations precede. If not, it allows to remain deficient, but perfects only so much as depends on the administration of a medicine of the genus of this order - in one difference of quality - for its projection alone,

<sup>141</sup>Obviously quicksilver.

without any administration of the third degree being added, perfects only that much. [81rb] The solar medicine of this second order for each of the regimens of administration is common. But in this it has a difference, namely in the greater subtilization of its particles through the specific methods carried out, and in the subtle regimen of the preparation of the sulfur administered in a mixture with the known matter of the medicine. For with this the medicine is tinted, and when this is projected onto each of those removed from perfection, it perfects that with a solar perfection so far as depends on the preparation of this second order of medicine, with the known and sure administration of the body deficient in perfection preceding. When this is projected upon luna, it perfects that with a very precious perfection.

**< 79 > Particular Discourse on the Solar  
Medicines of the Second Order**

Therefore, according to the order of the foregoing, for the completion of the work - which we have shown from the first that we would determine - it remains that we pass to a description of the medicine of quicksilver coagulating that itself. Therefore we say that the medicine of that is elicited from the same things, namely from those made known in various chapters of this work. And we say this, that since quicksilver is easily fugitive without any inflammation, it needs a medicine that may suddenly before its flight adhere in its depth and be joined to it through its smallest particles, thus compacting it and preserving it by means of its fixation in the fire until tolerance of a greater fire consuming its humidity come to it, and until that medicine convert it in a moment by virtue of this into a solific or lunific body, according to that for which the medicine was prepared.<sup>142</sup> Since, therefore, we find no

<sup>142</sup>This passage illustrates an interesting twist of the *Summa's* theory of transmutation. Quicksilver is first fixed by means of a medicine whose particles

other to agree with it more than that which is of its nature, we have therefore considered a medicine which would be mixed with it and be filled out thereby. And we have exercised our ingenuity to perfect the form of the medicine for it by an ingenious technique. This is that it be prepared with its aforesaid methods and with the application of constant labor so that all its very subtle substance - the purest white in luna and intense yellow in sol - be rendered perfective. And its ability to bring forth a yellow color is not attained without the commixture of a material tinting it - which is surely known.<sup>143</sup> Thus by the techniques of this magistry quicksilver may be perfected with this medicine, which adheres greatly to it, is easily fused therewith, and coagulates it, For it converts quicksilver into a true solifying or lunifying body, when its preparation has been administered. But it is generally queried - "from what can this substance of quicksilver best be derived?" And we, replying, relate that this substance is elicited from those things in which it is. [81va] But it is both in bodies and in quicksilver itself, according to nature, since they are found to be of one nature, but it is found with more difficulty in bodies, while more immediately in quicksilver, though no more perfectly. Therefore of whatever genus be the medicine, the medicine of the precious stone is sought both in bodies and in the substance of quicksilver itself. But since it happens that a medicine is sometimes mixed thoroughly and sometimes not, we narrate how each material or medicine acquires ingress into a body most deeply. The method is by dissolution of what enters and dissolution of what does not enter, and by mixture of both solutions.<sup>144</sup> For what makes

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bond with those of the quicksilver, thus increasing their size. Then a stronger fire is applied, which volatilizes any remaining small particles, and therefore renders the treated mercury yet more homoeomerous than before. The resulting substance, composed of uniform medium sized particles, may then produce gold or silver when projected onto a base metal.

<sup>143</sup>Sulfur, that is.

<sup>144</sup>This theory of mixture is in part a rationalization of previous technical procedures employed by alchemists. A gloss on the "Reddening Waters of

something capable of ingress is that which is joined to it through the smallest particles. But this is completed by means of solution. And fusion - in the case of infusible things - is brought about by solution; hence they are made more able to enter and alter. This, therefore, is the reason why we calcine certain things which are not of the same nature as the things with which they are mixed, namely so that they be better dissolved. Through this they are dissolved so that the bodies better receive their impression and likewise be cleaned by them on account of this. Or we give ingress to things that do not allow penetration on account of their thickness with multiply reiterated sublimation of the non-flammable spirits upon them, namely of unfixed arsenic and quicksilver, or with the multiple reiteration of the solution of that which does not have ingress.<sup>145</sup> A good rule for ingress in the case of unmixable things should now be given - that the body whose intention is to be mutated and altered by these be dissolved, and that the things whose intention is to enter with a resulting altering, be dissolved. A solution of all their particles may not be made, however, but of

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Avicenna" (BCC I, 651, Cap. X) found in the *De investigatione* (186) reveals the ultimate source to have been the literature of "tinting waters": "Et modus rubificandi spiritus est ut spiritus fixos et calcinatos assumens cum aqua rubificante rectificata septies imbiantur et assentur, et demum super lapide dissolvantur in aquam. Demum distillantur et reiterentur, deinde coagulantur in massam rubicundam. Et secretum est quod post septenam imbibitionem et assationem cum aquis rubeis, imbiantur cum oleo sulphuris, et pro opere maiori aqua <m> ipsa cum aqua corporis de cuius intentione est rubificare ad invicem commiscere, et iterum in fimo per dies .15. inhumare; et tunc fiet vera coniunctio et permixtio corporis et spiritus per minima, et fit ligatio que non separatur semper."

