Remote Viewing observations of Atoms & Quarks

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Contents

Note: This e-book is intended for both scientific and general readers.

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Remote Viewing of Atom & Quark structures Part 1

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Abstract:

The fine internal structure of the atomic nucleus and elementary particles may never be discovered by instrumental methods. This paper describes detailed observations of their structures by "remote viewing". This paper reconciles these observations with modern physics. Remote viewing has been verified by experiments published in 1974 in Nature, with a possibility of only 1 in a million that it could have occurred by chance (Targ & Puthoff, 1974).

Keywords: remote viewing, quark, nuclear structure, atomic structure, molecular structure

Introduction:

Most physicists would agree that the internal fine structure of the atomic nucleus and elementary particles may never be discovered by instrumental methods. This is because the wavelength of the beam in (say) an electron microscope is much greater than the size of such structures, so their fine detail cannot be resolved. The smallest structures to be observed will always be much smaller that the wavelength of any probe beam.

This permanent "brick wall" blocks the way forward for discovering the internal fine structure of sub-atomic particles, and makes them unknowable by any instrumental method.

For this reason, because this subject is of such great importance, an alternative method should be considered, even if it cannot satisfy the normal requirement of science that it should be repeatable by "anyone anywhere": The human mind has as-yet-uncharted abilities, and a method known as "remote viewing" may be the only method which will ever be available for observing the internal fine structure of quarks and sub-quarks, and so it would surely be illogical to dismiss it. Just as with the "thought experiments" of Relativity, which became testable later, when experiments were performable, it may be possible that in future years the observations given

here may become testable. Predictions from them may be made, which could become testable later.
Remote viewing is an acquired ability to observe physical objects with one's eyes closed, and, an additional faculty of being able to magnify them to any extent, opens up this method for the observation of atomic and sub-atomic size particles. Eight psychic powers, or "siddhis," are often referred to in the literature on yoga. One of them is: "minuteness - the power to be as small as an atom, at will" (Wood, 1965). In his *Yoga Sutras,* the great authority on yoga, Patanjali (c. 400 B.C.), states that one can acquire "knowledge of the small, the hidden, or the distant, by directing the light of a super-physical faculty" (Taimni, 1965).
Remote viewing details & many references are given by Hocking (2011).

Feasibility for anyone to learn remote viewing: Observations with eyes closed are described by a very easy method devised by the author (2014, 2016), the 2016 reference being an easily accessible open access free Google e-book (Hocking, 2016). These observations are of vivid visual images, like trees and cottages, highly stereoscopic, but not, as yet, of physical objects such as a piece of metal or ceramic. Further development of the method is needed.

But very few people are working on this topic, probably because it is considered to be something "weird", which many scientists think may damage their reputations to get involved with! But it is not at all weird, and it results from placing the mind into a brainwave state of *simultaneous* beta waves (normal wide-awake state) and delta waves (brainwave state in deep sleep), as measured using an electro-encephalograph (Hocking, 2016). For details see Appendix H1 (page 55).

Even if the likelihood of remote viewing observations being correct, were to be considered small, the importance of the topic is so great that it is worth testing them: (likelihood) x (importance) = worth considering.
This is especially true if there may never be any other way of obtaining information on the internal fine structure of sub-atomic particles. Also, the method is reported to reveal information far beyond that possible using hadron colliders, but at almost zero cost.

This paper describes detailed observations of subatomic structures made by the "remote viewing" method, performed by rather rare gifted observers, and so cannot be repeated by "anyone anywhere". This paper reconciles remote viewing observations with modern physics.

Remote viewing has been verified by experiments in controlled laboratory conditions published in 1974 in Nature [Targ & Puthoff (1974)], with a possibility of only 1 in a million that it could have occurred by chance. Those observations involved a gifted remote viewer telling the numbers on two dice shaken in steel box, but in that case it was possible to satisfy the criterion of "anyone anywhere" being able to repeat and verify the observations made (if the gifted remote viewer visited their laboratory), simply by removing the lid

from the closed steel box to read the dice after they had been remotely viewed and reported by the remote viewer.

But for the unique observations in which remote viewing faculty also magnified particles, it is not possible for "anyone anywhere" to verify the fine structures of the sub-atomic particles and atomic nuclei being observed, as that obviously requires the special ability to magnify as well as remote view, which cannot be verified by simply removing a lid from a box to view dice!

Remote viewing of atoms and molecules showed double the number of atoms expected, and the purpose of this chapter is to present a simple explanation in terms of zero point energy, which removes this problem, which had caused the observations to be set aside for decades.

Remote viewing has been successfully used by several government intelligence agencies, such as the CIA: Schnabel (1997), Swann (2006), McMoneagle (1995, 2000, 2006), Targ (2004), Morehouse (1997, 2000, 2004, 2008). If it were not for this success, it may not have been timely to write this paper now. The remote viewing method is neglected by science because it can only be performed by a few gifted individuals, and also because many scientists are wary of possible reputational damage if the use of unusual abilities is cited.

The paper published in Nature, by Targ & Puthoff (1974), mentioned above, showed, in ten experiments on two dice shaken in a closed steel box, that remote viewing gave the correct answers in 8 cases, with two cases being a "pass" (no answer given); the probability of this result occurring by chance is 1 in a million, which proves remote viewing beyond reasonable doubt.

A principal remote viewer working for the USA, was Ingo Swann, who demonstrated his ability to a group of science professionals in London forty years ago, just before starting with the CIA in the USA. One of us present, provided an electronic random number generator and Ingo Swann repeatedly correctly gave its readout, before anyone saw it, under carefully controlled conditions [(Hocking (1974)]. But of course none of the scientists present was able to reproduce his results, as none had a remote viewing ability.

Remote viewing being based on a special ability, cannot (yet) satisfy the usual requirement in science that a valid observation should be repeatable by "anyone, anywhere".

Ingo Swann is able to view remote events anywhere in the world, and he became a main member of the USA government CIA remote viewing group (Schnabel,1995; Swann, 2006).

An aspect of remote viewing includes a claimed ability to magnify an object to any extent. Remote viewers have reported using this to magnify atoms and quarks, and the first known observations were reported by Babbitt (1878).

The text on the pages below are from remote viewing observations reported from 1895 to 1951 by Besant & Leadbeater (1895, 1908, 1919, 1951).

Modern physics finds that a proton contains 3 quarks. Besant & Leadbeater reported in 1895 that the hydrogen nucleus contains a group of 3 smaller particles, which each contain 3 smaller ultimate particles of matter which they called "arnoo" (*Sanscrit*, smallest particle of matter, a term used by the Vaisheshika School of ancient India, linked to the Vedas).

These remote viewers reported (over a century ago) that the H nucleus consists of 3 'quarks' (the word coined by physicists, decades later), and that there are 10 spatial dimensions Both of these results were (decades later) deduced in current quark physics.

Because these observations cannot be repeated by "anyone anywhere", science disregards them. But in other fields, remote viewing has been recognised, and the USA government has extensively used remote viewing observations, and even awarded a Congressional Medal to one of the CIA Remote Viewing Group (Joseph McMoneagle) for his remote viewing intelligence observations (McMoneagle, 1995, 2000, 2006).

The remote viewing of sub-atomic particles and atomic nuclei can be regarded as being in the same class as a hypothesis. If a hypothesis is disallowed or suppressed, science would not test it in the future, because almost all physicists are simply unaware of the existence of these magnifying observations, because they were obscurely published, over a century ago. There are 230 very detailed and precise diagrams, and an enormous amount of effort was clearly put into their very detailed observations (Besant & Leadbeater, third edition, posthumous, 1951). These remote viewers have described their own very rigorous remote viewing training. Their trained observations, made in full consciousness, are not at all comparable with Kekule's well-known untrained dream of the structure of benzene.

If their observations are correct, they would be of extreme importance, and so it is desirable for scientists in future to have easy access to read those remote viewing observations, which is the purpose of this present e-book.

To give a brief preview of an important point made later in this paper, the remote viewers observed 8 *apparent* H atoms in the methane molecule (CH_4) but of course there are only 4, which they knew, but they were strictly honest in reporting what they saw. They knew that this would cause interpreters at that time, to conclude they were observing 8 half atoms of H, which caused their observations to then be dismissed for many decades! The explanation for this apparent discrepancy is to be found in the zero point energy vibration of Quantum Mechanics, which was only formulated in 1928 by Schroedinger, decades after the remote viewing observations of Besant & Leadbeater {B&L}.

The present author has considered their observations, over many years, and finally realised that the zero point energy (ZPE) oscillations of quantum mechanics would have the effect of *apparently* doubling the structures in the same way that a single guitar string looks like two strings when plucked to resonate at its note. At the stationary antinodes, the surface imperfections on the string can be seen with a hand-lens – at both antinodes. A casual observer who came into the room after the string had been plucked would say that he is seeing 2 strings -- or a doubled string! But there is only one string. Similarly, the 8 *apparent* atoms observed in CH_4, are actually only 4 *actual* H atoms but which are oscillating due to their irreducible ZPE, which gives the *appearance* of 8. So they were not observing 8 half-atoms, as the early interpreters had thought, but 4 H atoms oscillating due to their ZPE.

The fact that B&L reported 8 apparent H atoms in a methane molecule indicates their honesty, because if they had seen 8 but reported 4 (because it was then well know that the methane molecule is CH_4), it would have become clear in later years when ZPE became known, that they could not have seen 4 but 8 would have been seen, for the reason just given above.

Their observations cannot satisfy the normal requirement of science of being repeatable by "anyone anywhere", but because of their great potential importance as the only method available, it is surely a valuable approach and is written up here and published as valid research, on the definition that: *"Research is to see what everyone has seen, but to think what no-one has thought".*

To get an idea of the amount of effort put in by the remote viewers, please download their 400 page book free from www.4-D.org.uk (or see Besant & Leadbeater in the reference list -- in this present e-book). It seems very unlikely that they would have taken all the trouble to give their 230 detailed diagrams if they were not genuine observations. The interpretation of their diagrams is discussed below.

Remote Viewing of elementary particles, atoms & molecules:

Kekule

Kekule's well-known "reverie observations", found in many Organic Chemistry textbooks, are highly subjective, and are as follows:

The 19th Century organic chemist, Kekule, thought much about the structure of benzene, and had a half-awake reverie. This is not Remote Viewing but an example of an untrained dream observer, whose dream dramatised his intellectual problem, and solved it. It shows the ability of the mind to create subjective images (see below). Although Kekule's account below would be dismissed by many as a valueless figment of his imagination, his result was confirmed later by physical chemistry measurements. So, the results of a

seemingly valueless method can be tested against its predictions, which if they confirm it, justifies its use.

In Kekule's dream, black balls of carbon turned into black imps with forked tails that began racing around the room. Suddenly, each imp grabbed the tail of the one ahead of him, and six formed a whirling circle. One hand of each imp held a tail, and other hand a white handkerchief. They waved this to him as the group whirled by. He said that he then awoke with a start, realising that the imps were acting out the formula for benzene. As his hand grabbed the sketching pencil, the imps changed back to black balls again and the handkerchiefs had changed to hydrogen atoms: "The carbon atoms of benzene form a ring!"

Besant & Leadbeater

But the *expert level* remote viewing observations of Dr Besant & Leadbeater (1895-1951) were of a different order, and their rigorous training prevented any such subjective images, leaving only an objective item being observed. Importantly, they both had the same remote viewing ability, and so checked each other's observations. Their enormous effort in producing 230 very detailed diagrams of molecules, atoms and quark structures, given in their final 400 page edition (B&L, 1951), means that their results should surely not continue to be just ignored by science:

Their remote viewing observations, made over a century ago, were ignored for many decades because their observations described:

(i) 10 dimensions;

(ii) The H nucleus (proton) as containing 3 sub-atomic particles, with bonding which they (B&L) described as "strings";

(iii) Molecules, atoms and sub-atomic particles all moving in an all-pervading zero-viscosity "fluid", 'mulaprakrti' (*Sanscrit*, "matrix material), which fills all of space in the Universe.

These results were regarded as ridiculous by science during most of the 20th century. But in recent decades:

(i) The existence of 10 dimensions has been proposed by particle physicists;

(ii) Particle physicists have found that the proton is composed of 3 sub-atomic particles (3 quarks), and physicists have re-invented the word "strings" to describe quark bonding;

(iii) Recently, physics has re-discovered mulaprakrti, and calls it the "Higgs Field".

These and other such points, mean that it is worthwhile considering these century-old remote viewing observations. The smallest particle of matter observed by B&L was the elementary particle shown in Fig. 1.1.