<sup>145</sup>There is a certain ambiguity here, due to the author's use of the term "spissitudinem," which is translated here as "thickness." "Spissitudinem" could be translated either as "compaction" or "large particle size": the first would be the case if it referred to a mass of closely packed particles, the second if it referred to individual large particles. The *Summa* probably has the second case in mind, since the deponent verb *ingredi* refers to the penetrator rather than to the penetrated. It would make little sense to think of a penetrating medicine as a closely compacted mass, especially since the context makes it clear that the medicine is in a state of solution. Nonetheless, the passage is sufficiently unclear to justify the adoption of the neutral term "thickness."



certain ones. Hence let this same body be alternately imbibed and not another, for by this means it necessarily acquires ingress into that alone, while this does not necessarily occur in any other body.<sup>146</sup> From these ingenious methods, therefore, it is necessary that anything - depending on its nature - have ingress and make an alteration, its thorough mixture having been discovered. Hence the number of ten medicines is completed by this discourse with sufficient teaching. Thus it remains that we pass on to the medicine of the third order.

### <80> Discourse on Medicines of the Third Order

The medicine of this order is double, namely solar and lunar; it is one however, both in essence and in mode of operation. Hence it is called the unique medicine by our old philosophers, whose writing we have thoroughly read. But the addition of a yellowing color which is perfected by the very clean sulfureity and substance of fixed sulfur is the difference between the one and the other, namely lunar and solar, for the one, namely the solar medicine [81vb] certainly contains it in itself, the other not. This third order, moreover, is called the order of the greater work, and

<sup>146</sup>The *Summa* puts its technique of dissolution followed by mixture into practice in the above chapters on medicines of the "first order." At 79vb,21 - 80va,42, numerous preparations are made by first dissolving the medicine and calcined metal separately, then conjoining the two solutions. The point of this procedure is to acquire an affinity between the "spirit" (the volatile reagent) and the "body" (the calcined metal) by mixing the two *per minima* before projecting the medicine on the body *per se*. This again is a rationalization of procedures drawn from the literature on tinting and sharp waters, as the following passage from the *De investigatione* (178) shows - "Est et alius modus faciendi aquam de mercurio sublimato, fixo vel non, et etiam corporum calcium levior, ut cum aqua salis armoniaci sublimati ter et in marmore dissoluti vel alibi incerentur seu imbibanter spiritus seu calces ipse et assentur et iterum imbibanter et assentur ter vel quater reiterando ad lentum ignem, et ponatur super lapidem et dissolvatur faciliter, reiterando solum cum non soluto donec totum solvatur. Postea distillentur aque videlicet spirituum per alembic et corporum per filtrum et coniungantur. Idem potest fieri de atramento, viridi ere, et ere usto pro tinctura rubea facienda." Similar recipes are found in the *Liber secretorum*, BN 6514, 106rb - 106va.

that because it needs the diligence of greater wisdom in its administration, and longer labor in the preparation of perfection, for the final goal of truth, than does the medicine of any other order. And therefore the medicine of this order is not differentiated at all from a medicine of the second order in essence except by the very subtle degrees of preparation in its creation and by the longer application of labor. We will completely narrate all these degrees with their goal and also the manner of preparation with their causes and manifest tests, as well as the further degrees of the methods of administration for this third order. For the solar medicine needs one degree in the complete preparation of pigments, but the lunar needs another. The former needs the aid of the sulfur tinting it, but the latter not. Let us therefore relate the first manner of administration for the lunar medicine: it is that you take its known stone and by way of separation, you separate its purest part and put it apart.<sup>147</sup> Then let you fix some of that part which is most pure and leave some of it alone. When it is fixed, dissolve whatever of it is soluble, but submit the insoluble to calcination. Then repeat the process of solution upon it until that of it which is now soluble be dissolved wholly. Let this order be preserved with repetition until the greater quantity of it be dissolved. After this, mix all the solutions together, and coagulate them. Then keep it in a moderate fire with light roasting until a greater fire can be administered to it according to its exigency. After this, carry out the first order of solution repeatedly until all of it which is soluble be dissolved and coagulated repeatedly, and keep it in a temperate fire repeatedly until a greater fire can be administered to it for its perfection. Repeat all these orders of preparation upon it four times, and finally calcine by its own method. Thus you have governed the most precious earth of the stone with sufficient administration. Then join a quantity of the preserved unfixed part with this part of treated earth through its

<sup>147</sup>Another cryptic reference to the *mediocris substantia* of mercury.

smallest particles, by means of a useful method from among our techniques. And let this technique have the intention of raising it by the said method of sublimation, until the fixed be completely raised with the unfixed; if this should not happen, again let a quantity of the unfixed part repeatedly be added [82ra] until it suffice for its elevation. When it has been elevated, let its sublimation be repeated upon it, until the whole be fixed by this repetition of its treatment. So when it is fixed, repeatedly let it be absorbed together with one quantity after another of the unfixed part through the technique known to you, until the whole be again raised. Then let it again be fixed until it exhibit an easy fusion upon its firing. For this is the medicine which transforms every body removed from perfection and all quicksilver of whatever genus, into a perfect lunar body.

**< 81 > Particular Discourse on the Medicine of the Final  
Solar Complement**

An addition of unburning sulfur is made for the preparation of the solar medicine of this genus, perfectly administered through the fixing, calcining method with astute diligence, and through the multiple method of solution with much repetition, until it become clean - with the complete treatment which is perfected by sublimation being added to these. And the method of this addition is surely by repeating the sublimation of the unfixed part of the stone, with the technique of conjoining it to the sulfur through the smallest particles, until the latter be elevated with the former. Let it repeatedly be fixed with that so that it stand firm. And the more this regimen is repeated, the more the strength of the medicine will be multiplied, and the more the goodness of it increased, and the increase of its perfection greatly multiplied. And lest we be criticized by the impious, we relate the whole of this magistry with perfect and known brevity of discourse. The intention of it is that

the stone and its addition be cleansed perfectly by sublimation, and then with a method from among the ingenious techniques the volatile in them be fixed. Then let the fixed be made volatile and the volatile again fixed, and let the volatile be made fixed, the fixed volatile, and the volatile fixed so often that easy fusion upon firing appear. The very precious secret is completed in this order, which is an incomparable treasure above every secret of the sciences of this world. Let you strive for that with the greatest application of labor and with a lengthy spell of intense meditation. For with this you will find it, and without it not. And the repetition of treatment with the diligence of such precaution can be carried out on this medicine until its quicksilver mutate into a true, infinite solar and lunar body. And this only depends on the multiplication of its preparation. Therefore let the sublime, blessed, and glorious god of natures who has revealed the series of all the medicines with their practice that we have sought out with the goodness of this investigation and the application of our labor, be praised. We have seen with our eye [82rb] and touched with our hand the sought-for goal of this, with our magistry. But if we have hidden this, let the son of doctrine not wonder. For we have not hidden from him, but from the evil and untried. We have taught it with such discourse as necessarily happens to evade the unwise, and yet happens to lead the understanding to the thorough seeking out of its discovery. Therefore, sons of doctrine, seek out this most excellent gift of God and you will find it preserved for yourselves alone.<sup>148</sup> But sons of foolish impotence, and limitless malevolent depravity, flee from this science, since it is to you inimical and adverse, and will put you

<sup>148</sup>The notion that alchemy is a *donum dei*, so prevalent in the alchemy of the fourteenth century and later, was already available in the Arabo-Latin sources of the *Summa*. The *Liber septuaginta* (353) states the following - "... neque curamus utrum gentes sciant hoc vel nesciant. Neque enim fecimus libros nostros, nisi nobis et filiis nostris. Et quicumque hominum pervenerit ad intelligendum eos, erit ex nobis.... Deus enim dedit scientiam ei et abstulit ei utilitatem inmittendo timorem in animam eius. Ergo rogemus Deum, ut det nobis scientiam utilem et sensum multum."

in the misery of poverty. For this gift of God is wholly hidden and denied to you by the judgement of divine wisdom. Therefore, since the methods of all the medicines have been searched out, it is necessary to pass thence, following the beginning of our plan, to those techniques that make the perfection of this magistry known, along with the causes of these tests.

### < 82 > Particular Discourse on Cupellation

Thus, with the manifest practices having been left aside, of which we have not made mention, since they are known and sure to all without any ingenious method requiring wisdom - namely the practices of determining weight, color, and extension by the hammer - let us determine with care, through the practices of artificers, whether our projection really draw forth the goal of this art's administration. These practices are to be sure cupellation, cementation, firing, fusion, exposure to the vapors of sharp substances, extinction, the test in a mixture of burning sulfur, the repetition of calcination and reduction, and the easy or difficult reception of quicksilver. Let us therefore begin with the first according to this order; then let us pass to the others according to the same order, with their known causes, perfectly following our promise.

### < 83 > Special Discourse on the Consideration of a Test for the Magistry's Perfection, Namely of Cupellation

We therefore relate a discourse on cupellation with all its manifest causes, and the method of carrying it out.<sup>149</sup> Only the solar and lunar substance remains throughout the test of

<sup>149</sup>Consult p. 772 for a description of this test.

cupellation. We will therefore explore the true differences of the substances of these perfect bodies, along with the causes of cupellation, seeking why some of those removed from perfection hold up more and some less in the test of this magistry. The secret of these two bodies in the depth of their substance has been sufficiently related by us. It is, to be sure, that their first root was a large quantity of quicksilver; its essence was very pure and subtle before, but then thickened, until it could undergo fusion upon firing. [82va] Therefore whichever of the bodies removed from perfection have more earthiness, remain less in this test. But whichever have less remain more, since the latter greatly adhere on account of the subtlety of their particles, mixing and uniting among themselves. And likewise, those bodies that are of greater tenuity or to the contrary those bodies that are of greater thickness than those in a state of perfection, are necessarily separated from commixture wholly, since they are not of the same fusion, and hence are separated. And those that participate in a lesser quantity of quicksilver are more easily separated from commixture. It appears therefore that since saturn is of much earthiness, of small quantity of quicksilver,<sup>150</sup> and of easy liquefaction and tenuity - which qualities are above all opposed to the test of perfection called cupellation - saturn thus remains least of all the bodies in commixture but is separated and cedes most rapidly during the test of cupellation. Since it cedes more than the other bodies removed from perfection, it is on this account more suited for use in the test of this magistry. This is for the following reason: since it cedes more rapidly, it also draws with it each of the imperfect bodies. And on account of this, a greater quantity of the perfect may be saved from the strong combustion of the test of fire. Since a perfect metal may not rest for a long space of time in the