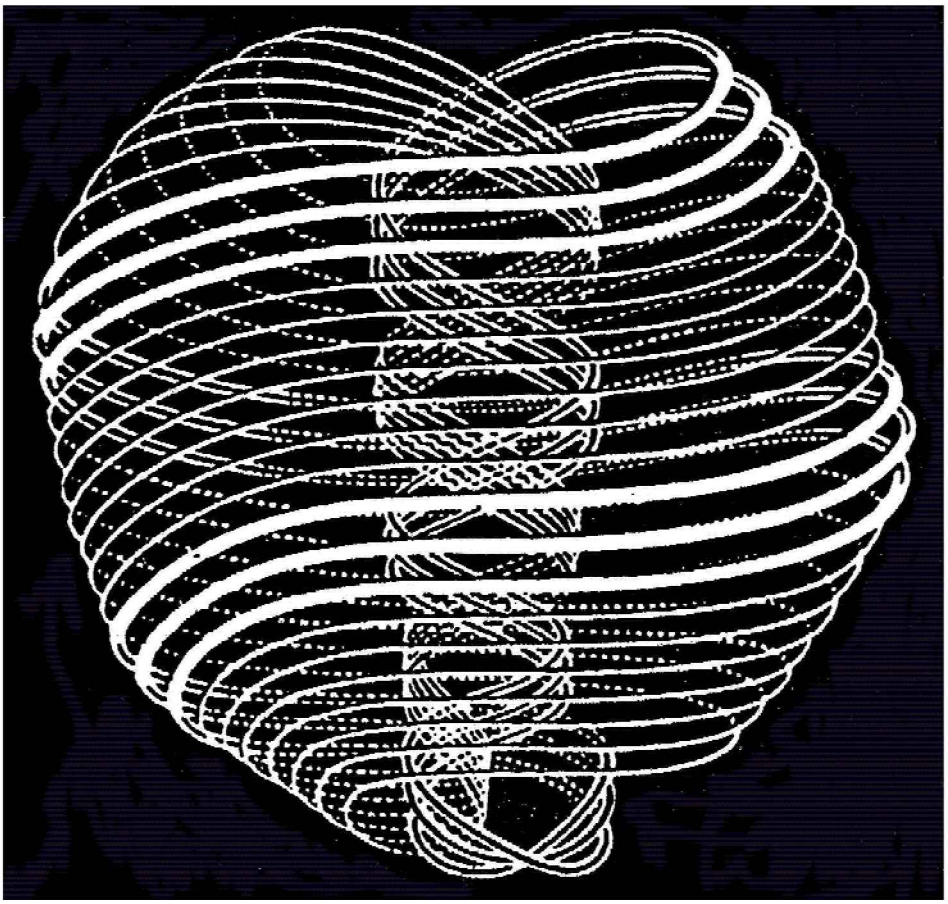
Although the following remark is admittedly third-hand information, it is worth recording here: the present author (MGH) avows that 45 years ago he met Dr E. Lester Smith FRS on many occasions, who had met Besant and Leadbeater (B&L) in the 1930s, and Dr Lester Smith said that he was certain that there was no deception involved in their observations, which were completely honest and objective. Their observations have also been verified by others: Babbitt (1878), Hodson (1957-1959). The Hodson observations were written up on a website which was later taken over by someone else, but fortunately, the present author had copied that website (Hodson & Lyness, 1959) some years ago, before it was taken over by others and thus lost. (This is a major weakness of the internet: Nominet, who administer UK website domain names, even advertises website domains whose owners have ceased to pay their annual fee, due perhaps to the death of the owner, and then very valuable data is lost if someone else buys that domain name and uses it for completely different purposes -- and of course deletes all that was on the website.) Hodson (1957-1959) is now preserved in a separate e-book publication (open access).

These remote viewing observations are extra-sensory observations in which the observer is (mentally) able to reduce his point of perception to as small a size as required – far smaller than a quark. To give a well-known analogy, it is like Alice In Wonderland but without the "Drink Me" drug. This method was described by Patanjali (c. 400 BC), 2400 years ago, as an ability (a "siddhi") to indefinitely reduce the size of a sensor in the mind of the observer so that objects appear increasingly large. The same method is reported by the CIA Remote Viewing Group, described with references by Hocking (2011).

Internal structure of Quarks

The unique importance of this very unusual method is because it is probably the only way in which the internal fine structure of quarks and their groupings may ever be obtained, as they are well beyond any instrumental method of observation, such as electron microscopes. This method needs no apparatus, such as particle accelerators (CERN etc). Besant & Leadbeater (1895-1951) describe an ultimate indivisible particle (Fig. 1.1), the "arnoo" (Plural is written as "arnoo", or as "arnoos") (*Sanskrit*, "smallest particle of matter").

3 arnoo are in a quark, and 3 quarks are in a proton (Besant & Leadbeater, 1951). "Quark" is of course a modern name. The arnoo is far too small to be ever observed by science. The 3 quarks in a proton can be "detected", but with no indication that their internal structure consists of 3 arnoo. The Sanscrit word "Arnoo" is pronounced as "arnoo". {The simpler spelling "anu" (*pl.* anus) used in some books, should be avoided, for an obvious reason. Cf the embarrassing choice by astronomers of the name "Uranus", for a planet.}



Arnoo (*Sanskrit*, smallest particle of matter): अणु

Fig. 1.1. Arnoo, ultimate particle of matter: 3 were observed in a quark, and 3 quarks were observed in a proton. *From Besant & Leadbeater (1895-1951).*

Dobyns (1995) mentions that there is no current experimental evidence for quarks being composite, and that tests performed for phenomenological consequences of an underlying structure to the quark, provide no evidence for such structure: quark compositeness can be rejected on any energy scale less than 1.4 TeV (Rosner and Soper, 1992; Cao *et al.,* 1994). Dobyns points out that as the mass of a proton is on the order of 1 GeV, this would require subquarks / arnoos to be enormously massive particles, bound by an as-yet unknown force, so intense that the binding energy cancels more than 99.9% of the subquark mass. (Binding Energy explanation: see in Appendix B)

But, the present author (MGH) comments that if the structure of subatomic particles is to be stable enough to be resistant to external energy events, such as bombardment by energetic cosmic rays and the activities of physicists at CERN, and nuclear warfare tests, then a very high binding energy is required for some critical particles. Otherwise, such events could perhaps produce very spectacular consequences, reminiscent of the quotation by Oppenheimer:

"I am become the destroyer of worlds"

(From the Bhagavad Gita of ancient India).

The large hadron particle collider at CERN can generate up to 14 TeV, which is 10 times the 1.4 TeV mentioned above; in 2013 a Higgs Boson was discovered at CERN with a mass of 125 GeV (= 0.125 TeV).
{A mass unit of 1 GeV is approximately 1 AMU (atomic mass unit, or "atomic weight" in past units, but now "atomic mass" is preferred). So a mass of 125 GeV is roughly that of the atomic mass of an Sn (tin) atom on the atomic weight or the atomic mass scale. So a Higgs Boson is classed as a heavy particle.}

Protons (H nuclei) were synthesised in the very early stage of the "Big Bang", and it is essential that its component parts (3 quarks), and their internal parts (3 arnoos, observed by B&L), must be stable enough not to be disrupted by any subsequent high-energy collisions. Otherwise, the progression of evolution of the 92 elements in the periodic table may not have occurred, and no life in the Universe would exist. Elements heavier than the H nucleus (the proton) were synthesised in the Big Bang, and are still being synthesised now in stars.

Inside stars, the process 4H → He releases only about 27 MeV per He atom produced, but as there are about 10^{40} He atoms being produced per second in a typical star, it may be necessary to have a large "safety factor" (high binding energy) to ensure that the 3 quarks in an H nucleus are very stable, to prevent some collision process from disintegrating them back into arnoos.

The arrival rate of 1 GeV cosmic rays at the Earth's surface is about 10,000 / m^2/s. At 1 TeV the rate is 1 particle/m^2/s. At 10 PeV there are only a few particles/m^2/year. Above 10 EeV about one particle arrives /km^2/year, and above 100 EeV only about one particle /km^2/century. I.e. the energies of the most energetic cosmic rays approach 3 × 10^{20} eV, but there are very few, because more energetic ones are absorbed *en route* by collision with interstellar protons – this may possibly have some relevance to possible disintegration of the quarks inside protons, if they contain 3 arnoo, but this is speculation.

Observations

Nature can be split into the "Form Side" (observed using scientific instruments) and the "Life side" (observed using our minds). On the Form Side, there is no chance of using instrumental methods to observe the smallest elementary particles like quarks, which are far too small, but on the Life Side, a possible "Remote Viewing" mental ability may allow their observation.

The first edition of the book by Besant & Leadbeater (B&L) was published in 1908, and the third edition was produced in 1951 with 230 diagrams. Their 1951 400 page edition is listed in the references list here (open access, free downloadable) and has an added preface by the author of this e-book, but for best fine detail of some of their diagrams, the printed 1951 edition is necessary.

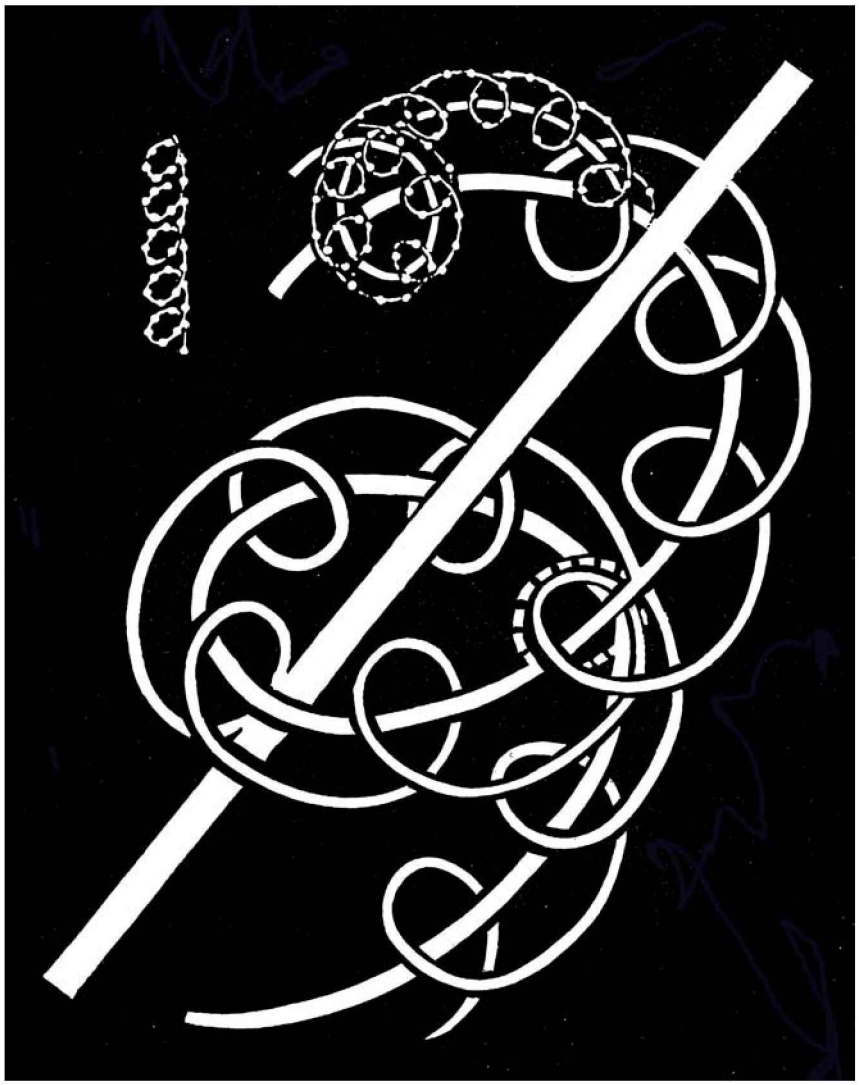


Fig. 1.2. Magnified detail of the arnoo shown in Fig. 1.1. This figure shows the coiled-coil structure of the 'strings', a name given by Besant & Leadbeater (1895-1951) many decades before it was used by particle physicists.
From Besant & Leadbeater (1895-1951).

Besant & Leadbeater are referred to for brevity as "B&L". These observers stressed the need for very careful training in order to avoid any subjective effects intervening.

By taking B&L's observations as a starting point, the present author (Hocking, 2007) has derived the well-known equations of Special Relativity in just one line, but without assuming the two *ad-hoc* Principles of Special Relativity proposed by Einstein. Also, Schroedinger's Equations are simply derived in just 3 lines, from Besant & Leadbeater's observations, and the Uncertainty Principle is re-interpreted to allow the precise observation of single elementary particles. The present conflict between quantum theory and relativity is removed, moving towards a "theory of everything".

B&L (1895-1951) described some new elements, then-unknown to science, which were discovered by science only many years later:

-- In 1907 (B&L): Ne-22 isotope.
-- In 1909 (B&L): Promethium.
-- In 1909 (B&L): Technetium.
-- In 1932 (B&L): Astatine and Francium.

There has been some discussion about whether their observations of hydrogen were of the whole H_2 molecule or the H atom (i.e. one end of an H---H molecule). This is discussed later below, but there are very many reasons showing that Besant & Leadbeater's observations cannot be explained in any other way than that they are genuine. These reasons advanced for the veracity of B&L's observations, are a quite separate issue from the doubling problem (whether B&L were observing H_2 or H), to be discussed later below.

Some points which indicate the absence of any pre-conceived ideas of what the results should be, are as follow:

(a) Their observations placed many elements which are in the same sub-group of the Periodic Table, into different categories in their classification;

(b) There are many characteristic groupings of arnoo, the fundamental ultimate indivisible particles, 9 of which are in the H nucleus – (explained later), which appear in chemically unrelated elements, which would not have been "expected" by B&L;

(c) The observers in 1895 and 1908 would expect the number of arnoo in the elements to be 9M where M is the atomic weight, not knowing about isotopes at that time. E.g. for sodium, relative to an atomic weight of H = 1.000, they would expect 22.88 x 9 = 206 but they actually observed 209 (see below). There were similar discrepancies for many other elements and so there was clearly no attempt to make the observations fit a formula that the number of arnoo = 9M. The discrepancies are not due to isotopes; e.g. for sodium there are no stable isotopes. Obviously, an isotope is what would have been actually observed. Binding energy must play a part, unknown at that time, i.e. some weight would be associated with different particular sub-grouping arrangements of arnoo and not just with the numbers of arnoo.

(d) Those elements which have no naturally occurring isotopes (i.e. having 100% abundance in nature) could only have been observed as the one 100% isotope, but some of the largest discrepancies occur for some of these elements. E.g. Co has a discrepancy of 26 from what would be expected from the simple formula 9M, Nb has a discrepancy of 45, Rh has 22, Tb has 54, Ho has 34 and Tm has 54. This is probably due to binding energy, i.e. the mass is not just the sum of the arnoo present but also depends slightly on the grouping arrangements of the arnoo, which differ in each element.

(e) At all temperatures above absolute zero Kelvin, atoms move too fast to observe, due to their kinetic energy. So Besant & Leadbeater had to slow down the rapidly moving atoms and molecules to zero velocity, essential for observing them. This means they removed their thermal (kinetic) motion, but even at absolute zero temperature there is a non-thermal motion which cannot be removed by slowing it down: the **Zero Point Energy** (**ZPE**). Its removal by B&L resulted in disintegration of the atom being observed. The slowing down of an atom to zero velocity, is not prohibited by the Heisenberg Uncertainty Principle (discussed later), because it has ZPE oscillations even when it has zero translational energy/velocity. B&L observed an *apparent* 18 arnoo in the proton (H atom nucleus), but it will be explained below that their observation of every structure, as *apparently* containing double the number of arnoo which were actually present, was due to the irreducible ZPE of Quantum Theory causing a rapid oscillation, like a guitar string appears double (at its two antinodes) when plucked. So there are actually only 9 arnoo, not the *apparent* 18, in a proton.