<sup>150</sup>The statement that lead is "of small quantity of quicksilver" does not correspond to the analysis of lead's principles on 76rb-76vb and elsewhere. Presumably the author means to say that lead has little fixed quicksilver, though it may still have a large quantity of the unfixed version.

consumption of the test, the addition of lead allows it to be burnt up less by the fire and more easily purified. But because the substance of jupiter was receptive of more quicksilver and of less earthiness, participating in a greater quantity or purity of that and in more subtle substance, therefore it may be more preserved in a commixture than saturn and venus, since it adheres more to the intermixed in its depth. And this is the cause why a great quantity of a perfect metal conjoined to it is destroyed before it is separated therefrom. But venus exhibits fusion with firing, though because the fusion of it is slower than that of a perfect metal, it is therefore separated from the commixture, though slower than saturn because of the firing of its fusible substance. But because it is of lesser quantity of quicksilver than jupiter, of greater earthiness and thicker substance, it is therefore removed from the mixture more easily than jupiter, since jupiter adheres more in its depth than venus. But mars does not have fusion, and is therefore not thoroughly mixed, which happens on account of the privation of its humidity. But if that should happen to be mixed because of the strength of the fire, by absorbing the humidity of sol or luna - since it does not have its own humidity - it is united to theirs through the smallest particles. Therefore, though it have much earthiness, little quicksilver, and a deficiency of fusion, it is not easily separated from them by [82vb] artifice. Through this the diligence of the artificer is extended to the true rectification of whatever body, if he rightly understand the efficacy of that which we have written. But if his intellect fantastically inquire about this he will gather nothing of truth from it. At any rate, there are two bodies of perfection remaining throughout this test, namely sol and luna, on account of the good composition which results from their good mixture and pure substance. Let us therefore relate the method of this - since it is greatly necessary to us in the true recognition of the perfection of this magistry. The method of this is therefore that sifted cinder, calx, powder of burnt animal bones, or a mixture of all or some of

these be taken. Then let it be wetted with water, and let there be a firm solid layer, and in the middle of the layer let there be a circular, firm hole. Let ground glass of a certain quantity be sprinkled upon the bottom of that hole, and then let it be permitted to dry. When it is dry, let that metal whose intention it is to undergo this test be put into the said hole, and upon that, have a strong fire of coals lit. Let it be blasted above the surface of the testable body until that be fused. When it is fused, let us project one part after another of lead upon it, and that should be blasted with a flame of great firing. When you see that to be agitated and moved with a powerful motion of shaking, it is not pure. Wait, therefore, until all the lead escape; if all of it does escape without the motion of the molten metal ceasing, it is not purified. So project lead upon this again and repeatedly blast upon its surface until the lead be separated. If it still does not rest, again repeat the projection of the lead and blasting upon its surface until it rest and you see it clear and clean on its surface. After this, take the coals away and break off the fire; then pour water upon its surface. You will find this perfectly tested.<sup>151</sup> And if at some time during the

<sup>151</sup>This is an accurate description of the test of cupellation, used for refining silver even in antiquity. The *Summa* may have drawn its inspiration for the inclusion of this test in a work of alchemy from the *De perfecto magisterio* (BCC I, 644), which gives recipes for the refining of silver by cupellation: nonetheless, the *Summa* gives a theoretical explanation for the efficacy of the test that is not to be met with in its sources. According to modern day views, the test operates in the following fashion. A "cupel," - a thick walled crucible - is formed of ashes, burnt bones, or other porous materials. The metal to be assayed is melted in this vessel, with a flux if necessary. Lead is then added to the fused metal, and the surface is blasted with air. The lead oxidizes, and absorbs the oxides of other base metals in the mixture. While some of the impurities sink into the pores of the cupel and others pass off as vapor, the lead itself, containing a variety of metallic oxides, must also be decanted. The end result is a "button" of silver and gold, which will be relatively pure if the process has been performed competently. The *Summa*, in its usual fashion, explains this process in corpuscular terms. The noble metals, silver and gold, cohere to their own substance, thanks to the minuteness and uniformity of their particles. As a result, they do not combine with the lead, and cannot be separated from the mixture thereby. The excessively small particles of the unfixed mercury in lead and tin (*tenuitatis corpora*: 82va,5) and the overly large fixed particles in iron and copper (*maioris spissitudinis corpora quam que in perfectione*

blasting of this test you have projected glass, it will be better and more perfectly purified, since that carries off the impurities and glues them together.<sup>152</sup> But in the place of glass, salt, borax, or any alum can be projected. This test can also be carried out in an earthen crucible, in which case it should be blasted both on the sides and likewise on its surface, so that the matter to be tested be inflamed more rapidly. Therefore with these things sufficiently related, let us pass to the test of cementation with its own causes and manifest, known practices.