A consequence is that in compounds like HCl, a ZPE oscillation or vibration has one extreme (an antinode) seen as **H-Cl**, and the other antinode seen as **Cl-H**, in very fast alternation, like a guitar string, so both antinodes would be seen (giving an *apparent* doubling).

The **H** atom contains 9 arnoo grouped as three triplets, at the 3 apices of a triangle **Δ**, each triplet being now called a quark. So HCl was observed as: **Δ-Cl-Δ** , but, because it was thought at the time that the H atom contained 18 arnoo (as 18 were 'apparently' observed – see below), the incorrect conclusion reached by those who initially interpreted B&L's results many decades ago, was that this meant that a half-proton containing 9 arnoo was being observed on each side of a Cl atom ! See Fig. 1.3, which illustrates this interpretation error.

These *apparent* half-atoms caused the results to be set aside for many decades until the present author realised that ZPE would inescapably cause an *apparent* doubling, as just explained above, and that a proton contains only 9 arnoo, vibrating to anti-nodes like a guitar string, and thus seen double, *appearing* to be 18 (just like a vibrating guitar string is seen at its static antinodes as *apparently* two strings). The proton is not 18 static arnoo.

B&L (1895-1951) describe 3D space as a continuous medium, in which small holes or bubbles move about -- this is the exact "opposite" of classical physics which regards space as being empty and containing "solid" particles. A photographic analogy is a negative and its positive print. Modern physics has matter and antimatter, and virtual particles which are similarly opposites of each other.

Besant & Leadbeater say these holes or bubbles are caused by an energy welling up from a 4^{th} spatial dimension which presses back the "continuous medium" of the 3^{rd} dimension, forming a spherical wall. A century ago, they

named that continuous medium as: mulaprakrti (*Sanscrit*, "matrix material"), which is identical to what recent physics has now named the "Higgs Field".

Remote Viewing vision (Babbitt, 1878; B&L, 1895-1951; Hodson, 1957-1959), sees bright bubbles, as the smallest division of more complex groupings (atoms & molecules), observed in this black medium, and these single bubbles exist in 10-dimensional space. See top left of Fig. 1.2, for a string of these bubbles. We may tentatively identify clusters of these as photons, the smallest particles of light energy. Note: physical photons can only move in physical 3D space, not in higher dimensional space -- see a Scientific American article (Arkani-Hamed, Dimopoulos, & Dvali, 2000) for a simple exposition.

Arnoo *(Sanskrit, 'smallest particle of matter')*

Arnoo, the ultimate particles of matter, are described as being cardioid in shape (Fig. 1.1), with an inrush of a force from 4-D space into the top of the "positive" type of arnoo (a source), and an outrush of force from 3-D space back to 4-D space, from the "negative" type of arnoo, which acts like a hole in space (a sink). 'Positive' & 'negative' are B&L's terms, but they say that they just mean "handedness" by this, which is what particle physics now calls "chirality" (left or right handedness), and they may (or may not) have actual + & - electrical charges.

Besant & Leadbeater's drawing of an arnoo (Fig. 1.1), shows chirality; they draw details of its fine structure (Fig. 1.2), and describe its constituent very small 'bubbles' as being caused by an internal pressure due to a force welling-up from a 4^{th} spatial dimension and pressing back the undifferentiated continuous medium of our 3D space, which they called "koilon" (*Greek*) or "mulaprakrti" (*Sanskrit*, 'matrix material'), which we would call a continuous structureless zero-viscosity thermodynamic fluid; i.e. arnoo are structured holes in mulaprakrti, now called the Higgs Field of space.

Ten helical strings recirculate down through the core of the arnoo, each forming an endless loop of string (i.e. there are 10 separate endless loops of string): Fig. 1.1. Along these strings, B&L calculated 49^6 (which is about 13,841,200,000) small spheres or bubbles. Three of the 10 strings in Fig. 1.1 have 0.57% more bubbles than the other seven, and so appear to be thicker. Each string is analogous to a coiled-coil electric lamp filament, but has 7 orders of coiling [six in the arnoo of the next higher (4^{th}) spatial dimension, five in the arnoo of the 5^{th} dimension, etc, and none in the arnoo of the 10^{th} dimension].

Dimensions

These higher dimensional arnoo would be what astronomers now call the "hidden matter" or "dark matter" in the Universe. Astrophysics calculations show that over 95% of the matter in the universe is "missing" and it is currently being looked for in various ways. From Besant & Leadbeater's observations, this hidden matter would be what is held in 4th to 10th dimensions (see Table below) and so it appears "missing" from our viewpoint. (Note: Gravity can travel across the higher dimensions, but photons and other electromagnetic radiation cannot, so gravity from matter hidden in higher dimensions can be detected – as 'missing matter', but light etc from them cannot.) Table 1 is given in terms of the nomenclature of religions, as remote viewers' observations may relate to that:

Plane	Christian Name	Hindu Name	Kabalistic Name	Dimensions	Arnoo coil order
Adi			Kether, Atziluth	10	0
MP.Nirvanic			Daath, Atziluth	9	1
ParaNirvanic				8	2
Nirvanic				7	3
Bouddhic				6	4
Mental[1]	Heaven	Swarga[1]	Tipheret, Beriah	5	5
Astral	Purgatory	KamaLoka[2]	Yesod, Letzirah	4	6
Physical	World	MartyaLoka	Malkuth, Asiah	3	7

A useful analogy: A coiled-coil tungsten electric light bulb has a "coil order" of 2, which would correspond to ParaNirvanic in the above table.

Footnotes to table:

[1] or Devachan/DevaLoka [2] or Naraka/Paatala MP = Mahaapara

Table 1

The last column in the above table, shows that 7 (of the available 10) dimensions are "rolled-up" in our 3-D world. Besant & Leadbeater reported that the smallest elementary particle, the arnoo, has 7 orders of coiling in its whorls (see Fig. 1.1 & 1.2), but the (similar looking) arnoo of the 4-D level has only 6 orders of coiling, which means that for a (theoretical or presumed) 4-D being, there is an infinite extent of 4-D space available. So the 4th dimension is not rolled up for a 4-D being, but is rolled up for 3-D beings like ourselves; so we can never see it with our 3-D vision. But we should not conclude that higher dimensions do not exist.

Evidence of a 4th spatial dimension:

Investigators at Stanford Research Institute found that a subject who said that he was able to tell the result of dice shaken in a closed steel box, found that the probability of his results being due to chance was < 1 in a million. Seeing dice in a closed box by a method such as X-raying the box would

require an X-ray source, and a detector in or behind the box: Cf. an airport security scanner. Obviously this was not available when this remote viewer was being tested in controlled laboratory conditions at Stanford Research Institute (Targ & Puthoff, 1974). He had no apparatus at all.

Imagine a hypothetical 2-dimensional being living in a flat 2-D world, where a steel "box" would instead be a steel "square". A 2-D being outside the square would be unable to see what was inside the steel square. But we, as 3-D beings, are not flat, and so with our 3-D vision we could simply view the steel square from our 3rd dimension, to see what is inside it! So by simple analogy, the remote viewer at Stanford Research Institute could use his remote viewing 4-D vision to view dice inside a closed steel box.

Summarising this: Anything made of 3-D arnoo (i.e. any 3-D object) has negligible extension or access into higher dimensions because they are "rolled-up" in 3-D space. Anything made of 4-D arnoo has access into 3 & 4-D but not into 5-D and beyond, etc. 3-D matter is made of atoms and molecules, but 4-D and higher matter is composed of elementary particles because electrostatic forces (which bind atoms & molecules together) fall off too steeply with distance in dimensions higher than 3. Elementary particles are not bound by electrostatic forces, which decrease with distance, but by quark string bonds.

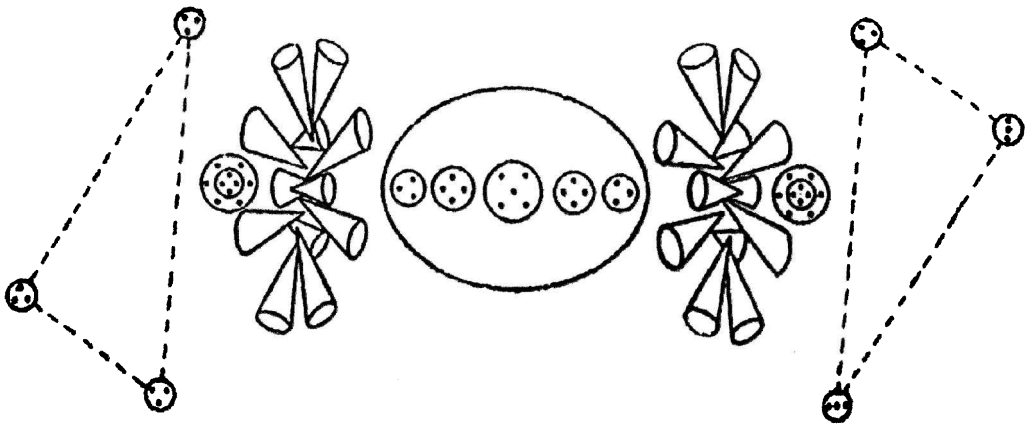
Molecules

All molecules contain bound atoms and all atoms contain bound groupings of

arnoo. All bound particles, even if brought to translational rest (0ºK), must still contain Zero Point Energy, according to the well established Quantum Theory. This takes the form of a high frequency vibration or harmonic motion, the restoring force being the coulombic (electrostatic) and strong nuclear binding forces (but the quark-to-quark "string" bonds are excluded as they are not of harmonic oscillator type). As already explained, the number of arnoo seen by B&L in atomic and molecular structures would thus *apparently* be double the actual number of arnoo present.

Two of the very many molecules drawn by B&L are detailed below. The same reasoning applies to all the others.

Please see on next page.



[H½] [Cl½] | [Cl½] [H½]

Fig. 1.3. HCl, an early **incorrect** interpretation, made some decades ago by early commentators on Besant & Leadbeater's observations.
The interpretation (in square brackets) is **incorrect**, because it was originally assumed that a triangle was ½ a H nucleus (proton), but actually it is a complete H nucleus.
Each triangle is a proton not a half-proton: Imagine a vertical mirror at the centre line: | so that the left [H][Cl] becomes the right [Cl][H] in the mirror.
"Zero point energy" rotates or vibrates the molecule in 4-D about this "mirror", so that each half is a mirror image of the other.
Each dot is an arnoo. 3 arnoos are in a quark (small circle) and 3 quarks are in a proton (dashed triangle) (H nucleus).

!! NOT TO SCALE !!

Notes:
(1) The figures are not drawn to scale; B&L (1895-1951) say that a scale figure "would require an *absurdly small dot* on a paper *many yards square*".
(2) The geometric outlines in these diagrams only indicate the arrangement patterns of the various arnoo combinations in atomic nuclei, and these outline shapes (funnels, etc) are not any kind of objects themselves. Each dot in the figure above, is an arnoo, but the many hundreds of other arnoos in NaCl are not shown here individually as dots.

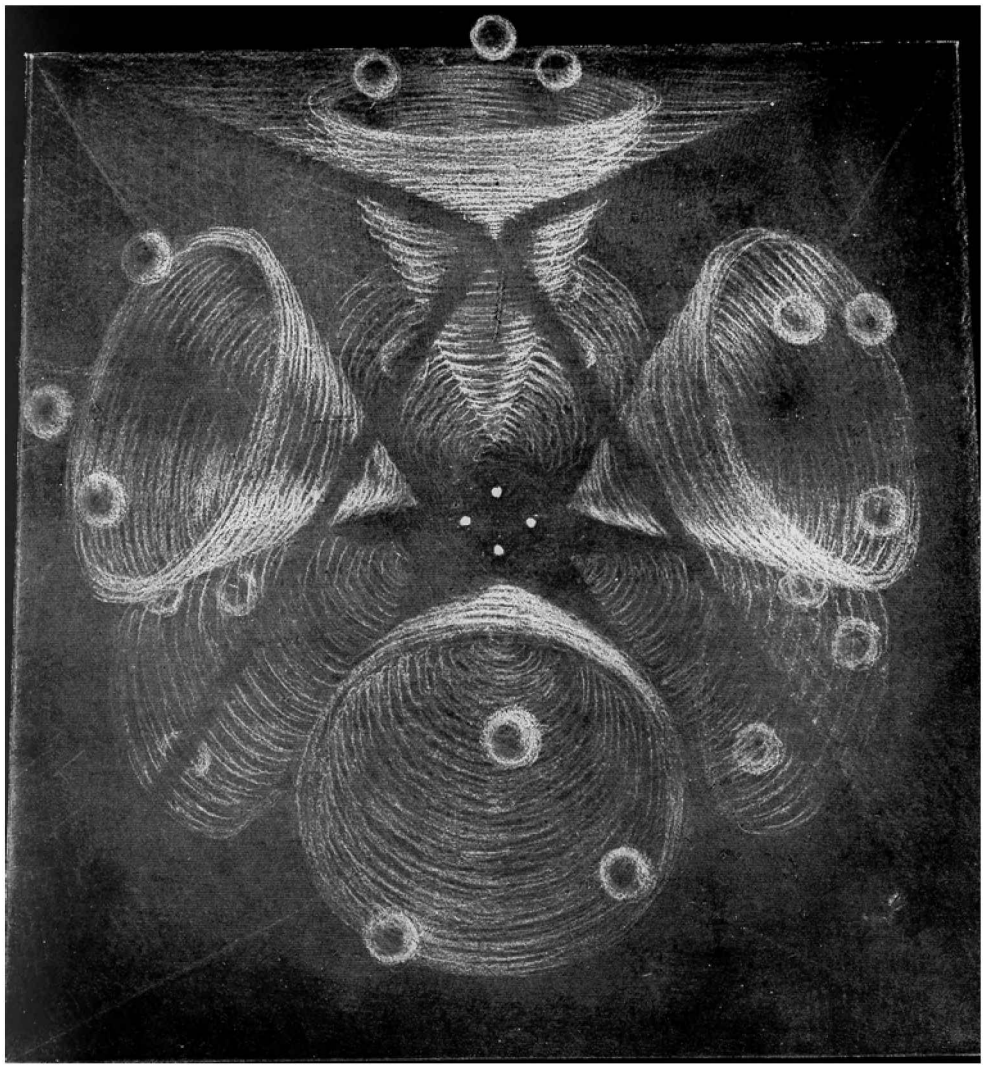


Fig. 1.4. Methane, CH_4 (B&L). !! NOT TO SCALE !!
H nucleus (proton) = 3 quark spheres (the 3 small spheres hovering in a triangular formation over each carbon funnel).
The carbon nucleus is in the funnels & at their centre.
The picture shows 8 funnels & 8 triplets of 3-quark spheres, placed octahedrally, but there are really only 4, located tetrahedrally, oscillating to appear octahedral. (C has only 4 valency).
Imagine a pyramid standing on a mirror, to appreciate an octahedron (two 4-faced pyramids fixed base-to-base).
The picture above looks down on the top pyramid only, so the lower inverted one cannot be seen, but some of its funnels are shown. Structures were all seen as white, in a black fluid background (mulaprakrti) (= the Higgs Field). *From Besant & Leadbeater (1895-1951).*

There were problems with B&L's diagrams, which lasted for decades because some things which they described were misinterpreted by early commentators, e.g. it (wrongly) seemed that hydrogen chloride, HCl, was: $H_{½}$ Cl $H_{½}$ (Fig. 1.3). As explained above, there appeared to be a half-atom of H on each side of a chlorine atom! But this effect is an inevitable consequence of the zero point energy (ZPE) vibration which cannot be removed by cooling the thermal motion of the HCl molecule to a stop, i.e. down to (in effect) absolute zero temperature:

B&L had to use their will (micro-telekinesis) to hold a molecule still, to observe it, because they found that molecules were darting about and colliding at high speed, due to their thermal or kinetic energy. This "holding it still" is equivalent to cooling a molecule down to absolute zero temperature, motionless, but mere thermal cooling would not alter its internal structure.

B&L could slow down a molecule to zero speed, but a residual irreducible vibration exists (in Quantum Theory) called Zero Point Energy, (ZPE). This non-thermal energy cannot be removed even at absolute zero temperature (where all the thermal kinetic energy of motion is removed). If the ZPE is removed, the structure disintegrates.

Consider another example: Methane (Fig. 1.4) was seen by B&L as an octahedron (imagine a pyramid standing on a mirror, to appreciate this 8-sided object). But it is known from chemistry that methane (CH_4) is tetrahedral, with the 4 carbon atoms at the 4 corners of a tetrahedron.

So next, imagine a tetrahedron as follows: Stand astride, stretch both arms upwards to form a V and then turn the torso 90 degrees to the right, to position the hands as far away as possible from the feet. The hands and feet then represent the four H atoms and the torso represents the C atom.

One's two hands form a V shape. Now imagine the two hands oscillating down to form an inverted V and then immediately back up to form a V again, like fast flapping wings. Simultaneously imagine that the two feet (which presently are forming an inverted V) continuously oscillate upwards to form a V shape. This is impossible to actually do, of course, but the whole exercise then would produce an octahedal arrangement with the 4 H atoms appearing to be 8 H atoms, which is what Besant & Leadbeater reported seeing. The person doing this would appear to have 4 arms and 4 legs.

Zero Point Energy (this oscillation) thus caused methane (CH_4) to be observed by Besant & Leadbeater as apparently having 8 half-H-atoms (explained below) located over the 8 faces of an octahedron, but chemistry gives its structure as 4 H-atoms over the four sides of a tetrahedron.

The H atoms are momentarily stopped at the antinodes, over the 8 faces of an octahedron, and are seen there. Cf a plucked (vibrating) guitar string, the surface detail of which can be clearly seen at its two stopped antinodes, if

examined through a lens. The single guitar string looks like two strings, due to its vibration.

The guitar string analogy is not quite appropriate because no blurring was reported in the structures observed by B&L (1895-1951). A better model is the escapement mechanism in a watch, but better still, is that the actual occurrence could be rotation in 4-D space (which appears as a vibration in 3-D space, of the structure spinning in 4-D space) (suggested by Eagles, 1981). This would seem to us to be a vibration, with only the (stationary) antinodes being seen, because the 4-D part of the motion is invisible to us. So no "blurring " would be seen. Such 4-D movements would not require the arnoo to physically (in 3-D) pass through other physical (3-D) arnoo.

The 3 quarks hovering over each funnel in Fig. 1.4 above, are one H atom, which is vibrating (due to Zero-Point Energy) to a diametrically opposite funnel where it also appears, creating the appearance of an octahedron for methane. The "flapping wings" model given above is slightly over-simplified, and it would actually be an oscillation or 4-D rotation to a diametrically opposite face of the octahedron. This does not require the proton (H nucleus) to pass through the carbon atom, as explained above, and below:

Zero Point Energy Vibration

Support for a vibratory doubling, involving an oscillation (or a rotation) to & from the 4^{th} spatial dimension, is that all of the left-handed & right-handed (marked as + & - in Fig. 1.5) arnoo in one H triangle were observed to be the mirror-images of the corresponding arnoo in the other: such a chirality reversal would be expected (a 2-D to 3-D analogy is to look at a letter "**R**" on a transparent sheet from above it and then from below it; or, an "**R**" will have a chirality change when rotated, via 3D, to "**Я**"). Or **d** to **b**, explained below:

This needs explanation, using an analogy: Consider a hypothetical 2D being. If a letter **R** on a paper were rotated downwards out of his 2D space and into 3D space below the sheet, and the rotation continued for 180 degrees until it again entered the 2D space of the sheet, it would re-appear there as a letter **Я**, without blurring, as it would be invisible to a hypothetical 2D being while it was rotating in 3D space below the 2D paper. If the rotation then continues, above the sheet, for another 180 degrees, it would re-appear to him in its original position as a letter **R** again. The hypothetical 2D being would see this rotation via (invisible, to him) 3D space, as if it were a vibration in his 2D space. Using this analogy, a rotation into 4-D space and back, would be seen by us as a vibration in our 3-D space, because any rotation via 4D space is invisible to us. This model removes the problem that the simple guitar string analogy, used earlier just for its simplicity, has some blurring between the two static antinodes of the string, whereas B&L reported no blurring of the structures seen.

There is evidence of an oscillation involving such chirality (mirror image) changes: In the 1st and 2nd editions of their book (1908 & 1919), on p. xiii and p.9 respectively, Besant & Leadbeater say, of hydrogen, "*The 6 little bodies are arranged in two sets of 3, forming two triangles that are not interchangeable but are related to each other as object and image*". (The "6 little bodies" are the circles in Fig. 1.5.) (my underlining). See this in the on-line Project Gutenberg version of the 1919 edition, Project Gutenberg HTML version, 7th paragraph of Chapter 2 (given in the references list below, for Besant & Leadbeater).

No "blurring" of the structures is mentioned by B&L, and so it is possible that the transits between these two mirror-image (opposite chirality) triangles is by a rotation via 4D space. This suggestion is made because:
Mulaprakrti (the Higgs Field) does not impede motion of bodies through it, to accord with Newton's First Law of Motion (dv/dt = 0), so either:
(i) mulaprakrti (the Higgs Field) has zero viscosity (suggested by particle physicists, which is very strange); or,
(ii) motion occurs only outside 3D space, by jumps via 4D space (discussed in Fig. 1.6 below).

See Part 2, for drawings of more molecular structures.

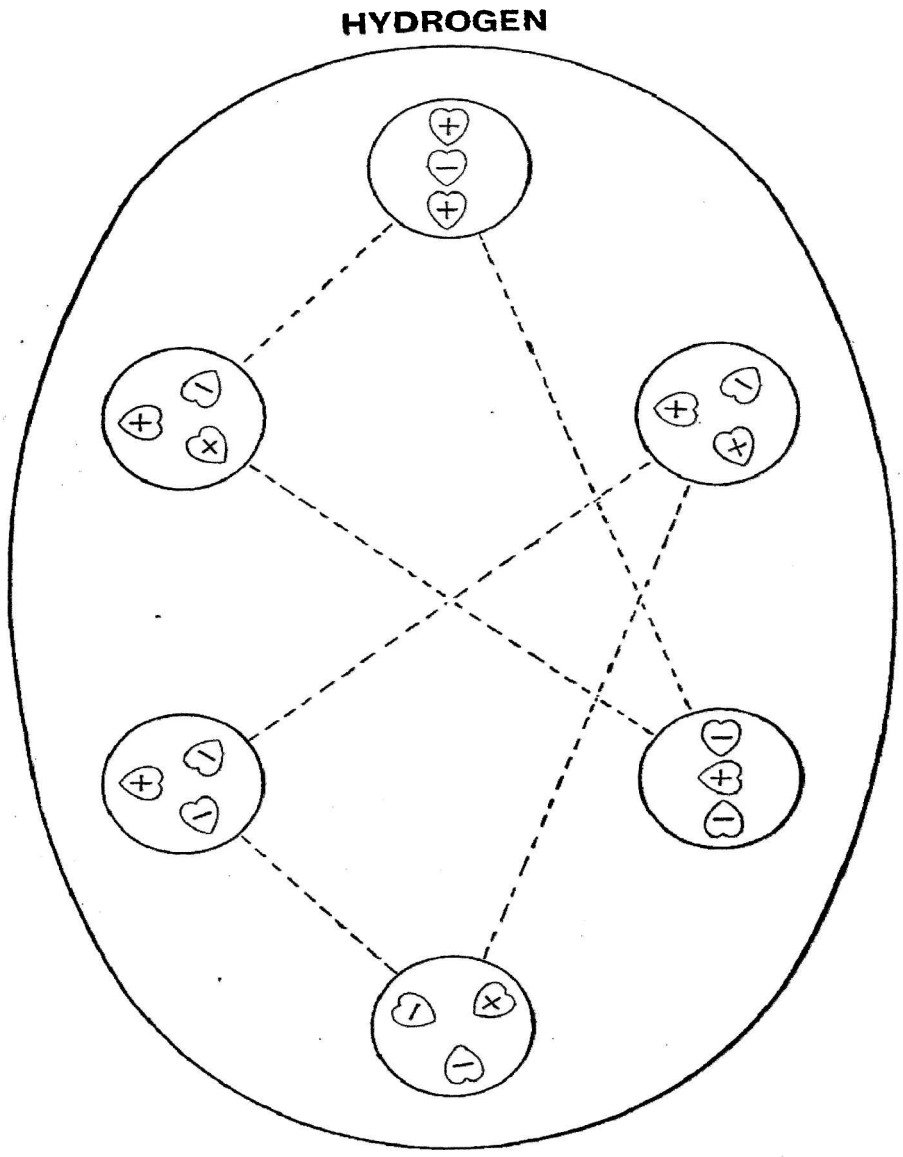


Fig. 1.5. The proton, as observed by Besant & Leadbeater (1895-1951). Only one dotted triangle exists. The illlusion of two is 'created' by its fast rotation/oscillation into 4D space and back, giving the appearance of two triangles. So the proton has 9 arnoo, in 3 quarks (circles in diagram), not 18 arnoo. Originally, the double triangle was incorrectly assumed to be an H atom nucleus (proton). See Fig. 2 in Part 2 for the lines of oscillation {i.e. which quarks (circles) oscillate to those in the other triangle}.
The cardioids in the circles, are arnoo, with chirality shown as "+" and "-". Three arnoo are in each of the 3 quarks (the circles above) in the proton. Further discussion of the micro-chemical observations of Besant & Leadbeater is given in Part 2 of this e-book.. See also the author's website:
http://www.4-D.org.uk Note: If this website cannot be found, it should have been archived by the British Library web archiving service:
http://www.webarchive.org.uk

Summarising:

The unexpected doubling of all B&L's structures, caused their molecules to apparently contain half-atoms, causing their book to be set aside for many decades, but the present author explains this as due to zero point energy vibrations or zitterbewegung. Fig. 1.5 shows the proton as observed, and initially the double triangle was incorrectly assumed to be an H atom nucleus (proton), *apparently* containing 18 arnoo. This meant that all 6 quarks (the circles in Fig. 1.5) were equated (incorrectly) to an H nucleus, and so when only 3 quark (circles) were seen over each "funnel" in methane, in Fig. 1.4 above, that was assumed (incorrectly) by early commentators to be a half H atom.

B&L's picture of a hydrogen atom nucleus or proton, shown in Fig. 1.5, has the appearance of the Seal of Solomon, depending on the angle of view, but is only one triangle, with zero point energy vibration giving the illusion of two.

Further discussion of the apparent doubling problem

There is no need to go to another explanation which has been suggested by Phillips (1977, 1995, 1996), that for some *ad-hoc* reason two nuclei (but not explained why not more than two) had "fused together" when B&L looked at it, so that what they saw, was a double nucleus of what it should be in the absence of their method of vision. There are many reasons why this cannot be so, which are listed in the Appendix 1 of Part 2, e.g. the valence of a rather unstable molecule like acetylene is unlikely to be also preserved as double during such a necessarily very energetic nucleus fusion process.

There is no reason to suppose, as suggested by Phillips (1977, 1996), that reducing the translational (kinetic) motion of an atom or molecule to zero, to observe it, would also reduce its internal ZPE to zero, as this is of a totally different type: non-thermal. Besant & Leadbeater saw only very clear and sharply-detailed structured particles, not like the waves or quantum fuzziness suggested by the Uncertainty Principle of Quantum Mechanics; Hocking (2007) has suggested that the mathematical appearance of waves in the Quantum Theory (Schroedinger's Equation) are actually not waves but the 4-D transits of moving particles: see Fig. 1.6. I.e. if a particle is oscillating between 3-D and 4-D space (as mentioned above), it is not in normal 3-D space during those transits, and this will come out as imaginary in the equation of motion (Schroedinger's Equation). But this imaginary number has then been conventionally "normalised" (squared, in effect), which decision creates a 'real' wave – a wave is a mathematical abstraction only and Hocking (2007) has derived Schroedinger's Equation in 3 lines on the model of a particle oscillating between 3-D and 4-D space (Fig. 1.6). De Broglie described the waves of Quantum Theory as "ondes fictives". No "quantum fluctuations" were reported by B&L.