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*constituunt*: 82va,6-7) cause these metals to fuse at a lower or higher temperature than gold or silver, and this too contributes to their separation from the alloy.

<sup>152</sup>Here we have an explicit mention of the "slagging fusion" mentioned by Darmstaedter (his n. 117).

[83ra] <84> Particular Discourse on the Cement

We say therefore that since some bodies are more burnt up by the method of calcining fire, and others less, that those which contain a greater quantity of sulfur are more combustible, and those which contain less, are less. Since sol, therefore, has a lesser quantity of sulfur than the other bodies, it is therefore burnt up least among all the mineral bodies by the inflammation of fire. But after sol, luna participates least of all the remaining bodies in sulfur, though it has more than sol. Hence it can stand a shorter space of time at this firing of flame than sol, and it can less tolerate things burning it on account of their similar nature. Because venus is of more sulfur and greater earthiness than sol and luna, it therefore tolerates less inflammation than they. But jupiter participates more in sulfureity and earthiness than sol and luna, though less than venus. Hence it is burned less through inflammation than venus, though more than sol and luna. Saturn, however, has preserved more earthiness and sulfureity by nature in its commixture than the foresaid bodies; therefore it is inflamed quicker and easier than all the bodies just mentioned, and attacked quicker by inflammation; it is not, however, consumed more quickly on account of this - that it has an especially well-conjoined sulfur and more fixed than that of jupiter. Mars, on the other hand, resists being burnt up not *per se* but *per accidens*. For when it be mixed to bodies of much humidity, it absorbs them on account of its lack of humidity, and thus having been conjoined, it is not inflamed nor burnt up if the bodies conjoined to it are neither flammable nor combustible; but if the bodies commixed with it be combustible, it is necessary that mars be burnt up and inflamed according to the nature of its combustion. Therefore, since the cement is composed of flammable things, the necessary cause of its discovery is manifest, and it is namely that all combustibles be

burnt up.<sup>153</sup> So, since there is only one non-combustible body, only that or another prepared according to its nature is preserved in the cement. Yet some last more and some less in the cement, though which more and which less, are known, with their said causes. Hence luna remains more, but mars less, still less jupiter, and less still venus, but least of all saturn. Let us therefore relate the method of the cement, since in the test of perfection it is highly necessary for our cognition thereof. We therefore say that the composition of this is from flammable things: [83rb] the things of this genus are all blackening, fleeing, penetrating, and burning, such as vitriol, sal ammoniac, flower of brass, old ground potter's stone, a very small quantity of sulfur or none at all, male urine, and similar sharp and penetrating things. So let all these be cemented with male urine upon thin tablets of that metal on whose account the test is to be performed. Then let the tablets be spread upon an iron grate in a sealed pottery vessel so that one of them not touch the other, with the result that the virtue of the fire freely penetrate each of them equally, and thus let the pot be kept in strong fire for three days. Let caution then be applied so that the tables be fired but not melted. After the third day, you will find the tables clean of all impurity if the body of them has been in perfection; if not, you will find them wholly corrupt and burnt up in calcination. But certain men put the tables in a fire without cement, and they are purified also, if they are made of a body of perfection, but if not, they are wholly burnt up. However, in this final test which is perfected with the the burning of fire alone, they need longer space

<sup>153</sup>As in the case of cupellation, the *Summa* may have been influenced here by the *De perfecto magisterio*, which describes the old assaying test of cementation as a means of purifying gold (BCC I, 644B). This test necessitates that one beat the metal to be tested into thin sheets. Then a "cement" - usually a mixture of brick dust and salt - is compounded. The sheets are placed in a crucible, one upon the other, with intermediate layers of cement. When the covered crucible is heated, the mixture evolves corrosive gases that attack any base metals left by the cupellation test, along with silver. By this means one can arrive at a gold of considerable purity.

of combustion than those which are tested by the judgement of cement.<sup>154</sup> But since luna is not far from the difference of sol's nature, with a little treatment it rests with that in the judgement. Nor does the separation of the bodies from one another come about in these two genera of test, except because of the diverse composition of their substances, since a diversity of fusion results from that, along with the thickness and thinness which are certainly causes of separation. For their substance is not corrupted by the substance of an extraneous body on account of their strong composition, since a mixture through the smallest particles does not come about. Therefore it is necessary that they be mutually separated from the commixture without the total corruption of their essences.<sup>155</sup> Wherefore the complete administration of the imperfect bodies is determined, with the ingenious technique of the complete administration of the fusion and firing of the same, which are reiterated.

#### < 85 > Particular Discourse on Firing

It remains, therefore, that we transmit a chapter on firing. We therefore say that the bodies of the greatest perfection are found, upon determinate firing, to take up the fire before their fusion.<sup>156</sup>

<sup>154</sup> Presumably this "cementation without cement" would be merely a variation on calcination, or what modern chemistry calls oxidation.