A suggestion has been made by Phillips (1977, 1996) that Besant & Leadbeater saw every nucleus as doubled because if the velocity of each particle within the

nucleus were reduced to zero ((unlikely, because of ZPE – see above)) then the Uncertainty Principle would cause its position to become so uncertain ("spread out") that there would be the same chance of finding it near as finding it in an adjacent atom's nucleus. ((This seems *ad hoc,* and also ignores the report by B&L (1895-1951) that only a single atom was selected and slowed down for observation.)) A further *ad hoc* suggestion was also made by Phillips (1977, 1996) that the nuclear particle could then interact with particles in a supposed adjacent nucleus to form an entirely new structure, which would thereby be doubled, as it is now two nuclei fused together, and it is this artificial new double-structure which B&L then observed. ((The comments of the author of the present paper, MGH, are in double parentheses above.))

But these suggestions by Phillips ignores why triple or higher structures were never observed, and, if the position of the original particle is widely "spread out", why does it not "go back" to form the highly stable nucleus from which it first came, or why should it go into an adjacent nucleus? A whole series of double nuclei was proposed by Phillips (1977, 1996) as being much more stable than the original stable nuclei which have evolved in stars over millions of years. And this theory requires that no original single nucleus structures at all remained to be seen. There are also many other problems with the "double nuclei" theory of Phillips, which remain unanswered. These are listed in Part 2.

Dobyns (1995) points out that Phillips' notion that the process of observation:
"forced two nuclides to fuse into a highly excited state *for which there is no other positive evidence,* cannot support any theory whatever".
It is: "a speculative notion whose validity has yet to be determined".

This also seems very unlikely to the author (MGH, of the present paper), who prefers the simple oscillation or rotation model suggested earlier above, where an atom or molecule is vibrating incessantly (ZPE) between two antinodes, which creates the appearance (illusion) of a double structure, just like the antinodes of a single guitar string give an illusion of two strings in the form: **()**

The above does not detract from many convincing reasons advanced by Phillips (1977, 1996) for the general veracity of B&L's observations, which is a quite separate issue from the doubling problem.

Symmetries are seen in all the structures reported by B&L, which support the doubling by ZPE oscillation model explained earlier above.

The Uncertainty Principle of Quantum Mechanics

This conventionally says that for a particle, the product of the uncertainties of its velocity and position is a constant, so if the velocity of the ZPE oscillations within a particle is reduced to zero, the uncertainty of the location of the oscillating components becomes infinite. The occurrence of infinities in equations is often taken to mean that there is an error present, or some factor has not been considered. The present author's explanations are as follows:

B&L had to make an atom stationary, to be able to observe it, but if its internal ZPE oscillations were also removed, it would disintegrate (if the velocity of the internal ZPE oscillation is made zero, then the uncertainty of the location of the oscillating components becomes infinite, which means that it decomposes). B&L reported that the atoms they observed did disintegrate, if an attempt were made to divide them (which would stop their ZPE oscillation, essential for their stable existence).

If the fact that the internal ZPE oscillations is ignored, then the Uncertainty Principle seems to indicate that the velocity of an atom cannot be reduced to zero without it decomposing (the uncertainty in its position becomes infinite!). But this problem is not new and it has been explained in conventional quantum physics for a single electron in free space, as a "zitterbewegung" (*Ger.*, trembling), which equates to an internal ZPE.

Hocking (2007) comments that Schroedinger's Equation (containing imaginary terms) is of the same functional form as Fick's Second Law of Diffusion and thus the "diffusivity", D, of a moving elementary particle is imaginary, meaning simply that it does not continuously exist in 3-D space. See Fig. 1.6. Prior to the introduction of 10-D space by quark string theory, the imaginary values of ψ in Schroedinger's Equation embarrassed physicists, who only "believed in" the conventional 3 dimensions, and they thus decided, in effect, to square ψ to force it to be always real and never imaginary, and thereby artificially created "matter waves". They called this process "normalising" ψ and it compelled ψ to conform with the then "world view" of what Nature "should be" (real, with nothing imaginary, no 4th or higher dimensions).

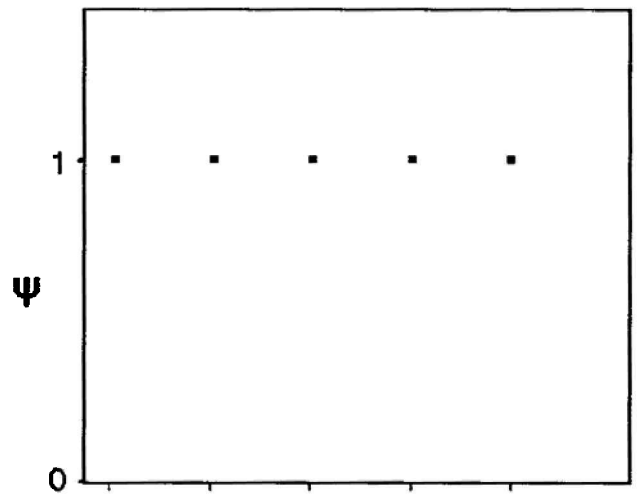


Fig. 1.6. Plot of equation (ii), $\psi = \exp[-2i\pi\{x/\lambda - t\nu\}]$
or equation (iii), $\psi = \exp[-2i\pi\{(xmv/2h) - tE/h\}]$.
$\psi = 1$ whenever the particle has made an integral number of jumps, n (of length λ), which is when its distance travelled = $x = n\lambda$, or when its time of travel = $t = n/\nu$. Equations (ii) & (iii) are well-known solutions of Schroedingers equation.
From: Hocking (2007).

This understandable attitude at that time (that there are no higher dimensions) is very well illustrated by statements in many standard textbooks, which assert that "the particle must be somewhere", to "justify" (in effect) squaring ψ to prevent it from being imaginary (i.e. nowhere in 3-D space)**!** This "normalising" procedure discounts the possibility that it actually could sometimes be nowhere in our 3-D space, if it oscillates or spins in and out of 4-D space. The "normalising" approach artificially creates a real fractional probability (instead of an imaginary one), i.e. a consequential "uncertainty" about whether a particle is really present at any given location (in 3-D space), which creates the notion that particles can somehow exist as waves (instead of particles) and leads to interpreting ψ as a "wave function". But it could actually be an imaginary probability, meaning that the particle is present "somewhere", but that "somewhere" is (momentarily) 4-D space. The mathematics automatically consigns existence in a dimension higher than 3, to an imaginary term.

Possible evidence for motion occurring via 4D jumps, is that the Higgs Field (mulaprakrti) would otherwise require a zero viscosity for the 3D "background" fluid in which all matter exists, to accord with the obvious Newton's First Law of Motion. An alternative to this strange hypothesis is that motion occurs as in Fig. 1.6, i.e. by discrete jumps via 4D space, perhaps equally strange.

The Electron

B&L left the study of electrons incomplete**;** Leadbeater added something about that at the end of their book (1951 edition). But later, Hodson made a more detailed study of electrons**;** see the present author's (MGH's) Preface and Foreword in the remote viewing report by Lyness & Hodson, 1957-9. Hodson viewed what he called a very small "granular" structure at the E1 level (the uppermost part of the "physical plane"), and his further observations indicate that these are electrons. At the boundary between phases (e.g. at the liquid/gas boundary, well known to us), it is possible to observe structures in both phases, so, similarly it should be possible for Hodson to view "astral" (4D space) arnoo as well as also viewing at the E1 physical (3D) level. Hodson reports viewing very large numbers of very small arnoos – far smaller than the normal physical arnoos. B&L report that there are arnoo subjects at every level – see Table 1 above -- which differ in their "order of coiling" (coiled coil, coiled coiled coil, coiled coiled coiled coil, etc, stepping down their dimensionality).

The electron may be the astral arnoo: there are 9 arnoos in a proton and CWL reports that 49 astral arnoos are produced if one physical arnoo is "decomposed" (pushed into the astral), so (very simplistically!), the mass of an astral arnoo is 1/(9x49) of the mass of a proton, which is 1/441 = 0.0023 of the proton mass. This neglects binding energies. The proton atomic weight is about 1 and the electron atomic weight is 0.00054.

Appendix

(1) The authenticated removal of part of a single crystal of vanadium carbide from a sealed glass tube, in laboratory conditions, published in Nature, by Hasted, Bohm, Bastin, O'Regan and Taylor (1975), requires the use of a 4th spatial dimension, just as the removal of an object from inside a 2-D circle (by lifting it out into 3-D) would appear impossible or miraculous to a theoretical inhabitant of a 2-D world (as it requires a transit via a 3-D spatial dimension).

(2) Gell-Mann's "Eightfold Way"

Gell-Mann predicted 8 particles from a symmetrical model, but B&L reported seeing only 1 to 7 arnoo linked with strings of force (quark string bonds) to form composite particles (i.e. never more than 7 types of composite particle). Gell-Mann found 7 particles easily, but the 8th took over a year of searching through thousands of cloud-chamber tracks from a cyclotron, which can explain why B&L did not see it.

(3) Chirality changes {mentioned above, e.g. Targ & Puthoff (1974)} are also discussed in general, by Greene (1968) and Monroe (1977). The mirror-image reversal (chirality reversal) of some test drawings on paper, perceived during remote viewing of them, is published in Nature, by Targ & Puthoff (1974). This suggests that they may have been remote viewed from the other side of the sheet on which they were drawn.

(4) In the 1970s, elementary-particle science drew diagrams of strings with quarks at their ends, like the diagrams published many decades earlier by B&L, but did not mention their book. This may be partly due to the unfortunate title of their book, "Occult Chemistry", because the word "occult" has changed in its meaning since the first edition over a century ago, and today the occult has now become unfortunately associated with evil in horror videos etc. In earlier times "occultation" was used in astronomy for an eclipse. "Occult" simply means "hidden" (*Latin*, occultum).

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The final 1951 edition is available as a free pdf download from the author's website: http://www.4-D.org.uk (will be archived by the British Library) with a preface added by the present author, or, without the preface from: www.hermetics.org/occult.pdf which is an archive website.
But for the fine detail of some diagrams in the 1951 edition, the printed version is necessary (see above).
The earlier 1919 edition only, is available from Project Gutenberg at: http://www.gutenberg.org/files/16058/16058-h/16058-h.htm which has much clearer fine detail in its diagrams in their HTML version than in their EBOOK or MOBI versions.
NOTE: If the author's website becomes unavailable, it should have been archived by the British Library web archiving service: http://www.webarchive.org.uk

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Remote Viewing of Atom & Quark structures Part 2

Summary

The fine internal structure of the atomic nucleus and of elementary particles may never be discovered by instrumental methods, and so are considered to be forever "unknowable". But this e-book describes detailed observations of these structures made by "remote viewing", and reconciles these observations with modern physics. This e-book also considers molecule structures observed by remote viewing. The observations of atoms are discussed in relation to the Periodic Table.

Remote viewing of atoms and molecules was discussed in Part 1. Quark physics was, of course, unknown in 1895 when the remote viewing observations were first published by Babbitt (1878), and Besant & Leadbeater (1895-1951), which is a significant point in favour of serious consideration of these observations: stable quark structures could not have been imagined or fabricated by these observers a century ago.

The explanation given by Phillips (1977, 1978, 1980, 1995, 1996) for the doubling of the observed structures, is a "nuclear fusion" of two of the atoms or molecules under observation, caused by the remote viewing process itself. But this seems an extremely *ad hoc* hypothesis, and it is very unlikely that an unstable molecule like acetylene (say) could undergo the energetics of a nuclear fusion with another acetylene molecule and yet remain un-decomposed.

The purpose of Parts 1 & 2 here, is to give an alternative simple explanation of why all structures were observed by remote viewing as doubled.

Oscillation Model

Parts 1 & 2 propose an oscillation model, for the atoms and molecules observed by Besant and Leadbeater (1895-1951) in their remote viewing investigations. The model proposed here, shows that atomic-size structures can appear to be apparently doubled, because of a zero point energy vibration. The model removes the long-standing problem of half-atoms seeming to be present in the structures observed by remote viewing.

Many authors have shown that present quark theories can be modified to predict 9 smaller ultimate particles in the proton (Phillips (1977, 1978, 1979, 1980, 1996); Terazawa (1980); (some other theories with nine subparticles in a proton which are not mentioned in this review, include those listed next:); Eagles (1980); MacGregor (1974, 1978); Sternglass (1978); Harari (1979); Shupe (1979); Taylor (1979). Besant and Leadbeater (1895-1951) observed apparently 18 arnoo (see Part 1) in a hydrogen nucleus, but ambiguity exists in whether they may have been examining an H atom or an H_2 molecule.

All molecules contain bound atoms, and all atoms contain bound groupings of arnoo (see Part 1). All bound particles, even if brought to translational rest (0ºK), must contain zero point energy, according to the well established quantum theory. This takes the form of a high frequency vibration or harmonic motion, the restoring force being the coulombic and strong nuclear binding forces, but the quark-to-quark "string" bonds are excluded as they are not of a harmonic oscillator type. An analogy is a guitar string or a vibrating metal rod (Fig. 1) which appears to be double, due to the string being repeatedly stationary at each end of its vibration trajectory. In between these extreme positions (antinodes), it is moving too fast to see. Similarly, the number of arnoo seen in atomic and molecular structures would be double the actual number present. The guitar string analogy is not quite appropriate because no blurring is reported in the OC structures observed by Besant & Leadbeater.

There are possible explanations for this.

(i) The arnoo structures may remain at the antinodes for a relatively long time compared with the time spent in transit. Thus the oscillation may be more like a square wave than a sine and the transits are relatively infrequent. They are much faster than a guitar string. There may thus be no visible blurring effect. A mechanical analogy to this is the escapement mechanism in a clock or watch.

(ii) Also, during remote viewing with magnification, the observer's sense of the apprehension of time may be enlarged or contracted to a very great extent, and this may be relevant here.

(iii) But the most likely alternative, is that the transit from one antinode to the other occurs by a rotation in 4D space, a suggestion by Eagles (1981) reported by Hocking (1983, 1984), which is not visible in normal 3D space. It would thus only appear as a vibration in 3D space, with no “blurring”. Evidence for this is discussed in Part 1.

No blurring is reported during the remote viewing observations (unlike for between a plucked guitar string’s stationary antinodes), which is consistent with transit between the antinodes via a 4^{th} spatial dimension. It would seem more like the escapement mechanism in a clock, than vibration of a guitar string. This has been discussed further in Part 1.

Hydrogen

It is desirable that an odd number of arnoo be present in the hydrogen nucleus, to obtain the correct spin of 1/2, although alternative but less satisfactory explanations have been suggested by Hocking (1968) to give spin 1/2.

Phillips (1977, 1978, 1980, 1996) has suggested (*ad hoc)* that the hydrogen structure observed by Besant & Leadbeater (1895-1951) as having 18 arnoo, is two protons fused together, so that the proton then contains 9 arnoo. To preserve consistency (9 arnoo = 1 AMU – atomic mass unit) it is then of course essential to assume that all structures in Besant & Leadbeater’s books (1895-1951) are fused-together forms of pairs of nuclei concerned and Phillips

(1977, 1978, 1980, 1996) gives a theory of atom nucleus fusion to obtain the necessary pair fusions.

However, using the alternative oscillation model outlined above and in Part 1, the observed hydrogen structure is one proton and it contains 9 Arnoo, but which are seen as apparently 18, by analogy with Fig. 1 due to an inevitable "zero point energy". This zero point energy is exactly analogous to the well-known zero point energy of atoms in a crystal lattice, and must occur in any harmonic oscillator type of system.

The oscillations (shown in Fig. 2) involve motion of the entire triangle shape and not individual quarks singly or separately, so an oscillation of the non-harmonic oscillator quark string bonds is not proposed. This also applies in all other cases. Fig. 2 gives the vibration of the one triangle into the other, preserving the separate p' and n' quark types [see Phillips (1977, 1978, 1980, 1996], as required by conservation rules. All arnoo change their chirality (indicated as + & - in Fig. 2) but not their 'colour' at each end of their vibration trajectory (i.e. + becoming -), i.e. they reappear each time their rotation intersects 3D space, as their mirror images, indicating that a rotation is occurring via 4-D space. Put simply, this is analogous to a two-dimensional letter "**d**" rotating to a "**b**" via 3D space.
Note**:** + and - here are used by Besant & Leadbeater to indicate right or left handedness, not charge. This was discussed in Part 1.

The possibility exists of very small transits via 4D space, which is "rolled-up" in normal 3D space. Weinberg (1983) and many others, suggest a multi-dimensional universe but restricting normal access to the higher dimensions, to high energies - i.e. to very short distances. This could make a 4th dimension normally accessible only to fundamental particles.

The spins of the arnoo in the triangles, take the values required by the Pauli Exclusion Principle, and the two triangles in Fig. 2 are equivalent to those given by Phillips (1977, 1978, 1980, 1996) and follow those drawn by Besant and Leadbeater (1895-1951). Simultaneous motion of all apices of one triangle along the arrow lines, moves it to the other position, and vice-versa, like the escapement mechanism in a watch. A 4-D circular motion (rotation) model via 4D space described above could apply.

The triangle of 9 arnoo, which oscillates to give the appearance of two triangles (shown in Fig. 2), is held together by very strong quark string bonds. These bonds, which Phillips (1978a) has pointed out, would not allow harmonic oscillation, and are not stretched or broken during the oscillation of the triangle.

The same applies to the proposed oscillations of discrete quark groupings (e.g., Ad 6) in all the other structures observed by Besant & Leadbeater. Thus harmonic oscillations will be possible for such groupings, since such discrete quark groupings are bonded to other groupings by nuclear and coulombic forces, and not by quark string bonds.

In building up the H_2 molecule from what B&L call two “level E4” spheres [Besant & Leadbeater (1951)] each containing 9 arnoo, each being a proton or H nucleus, one sphere (proton) would immediately fly off to the equilibrium inter-proton distance in the H_2 molecule. Both protons would adopt the oscillating triangle picture shown in Fig. 2 (a single proton). The two protons would be a very long distance apart, on the scale of Fig. 2.

These oscillations represent the irreducible zero point energy of the proton being held "still" for observation: the proton, being bound in the molecule, must possess zero point energy (it cannot be static). Its constituent triangle oscillations would occur in the direction of a line between the two protons. But these oscillations would not represent the zero point energy of the molecule, which must all be contained in another oscillation between the two protons, over a relatively large distance between the two protons. Only the first proton is being held "still" for observation.

Although the term "zero point energy" has been used here in general, it is not rigorously appropriate for a proton being held still for observation, as the Uncertainty Principle requires the product of momentum change and position change to be $h/4\pi$. This means if the momentum change is near zero (proton being held still), the position change is very large (far greater than the twin triangle separation). But the proton is not internally still – its two quark triangles are oscillating (Fig. 2). This difficulty can be overcome by describing the triangle oscillation (giving the appearance of a twin triangle) as a form of zitterbewegung [Marmier & Sheldon (1969) and Phillips (1978a)] which is also a consequence of the Uncertainty Principle. It can be shown [Marmier & Sheldon (1969)] that an electron, for example, cannot be static but has eigenvalues of velocity of + c and -c, which has been interpreted as a rapid oscillatory motion (zitterbewegung).

The separate “E4” spheres observed by Besant & Leadbeater, mentioned above, would also have an internal zero point energy, internal to the proton, as it is a bound state of quarks.

The quarks are bound by the very strong quark string bonds which are not of the harmonic oscillator type, and so negligibly small quark displacements would represent the zero point energy because of the very strong effective strength of the quark string bonds. It may be thought that the same oscillating triangle of the proton bound in the molecule, could not occur in the free atom because it involves a centre of gravity oscillation of the proton which could not occur in a free atom. But if the oscillation were due to a rotation via 4D space, this would not apply.

If the hydrogen structure in Fig. 2 were an atom, then the ovoid around it cannot be taken as its electron shell, as the 1s atomic orbital is well known to be spherical. But the 1s molecular orbital for H_2 is ovoid and the distance between the two protons in H_2 is known to be 100,000 times the proton radius.

This means that if Besant and Leadbeater were observing just one of the protons, as the H double-triangle structure, at the size shown in Fig. 2, then the other H double-triangle of the other proton in the H_2 molecule would be 5 miles (or 8 km) away! Thus it is easy to explain why, from H_2 gas, they selected the structure shown in Fig. 2 as the H atom, and why they "did not observe H atoms to move in pairs". Two copies of Fig. 2 five miles apart would not be seen to move as a pair. If a proton in a molecule were being observed, then the ovoid could be the 1s molecular orbital, assuming that it is vastly larger than the proton. Besant & Leadbeater (1895-1951) emphasise that their diagrams are not to scale.

While observing a proton, the ovoid wall would be several miles away, on the scale mentioned above, and vice-versa. Thus the observers could hardly take in both ovoid and proton at one magnification. This means that although a proton observed in H_2 would be towards one end of the ovoid, it is very unlikely that they would be aware of its position in the ovoid. In this respect the diagram given (Fig. 1.5 in Part 1) for hydrogen centred in its ovoid could be misleading.

Ortho H_2 can be explained as a molecule with hydrogen variety 1 (spin ½) at both ends, which would have a higher entropy according to statistical thermodynamic calculations than the para form which is the stable form at 0ºK (100% p-H2). The para form (least disordered) would be molecules with variety 2 at each end. This also accords with variety 1 being the more commonly observed by Besant & Leadbeater at room temperature (a 3:1 ratio of o:p is experimentally found in physical chemistry). A change in temperature changes the ortho:para ratio, which shows that variety 1 can easily change to 2 and vice-versa. If varieties 1 and 2 are identified with ortho and para H_2, then the chirality change (which is evident in the hydrogen diagram in Fig. 2) for the Arnoo at the 10 o' clock position, must occur readily merely on changing the temperature. This would support the ease of changes of chirality, which is required for the oscillation model (Fig. 2).

Besant and Leadbeater give a structure of two rarely observed crossed ovoids (Fig. 3), produced only during the electrolysis of water, which they thought might be deuterium. Electrolysis produces H atoms [Bockris & Reddy (1970)] which quickly combine to give H_2 molecules. If the scale of the drawing is considerably coarser than that used to draw the proton in Fig. 2, then this structure could show the distorted electron orbitals of H atoms in a 'collision complex', bound temporarily together by the London dispersion forces. It is well known [Sidgwick (1962)] that atomic H gas has a life of about half a second, during which time it undergoes many billions of collisions. It only forms H_2, when an energetic enough collision occurs. This effect is the well-known activation energy factor of chemical kinetics.

The spherical electron shell around each H atom would be squeezed out oval by coulomb repulsion, towards the 4 corners of a tetrahedron, to give the charge distribution shown in Fig. 3. This is a temporary dipole attraction effect and the two would soon separate. H atoms would be very rarely found in H_2 gas from electrolysis and a more likely explanation could be that the crossed

ovoids were a van der Waals coupling of two hydrogen molecules, but if only one pair of H triangles was observed in each, it must be assumed again that the other proton had escaped notice due to the vast size difference between the ovoid electron molecular orbital and the proton, mentioned above.

Adyarium [B&L (1951)] (36 Arnoo observed = 18 actual Arnoo vibrating) can be identified with deuterium. It would be one end of an D_2 or a HD molecule, the other deuterium or H nucleus being very far away, as explained for H_2. The circular shell shown around Adyarium could be a nuclear binding force structure around one deuteron, not an electron shell, or it could be an ovoid seen from a different viewpoint.

Nuclei as harmonic oscillators

For the proposed oscillation model, it is appropriate to note that nuclear structure models based on the nucleus as a harmonic oscillator (Fig. 8) have been fairly successful, some modifications being required for the heavier elements. Fig. 8 shows the Woods-Saxon potential energy curve, which is a widely accepted representation of the nuclear potential energy well, intermediate between a harmonic oscillator and a square well [Bohr & Mottleson (1969) & Irvine (1972)]. Fig. 8 shows only small deviations of the potential energy curve of a proton or neutron, from the ideal harmonic oscillator curve (dotted line). The energy well is analogous to a frictionless wine glass in which a steel ball (nuclear particle) is released against one wall and then perpetually oscillates up and down opposite walls. This is an oscillation of potential and kinetic energies, their sum remaining constant at all times. There is considerable evidence that the mean free path of particles in a nucleus is large, and in many cases larger than the nucleus [Bohr & Mottleson (1969)].

Besant & Leadbeater's observed structures on the oscillation theory

Figs. 4 to 7 & 9 to 11, give some examples of the generation of double the 'expected' numbers of Arnoo in atoms, on the oscillation or vibration theory. The drawings of the asymmetrical "stopped" structures clearly show unstable situations, and the vibration to give the symmetrical stable structures is essential, which could be why zero point energy vibration cannot be removed without disintegrating the atom**:** the Uncertainty Principle for a linear oscillator is $Px' = h/4\pi$ where P is the momentum (mv) change and x' is the position change. If v = 0, then P = 0 and x' becomes infinite, i.e. the molecule disintegrates. A guitar string at its antinode is also an asymmetric unstable state and is stabilized by its transits to the opposite antinode.

(Note: the word "stopped" above and in the figure captions is only meant as a short way of indicating that the structure is seen or shown as instantaneously stopped at one of its antinodes. If a plucked guitar string is examined with a lens, scratches and details on its surface can clearly be seen, at these "stopped" antinodes.) The application of the Uncertainty Principle and the value of the constant $h/4\pi$ given above must be regarded as an assumption, in relation to remote viewing observations.

The stability of the structures, which are all symmetrical, observed by Besant & Leadbeater (1895-1951), have been theoretically verified by Phillips (1977, 1978, 1980, 1996), who assumed that they are double fused nuclei. But the success of Phillips' model stability predictions, could be due instead to these being the stable vibration patterns or 'standing wave' antinodes of a single atom. Zero point energy forbids the holding still of a structure which contains groupings held together by harmonic oscillator type forces.

Some examples of the proposed oscillation theory giving the apparent doubling in the observed structures are given here. Fig. 4 shows the oxygen atom. It is interesting that such planes of symmetry (PS) as that through the central globe of oxygen, exist for all element structures or parts of structures drawn by Besant & Leadbeater (1895-1951).

Note: The structures observed include geometric shapes, like funnels, bars, etc, which are just outlines of the way in which the various groupings of arnoo were observed to be arranged. These geometric shapes are not actual objects themselves.

Lithium (Spike, Groups and 7)**:** There is a PS horizontally through the Li 63 spike and a vertical PS through the Ad6 petal cluster. The 4 Li4 globe is symmetrical about its centre.

Sodium (Dumb bell, Groups 1 and 7)**:** See Na part of Fig. 11. There is a horizontal PS halfway down the rod of this atom. The others in the group are exactly similar. The members of other groups are also exactly similar to the example chosen from their group (unless otherwise stated).

Calcium (Tetrahedron, Groups 2 and 6)**:** See Fig. 5. There is a PS halfway between any two funnels so that with two PS the oscillation of only two funnels through these PS will give the appearance of four. The central globe has a centre point of symmetry so that its groups are similarly halved in their actual number present. If funnels are equated with valency, as Lester Smith and Slater (1954) suggest, then Ca is divalent with two (actual) funnels.

Boron (Cube, Groups 3 and 5)**:** There is a point of symmetry in the cube centre, so that the six funnels radiating out from the face centres can be generated by only 3 funnels oscillating about this centre.

Carbon (Octahedron, Group 4)**:** There are three apparent PS which reduce the eight observed funnels to 4 actual, but as half the observed funnels have 27 arnoo and the other half have 26, there will be only one true PS. See Fig. 10; but for clarity the 4 funnels in each antinode are not shown and must be imagined in the octahedron faces beneath the H or OH. The carbon centre (4 arnoo) is a square (2 actual arnoo).