<sup>155</sup>The passage from 83rb,24 to 83rb,32 is quite difficult to interpret, since it is unclear whether "the separation of the bodies from one another" (*separatio corporum*: line 24) refers to the separation of gold from silver or of gold and silver from the base metals. At any rate, the explanation of the test is the same as that of cupellation: due to variation in particle size the metals have differing temperatures of fusion, and can therefore be separated from one another. This is not a very satisfying explanation of cementation, however, since the test is carried out below the melting point of the alloy. Hence the *Summa* supplements this explanation at 83ra,1-32, arguing that metals which contain more sulfur are more easily burnt up by the fire and corrosiveness of the cement.

<sup>156</sup>I.e. they incandesce before melting. Darmstaedter, n. 166, points out the following - "Red heat begins at 600° C., bright-red heat at 800° C., then yellow heat, and at over 1200° C. white heat. Since silver melts at 960° C. and gold at 1060° C.- between red heat and white - the remarks of Geber are correct. Also

Thus we say that if we try to arrive at their complete alteration, it is necessary to bring their treated bodies to fusion. And this is, to be sure, that before the bodies of perfection are fused, they take up the firing [83va] with an inflammation of a beautiful bluish color, before their firing arrives at a whiteness of fire which the eye cannot regard at all. It is therefore manifest that the perfect firing of these is completed with an intense redness before the act of fusion, and not with the whiteness which the eye cannot regard. But if the treated bodies are fused before they are fired, they are not in their perfection, while if they are fired to incandescence with the labor of a fire of strong force, their treatment is not true. The former happens only to the soft, the latter only to mars. For the unfireables do not easily take up firings in the method of preparation, nor do the infusibles easily receive the proper fusion which we have found according to nature in the perfects. And if, having been treated with firing, they do not show forth a flame of bluish, beautiful color, their administration is incomplete. And if any of the differences of perfection in the prepared bodies be found deficient by the astuteness of the test, the artificer's attempt was insufficient. Let him therefore seek again until, with methods brought together by divine providence, he find.

#### <86> Particular Discourse on Fusion

Let us therefore transmit all that is necessary in the relation of fusion, according as it is a test of all the bodies themselves for the sure recognition of them. Therefore we say that a fusion of perfection is one with firing, not with the genus of every firing, but with the firing in which the body does not wholly whiten, with the

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the remarks about iron, which melts at over 1200° C. with white heat.... Copper melts at 1083° C., in like fashion as gold. Tin melts at 231.5° C., lead at 327° C., both far beneath the temperature of visible incandescence." This test and the following - unlike those of cupellation and cementation - do not occur in the *De perfecto magisterio*. They seem to be original to the *Summa*.

firing in which there is not blackness arriving, and in which the body does not suddenly fuse and liquefy, so that it flow suddenly after its firing. Therefore when the body has fused with a very small force of weak fire, without firing, or with dark firing, it is necessary that this body be of imperfect preparation by a defective technique, whichever one of the imperfect bodies it be. And if after its fusion it is left to cool off, and the product of firing suddenly turns wholly black, and on account of this it loses its firing before it hardens, the body, of whatever genus it be, is not in its perfection. But it is necessary that this body be judged to be from the genera of bodies of imperfect softness. And if the ignition of that occurs before fusion, with laborious and violent force of a strong fire, and with a ray of immeasurable brightness, becoming wholly white, the body is then not of perfection, but an altered body of hardness. [83vb] And if on account of this, it is removed from the fire after its fusion and suddenly hardened so that it not flow, with the shining firing of that remaining, of whatever genus and preparation the treated body was, it is still not of a lunar or solar perfection, but is placed under the nature of the differences of mars. It therefore appears from this that in the practice with fusibles a triple degree of firing is comprehended before the liquefaction of their substances, namely one dark, a second clear red, and a third very shining white with a beam. The first is, in fact, of the soft bodies, the second of the perfect, and the third of the hard, which is proven by the test of reason. But whoever wishes to determine the degree of all these firings, should melt all the fusible bodies, and inspect the amount of fire necessary for the complete perfection of fusion, and with this consideration, he should gather up the difference of degree of all the signs of fusion; thus he will certainly find it, otherwise not. And let this example be brought to you in all the manners of examination determined, and still to be determined by us. Let these sayings suffice as regards fusion.

**<87> Particular Discourse on the Exposure of the Bodies  
above the Vapors of Sharp Things**

Hence pursuing the goal of our discourse, let us narrate the exposure of the bodies above the vapors of sharp things. We therefore say that we see the bodies of perfection exposed above the vapor of sharp things - namely of pontic, pungent things and those completely like them - either not to effloresce, or to give off a very beautiful, blue flower. But we find the purest sol not to effloresce, while luna or impure sol exposed above the vapors of sharp things does effloresce, and gives off a very beautiful blue flower, though sol more beautifully than luna. And imitating nature on account of this, we too create a blue color in prepared bodies, which is perfected through the goodness of quicksilver, as was related by us sufficiently in the foregoing chapters of our discourse. Therefore, whichever prepared bodies have been above the vapors of acute things and have not created a blue color of beauty, are not at the complete end of their preparation. One of the bodies effloresces a dark red or dark yellow color mixed with green on its surface, due to the sharpness of pontic things, and mars is of this genus. But another effloresces dark green on its surface, mixed with muddy blue, and venus is of this sort. But another effloresces dark white, and saturn is found to be of this sort. Another clear white, [84ra] and jupiter is of this sort.<sup>157</sup> But because the most perfect body effloresces least or not at all, and if at all, it effloresces very gradually, and since jupiter effloresces a gummosity of this sort least and slowest among the bodies removed from the goal of perfection, we have therefore decided through the