Iron (and all bars group)**:** The centre of the atom is a point of symmetry about which all the 14 bars oscillate (7 actual bars, numbered 1 to 7 in Fig. 6).
Argon (and all stars group)**:** This is a flat 6-armed star of arnoo, all arms being identical. The centre is a point of symmetry about which all the arms

can oscillate to the ones opposite. So there are only 3 actual arms and half the observed number of apparent arnoo, Fig 7.

Compounds:

Finally some examples of compounds will be given. The oscillation hypothesis removes the difficulty of apparent atom splitting in observed molecular structures. All the structures of compounds given by Besant & Leadbeater can be explained as an oscillation of whole-atom structures, except that five on p. 302-310 in the last (1951) edition have not yet been fully considered as insufficient details of their 3-dimensional structuring are given. These can be explained if assumptions are made about this. Even B&L's NaCl structure can be separated out on the oscillation model, but is complicated and is not shown here.

The molecules, although separated out into whole atoms, appear compressed, due to not drawing them to scale, and perhaps also by the actual remote viewing restraining process, during observation. Further study is needed of the theoretical chemical calculations which can be mode using the structures given, e.g. for benzene the entropy can be calculated and compared with the measured value. Predictions of the numbers of isomers may also be made for comparison with the actual numbers.

The question of the observed molecules being perhaps of atomic and molecular size while the observed atoms are perhaps only of nuclear size, is because the diagrams are not at all drawn to scale, meaning that the nuclei of atoms was the point of interest when drawing atoms, not their electron shell. But for molecules, observed molecules need to be viewed at of the order of atomic sizes. The oscillations would appear to oddly "mix up" parts of the combined atoms in compounds, as observed – see the drawings in Figures 4, 5, 9, 10 & 11.

The trend in all the compounds seems to be that Nature avoids asymmetry - e.g. HCl would be very asymmetric if consisting of a H atom always on one side of a Cl atom in the conventional way. This is avoided if an oscillation similar to that of NaOH (Fig 11) occurs**:** A diagram of the HCl observation is given in Part 1 of this paper. Lack of space precludes inclusion of many other compounds here.

The four dimensional circular motion model (mentioned earlier) can be advantageously applied to molecules -- e.g. in Fig. 11 a rotation of either of the upper drawings about point a in a circle perpendicular to the plane of the paper, will produce the other upper drawing. Hence the lower, observed, molecule structure can be obtained by fast rotation. Similarly, Figs. 9 and 10 (half-structures) if rotated about the centre point of the pyramid bases, will give the "double" structures observed.

NOTE: The figures below are not to scale! Besant & Leadbeater emphasise that this would require**:** "an absurdly small dot on a paper many yards square". The figures below are very abbreviated by the present author, and the full originals should be referred to -- see in Besant & Leadbeater (1951).

Fig. 1. Left: Guitar string, still. Right: Appearance of same string, plucked.

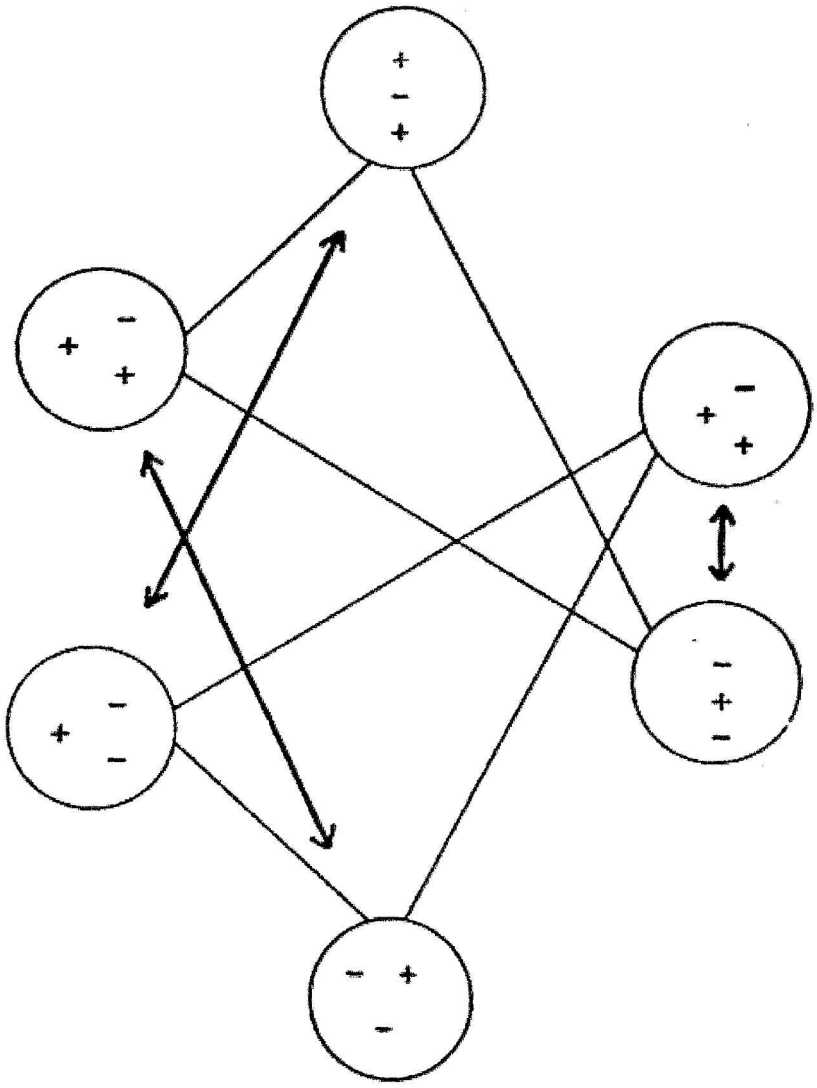

Fig. 2. One proton in H_2 molecule. 18 anoo apparently, but only 9 arnoo actually. Either triangle, its apicies moving simultaneously along arrow lines, converts to the other, changing all chiralities (+ & - are used to indicate chirality here: B&L). Actual movement will be oscillation or rotation from a 3D location and back, via 4D, because all the chiralities change: evidence of 'mirror-image transits' caused by excursions into and out of 4-D space.

Oscillation of + - + linear to triangular may be by a twist or change of viewpoint. The triangles are not in one plane, as drawn here flat.

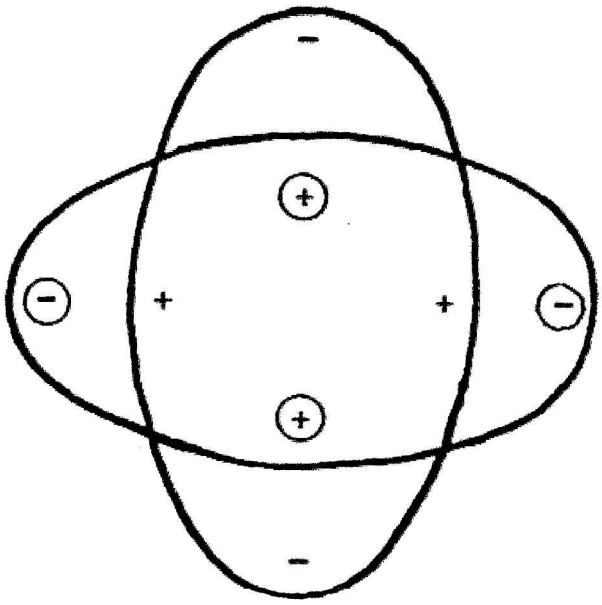

Fig. 3. Possible London Dispersion Force electrostatic bonding of two H atoms.
The circled electrostatic charges are for the top ovoid.
+ indicates parts of the electron shells which are less negative than average.

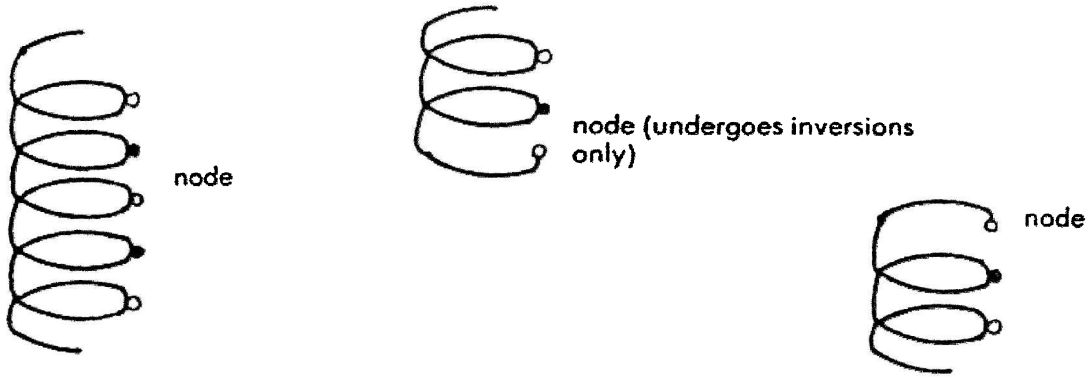

Fig. 4. Oxygen atom, O. But for clarity, only one of the two spirals is shown here. In sketch form, not showing all the arnoo.
LEFT: Observed oxygen atom, apparently 290 arnoo.
CENTRE: Stopped at top of vibration about the centre node. 146 arnoo actual.
RIGHT: Stopped at bottom of vibration about centre node. 146 arnoo actual.

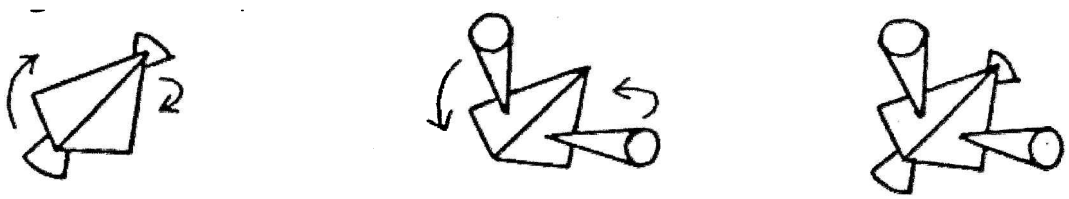

Fig. 5. Calcium, Ca. LEFT: 360 arnoo, actual. CENTRE: 360 arnoo, actual.
RIGHT: 720 arnoo appear to be in observed atom, due to oscillation or rotation of the left & right (actual) structures. Shown in sketch form.

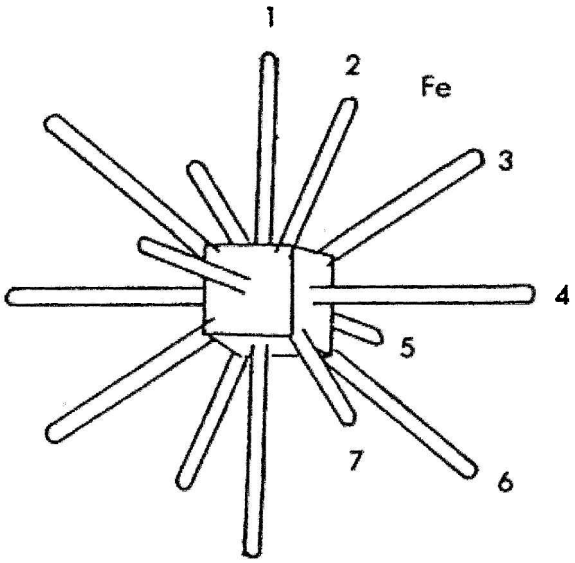

Fig. 6. Fe.

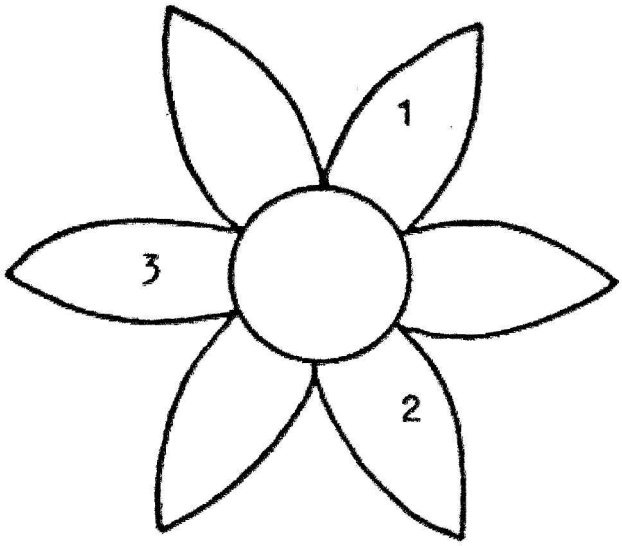

Fig. 7. Ar.

Note: The structures observed include geometric shapes, like funnels, bars, etc, which are just sketch outlines of the way in which the various groupings of arnoo were observed to be arranged. These geometric shapes are not actual objects themselves. See Besant & Leadbeater, third edition (1951).

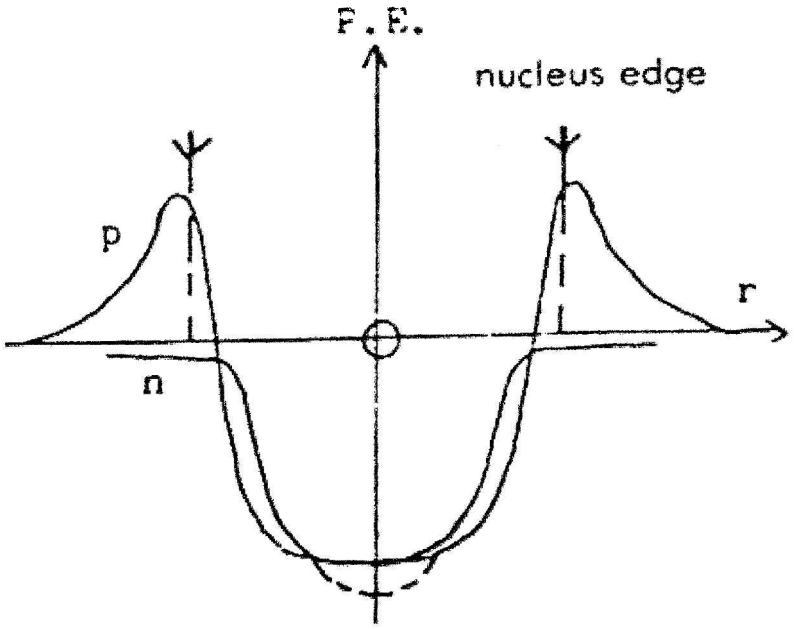

Fig. 8. Potential energy well for proton (p) and neutron (n) in nucleus. Harmonic oscillator parabolic potential energy curves (dotted curve is for an ideal harmonic oscillator).