<sup>157</sup>The exposure of metal sheets above hot vinegar (derived from various vegetable substances) would produce metallic acetates of varying color, the most familiar being verdigris. We have already remarked on the "silver-blue" pigment so often described in the Middle Ages, produced by exposure of silver plates to vinegar (cf. n. 67). The *Summa* correctly notes that pure gold would not undergo such corrosion at all.

test of this magistry that jupiter approximates perfection most in the work of the greater order. Hence through this test the genus in which the treated body rests can be sought out, if you have rightly understood the order of those which we have narrated in this chapter; but if not, impute it to the insagacity of your own foolishness.

**<88> Particular Discourse on Extinction**

Let us therefore adduce the total description of the test of extinction. The practice of that, by which it is known whether the magistry be established in perfection, is multiple. First, if the fired body is extinguished in a liquid and the lunar does not become white nor the solar brilliant yellow, but is changed into another color, the alteration of the magistry is not at its goal. Or if it give forth a scoria partaking of superficial blackness on its surface during the repetition of its firing and extinction in waters made from the treatment of salts of alums of any genus, or if upon its extinction in sulfurs and from extinction and much reiteration of firing it diminish, or become infected with filthy black, or be completely shattered by the shock of the hammer, then the technique of the work has been deceitful. Or if the body be put to the fire by cementation in a mixture of sal ammoniac, verdigris, and boy's urine or their like in nature, and after firing and extinction it completely lose its own lunar or solar color, or create a scoria, then the body still continues to remain in sophistic corruption. But I transmit one certain, general, rule to you, that both in the tests described by us and in those to be described, if the altered body should exchange any of the differences of perfection, - namely of weight or color - the artifex has not rightly investigated the work, but fantastically, which work is not precious, but belonging to destruction.



**< 89 > Particular Discourse on the Commixture  
of Sulfur with the Bodies**

Whether the magistry rest in perfection is similarly tested with a commixture of sulfur, since in our practice we have found sulfur mixed with the bodies to burn some more and some less; and with our artifice we find some to return from the burning of that, but others not. The difference between the bodies removed from perfection [84rb] and prepared in a sophistic perfection, can be noted from this. Therefore, since we find that sol - among the bodies of each genus - is burnt up least by sulfur, then jupiter, then luna, after this saturn, and that venus is burned up by the oiliness of sulfur more easily than all these, and mars easiest of all, it is on this account noted which one approaches the perfect more and which less. And it can be sought out from the diversity of colors after the burning up of the bodies, in what genus the altered body is from the root of its nature. For sol to be sure sends forth an intense yellow or clear red color from the combustion of sulfur, but luna black mixed with blue, Jupiter black mixed with a little redness, saturn dark black mixed with much red and lividity, but Venus sends forth black mixed with greenness if much burning of the sulfur precedes, and a very clean, beautiful violet color, if a little burning precedes, from its commixture with sulfur. Mars, on the other hand, produces a dark black color in every genus of burning.<sup>158</sup> A similar diversity in the bodies is also noted during their reduction from the combustion of sulfur. For some indeed reduce, but others withdraw from reduction with sulfur, even with force of fire, either totally or as regards their greater quantity. Certain ones are reduced into a body of their own nature by means of burning, while others are reduced into a body other than that of their own nature. Moreover, the bodies are reduced from the burning of sulfur to the nature of their own body according to the diversity of their

<sup>158</sup>This sequence refers to the production of metallic sulfides.

preparation. Both sol and luna are reduced to their body. But jupiter withdraws, as does saturn - jupiter either totally or according to its greater part, while saturn does not withdraw totally, but sometimes a greater part of it is destroyed, and sometimes a lesser.<sup>159</sup> But the diversity of these happens to come about both on account of the bodies' nature and according to the difference of their treatment in the preparation of the work. For it happens that jupiter is destroyed by a sudden forcing up of the fire during its reduction, but that both saturn and jupiter are preserved by a successive and gradual reduction. But their reduction inclines toward another sort of body, rather than toward the nature of their own. But our experience is that the reduction product of jupiter is found to be turned into a clear antimony and that of saturn into a dark one.<sup>160</sup> It happens that venus is diminished by the force of the reducing fire, but mars more. The reduction of venus, however, is dark, yellow, and heavy, while that of mars is livid white, and dark, soft, and participating in blackness, with its own augment of weight. Therefore from these [84va] the nature of all the altered bodies can be sought.

<sup>159</sup> Such a loss of tin and lead during reduction is primarily attributable to their volatility.

<sup>160</sup>This is the earliest reference known to me to a metallic slag as *antimonium*, presumably identical to the *vitrum antimonii* of later alchemists. This "glass of antimony" has traditionally been considered to be antimony oxysulfide ( $Sb_2S_2O$ ), which can occur in a glassy, transparent form, but Dr. Lawrence Principe has recently presented a forceful argument contending that the *yellow* glass of antimony (as opposed to the red oxysulfide) is actually a silica rich slag primarily composed of antimony trioxide (Principe, "Chemical Translation' and the Role of Impurities in Alchemy: Examples from Basil Valentine's *Triumph-Wagen*," *Ambix* 34:1987, pp. 21-30). *Vitrum antimonii* aroused considerable interest in the XVIth and XVIIth centuries, perhaps reaching its apogee in the *Curus triumphalis antimonii* of the pseudonymous Basil Valentin. Cf. David A. Schein, *Basilii Valentinus und Seine Tinkturen aus dem Antimon* (München: Tibor Marczell Verlag, 1977).

**<90> Particular Discourse on Calcination**

We must now examine the test of repeated calcination and reduction. We therefore assert that the bodies of perfection are found during the repetition of calcination and reduction to lose nothing of the differences of goodness, be it of color, of weight, or of quantity (one must guard against the diminishment of this), or of brightness, however much the multiplicity of the operation be repeated on them. So if anything of the differences of goodness from any genus of the altered metals be lost through the repetition of the techniques of calcination and reduction from that calx, it must be judged that the artifex has sophistically investigated this search. Wherefore, let you exercise on them so that you recognise them.

**<91> Discourse on the Conjunction of Quicksilver  
with the Bodies**

It is already manifest to us that the things containing most quicksilver are the bodies of perfection, and that they are therefore the friendliest to quicksilver and most united with it. On this account, it must be affirmed that those bodies approach perfection more that amalgamate more amicably with quicksilver. The sign of this is the easy amalgamation of quicksilver by a body of solar or lunar perfection. For this reason, if the altered body does not take up quicksilver into its substance, it is necessary that it be far from the goal of perfection.

**<92> Epilogue of the End of the Whole Magistry**

Because we have thoroughly treated the known tests of the ~~chances~~ of this magistry according to the requirement of our proposed discourse, it remains that we arrive at the goal of the

whole divine work in one chapter, and contract the magistry dispersed in our chapters into one *summa* of abbreviated discourse. We therefore say that the sum of the whole work's intention is only that the stone noted in various chapters be taken.<sup>161</sup> Then with steadfastness of work, let the operation of sublimation of the first degree be carried out upon it, and by this let it be cleansed from corrupting impurity. This is the perfection of sublimation; with it let the stone be subtilized until it arrive at the final purity of subtlety, and become as volatile as possible. Then let it be fixed with the methods of fixation, until it rest quiet in the fierceness of fire. This is called the second degree of preparation, and in this one goal of preparation consists. But the stone is also administrated in a third degree, which stands firm in the final end of perfection. [84vb] It is namely that you make the now fixed stone volatile with the techniques of sublimation, then the volatile fixed, the fixed soluble, and again volatile, and the volatile again fixed, until it flow and again change, in a certain solar and lunar complement. From repetition of preparation in the medicine of this third degree, there results a multiplication of the goodness of its alteration. Hence from the diversity of repetition of the work upon the stone in its degrees, there results a diversity of the multiplication of the goodness of its alteration, so that one medicine transmute twice as much as itself into a true solar and lunar body of perfection, another ten times as much, another one hundred, another one thousand, and another into infinity. Then let it finally be ascertained whether the magistry rest in perfection.

**<93> Here the Author relates how he has hidden the Science and  
brings the Work to an End**

And lest we be attacked by the jealous, let us relate that we have not passed on our science in a continuity of discourse, but that

<sup>161</sup>Clearly mercury is meant.

we have strewn it about in diverse chapters. This is because both the tested and the untested would have been able to take it up undeservedly, if the transmission were continuous. And we have also hidden it where we have spoken more openly - not under enigma however - rather we have addressed the artificer with a plain sequence of speech. And we who have written that which we have written down in the manner of discourse, as it happens, are comprehended in the mind of our God the only, highest, blessed, sublime and glorious, or in the grace of His divinely infused goodness, that of Him who extends to and withdraws from whom He wishes. Let the son of doctrine therefore not despair, since if he seeks, he will find, not by inquiring of doctrine, but by inquiring of the motion of his own nature. For he who seeks knowledge through the goodness of his own diligence will find it. But he who inquires by the pursuance of books will arrive very slowly at this most precious art, because we have taught the art investigated by ourselves alone and not by others, the art most true and wholly certain. We have therefore only drawn the understanding to this art, and we have exposed the way of investigation to the same, with the techniques taught by us. But we have not written anything except that discovered by us ourselves, and the method of its discovery and the techniques of those methods. Therefore let the artificer of good intellect exercise himself through those things which we have passed down, and he will be happy to have arrived at the highest gift of God. So let these sayings suffice for the seeking out of this lofty art.

<94> Establishment of the End of the Whole Magistry

The book of the perfection, of Geber, here ends,  
thanks be to God. Amen.

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