Fig. 9. SnO. The O atom stands upright from the base of the Sn pyramid of funnels, spikes etc {not shown; see B&L (1951), page 290}; surrounding SnO lattice atoms not shown}. Oscillation between these two antinodes then appears to contain the O atom within the tin, which of course it is not. As with all other diagrams, this is very much not to scale, and is B&L's attempt to show everything on one sheet of paper by grossly distorting distances.

Fig. 10. Methanol, CH_3OH. See B&L (1951) Fig, 196. The three H atoms and one OH group hover tetrahedrally over four C funnels (not shown), in the octahedron, in the above two antinodes. The observed structure is the superposition of these two antinodes (not shown), and so it appears to have double the actual numbers of arnoo. As with all other diagrams, this is not to scale.

Note:

The strange and diverse geometric outlines in these diagrams indicate the arrangement patterns of the various arnoo combinations in atomic nuclei, and these outline shapes (pyramids, etc) are not any kind of objects themselves. The diagrams are not to any kind of scale, and the distances apart of the nuclei of carbon, oxygen and hydrogen in methanol, for example, are vastly greater than the sizes of their nuclei. As already mentioned above:
Besant & Leadbeater emphasise that to draw to scale would require**:**
"an absurdly small dot on a paper many yards square".
The many hundreds of individual arnoos are not shown in the above diagrams, but only the outlines shapes of their disposition. For diagrams showing individual arnoos, see Besant & Leadbeater in the references list.

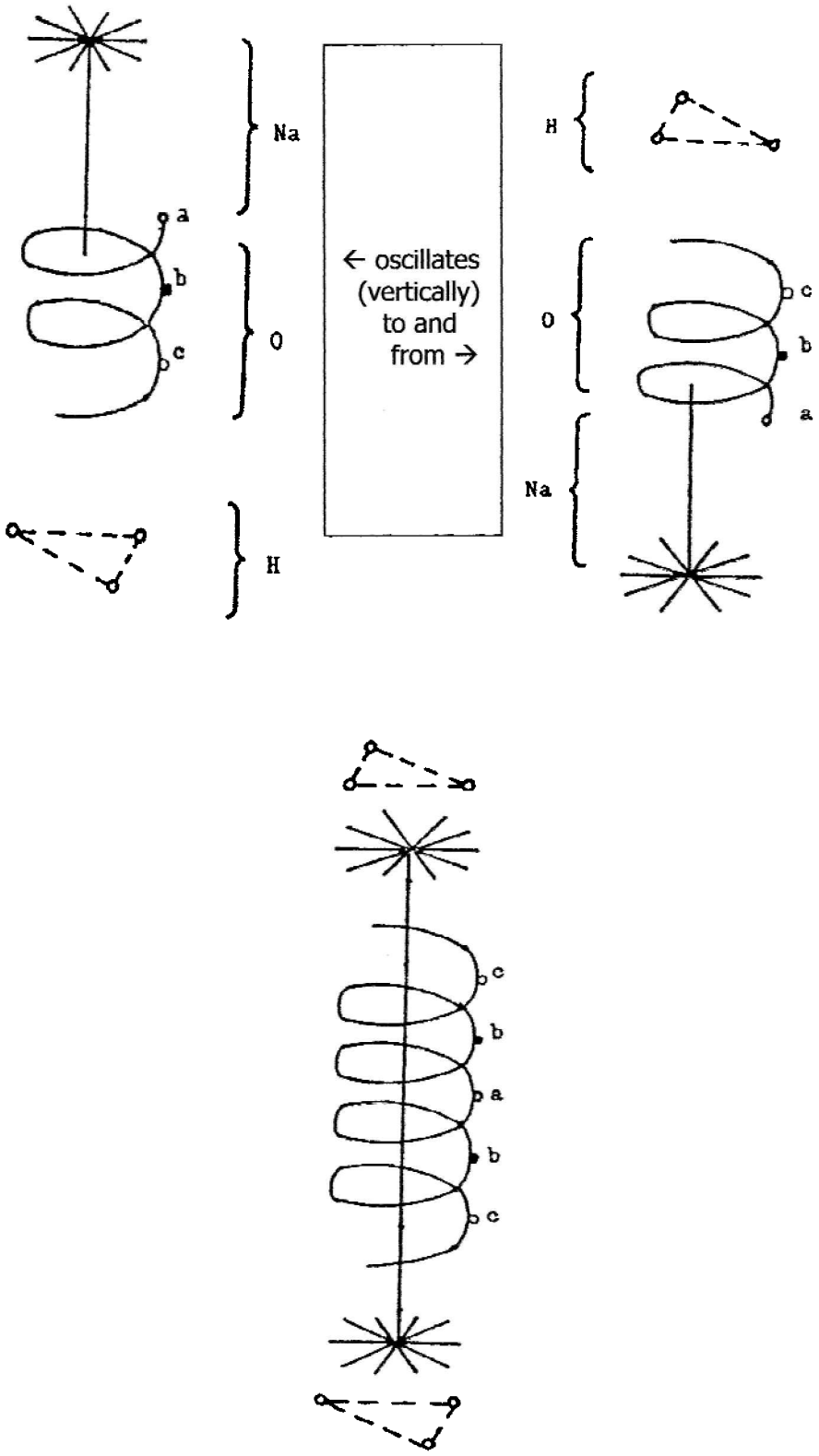

Fig. 11. Sodium hydroxide, NaOH (author's very abbreviated diagram). LEFT: Upper half of the oscillating (or rotating) structure. RIGHT: Lower half. The upper half oscillates vertically into the lower structure, to give the appearance of the full observed structure drawn below these, and thereby apparently having double the correct number of arnoo in it. Shown in sketch form.

Periodic Table considerations

Part 1 described an oscillation model for atoms and molecules observed by remote viewing by Besant and Leadbeater (1895-1951) in their investigations.

The following section is not directly concerned with the oscillation model as such, but seeks to show that the identification of the observed structures with the chemical atom (required by the oscillation model) is compatible with their reported (but below scientifically detectable trace limits in nature, like promethium) elements named Kalon, X, Y, and Z [Besant & Leadbeater (1895-1951)].

The William Crookes Periodic Table is used, as it uniquely allows for filling of both electron shells and nuclear shells.

Kalon: The Crookes Periodic Table [given by Besant & Leadbeater (1908, 1919, 1951)] is a figure 8 spiral with 8 places around each loop, thus allowing for the filling of s and p electron shells (total 8 electrons). Transition metals and inert gases appear at crossover points. The first **d** shell to occur (3d) reaches 8 (along with 4s) at iron, but since 10 electrons fill a **d** shell, two other transition metals (Co & Ni) are placed with Fe in the Crookes table. Then 4s and 4p fill to reach 8 at Kr. The 4d and 5s shells fill to give 8 at Ru (exactly similar to Fe case above). Then 5s and 5p fill to reach 8 at Xe.

The Crookes scheme then requires 5d and 6s to fill, reaching 8 at element X (there is no provision for any f shell filling). After this, 6s and 6p should fill to reach 8 at kalon. This would give kalon a structure having all s, p and d shells filled out to 6p**;** all known inert gases end with a p orbital filled. It is possible that a very few atoms of kalon exist with this structure, as an undiscoverable inert gas (see below). Its electron shell filling order is unlikely but this is offset by its being an otherwise very stable inert gas shell. But from its mass number of 170 it would only have 98 neutrons (72+98=170) which puts it below the neutrons vs protons graph for stable nuclei [graph given by Moore (1962)]. This is consistent with it being reported by Besant & Leadbeater that only one or two kalon atoms are present in a room.

For comparison, the estimated natural abundance of tritium (relative to H) is less than 1 part in 10^{17}; this means that both natural kalon and tritium are undetectable against background by any scientific technique (the tritium abundance is estimated from its known half-life value). 68Er164 has an anomalously high abundance relative to 68Er162 [Burbridge et al (1957)], possibly due to kalon decay. On whether physics could “envisage” any new "elements", the example of muonium could be cited, although of course not an element.

Elements named X, Y & Z [Besant & Leadbeater]: Fig. 12 shows atomic volume vs atomic number, and major volume contractions occur at the transition element groups. There are 18 places between the Fe (26) group and the Ru (44) group; there are 32 places between the Ru (44) group and

the Os (76) group, because the lanthanons intervene (filling the inner 4f shell). Adding 18 on to the Ru group gives 62, 63 and 64 for the atomic numbers of X, Y and Z transition metals (bars group).

These are predicted by the Crookes Periodic Table which is based on a s, p, d electron shell "mainstream" evolution of the elements, and takes no account of the lanthanons 4f shell filling. Fig. 12 shows a gap at the lanthanides, where X, Y and Z might have existed (dotted line). They are a possible "statistically unlikely" (see below) alternative to the lanthanons, and could exist in trace quantities below scientific detection limits. The situation is analogous to structural isomerism in organic chemistry, e.g. $C_4H_{10}O$ can take different structures with totally different properties. There is no indication given by Besant & Leadbeater of where or in what compound the elements X, Y and Z were seen, but Besant & Leadbeater claim remarkable powers of collecting very rare atoms such as polonium.

There is a large anomalous fall in the cosmic abundances [Phillips & Williams (1966)] of elements from mass number 145 to 175, which spans the range where the lanthanons replaced the mainstream evolution of elements which might otherwise have occurred. X, Y and Z could be the results of a suppressed mainstream evolution in parallel with the stabler lanthanons. Only the stablest alternative elements would be expected to exist in competition with the lanthanons, so only X, Y, Z and kalon were found by Besant & Leadbeater.

Since nuclei are evolved (built up from lighter nuclei) in stars having very high interior temperatures which strip off most of the electrons, there is a possibility of following the Crookes mainstream periodic table across where the lanthanons are: the outer electrons are added later in the outer cooler parts of the star and the lanthanon 4f electron shell filling thus occurs only after the nuclei have been made. This supposes that the Crookes table is applicable for the building up of nuclear shells, which could then explain why the atoms (nuclei, really) seen by Besant and Leadbeater have structures of types of nuclei which follow the Crookes periodic table.

This table is perhaps more appropriate for predicting nuclear structures than chemical (electron shells) properties of atoms. It leaves room for X, Y, Z and kalon and explains why the observed lanthanon nuclei are spread across all the chemical groups shapes (dumbell, tetrahedron, etc) observed by Besant & Leadbeater. These groups are dependent on the atomic number (Z) of protons in the nucleus. Major closings of proton shells occur at the magic numbers such as 50 and 82, a semimajor shell closing at 64 and minor nuclear shell closings at 58 and 68 [Bohr & Mottleson (1969)].

Table 1 shows relevant Crookes groups vertically; the values of (Z-n) also shown make this a "nucleus periodic table", as will be explained shortly; n is the magic or semi-major proton shell closing number next below each (Z). Exact agreement is found between successive periods of the table for 13 of the vertical groups (underlined), if subtraction of 1 unit is allowed in 4

consecutive groups (asterisked). This explains why the atoms of the lanthanons observed by Besant & Leadbeater fall into the (nuclear) groups predicted by the Crookes table.

However, there are 4 groups for which no agreement is obtained: Pd-Z-Pt (not lanthanons), Ag-Sm-Au, Cd-Eu-Hg and In-Gd-Tl. The last 3 groups involve the lanthanons immediately following X, Y and Z and the non-agreement could be due to the disturbance to the scheme due to X, Y, and Z. It is curious that if Sm, Eu and Gd had (Z) = 65, 66 and 67, as predicted by Crookes, exact agreement would occur for the Ag-Sm-Au and Cd-Eu-Hg groups.

X, Y and Z have such low abundances that they are undetectable by scientific techniques; they are unstable. Y and Z have higher atomic number to mass ratios than is stable (unlike Rh and Pd). It is significant that X, Y and Z immediately follow 61-Pm (Promethium) which is the only (conventionally known) element (from H to U) which is not detectable in the lithosphere by scientific techniques. Pm follows Nd which has a magic neutron number of 82 in its most abundant mass 142 isotope; but this is similar to Tc following Mo (magic neutron number 50 in abundant 92 mass isotope) and yet Ru, Rh and Pd bars group follow Tc normally.

It is thus suggested that the peculiar lanthanon 4f electron shell filling is incompatible with a bars structure nucleus and that this structure rearranges to give 62Sm147 (from 62X147), 62Sm148 (from 63Yl48 by positron emission, since 63Y148 is on the high side of the stable proton: neutron ratio), and 62Sml50 (from 64Z150, similarly to Y), these Sm isotopes being the stablest available (Eu and Pm have none suitable). It may be significant that the abundances of Sm148 and Sml50 are well above those of other elements formed by neutron capture processes [Burbridge (1957)], suggesting another path for their formation. Present theory on the effect of nucleus shape on nucleus-electron interaction energy predicts an effect too small to affect the stability of 6s or 4f states, but the extremely non-spherical bars type of nucleus may generate additional terms.

The relation of nucleus shape to chemical properties, which is predicted by the characteristic group shapes observed by Besant & Leadbeater and in the Crookes table as shown above, suggests that the addition of one proton to change (say) chlorine into an argon isotope, involves more than just adding 1 proton to 17 others all alike, and calls for some drastic rearrangement such as is shown between the dumbell (Cl) group and star (Ar) group. This effect masks any recognition of the proton added to the 17-Cl when the 18-Ar star is examined. This opens up the tricky question of whether or not protons and neutrons exist as such in nuclei. Beta emission of electrons from nuclei does not mean that nuclei contain electrons, and one must beware of simplistic views, but the position is fairly summed up at a nuclear physics conference as follows:

"The nucleus is composed of neutrons and protons. This statement would be accepted by most people and yet it conceals a great deal of ignorance. . . . To what degree is it proper to picture the nucleus as a collection of neutrons and protons? To what degree are essential changes introduced by the background field in which the nucleons are immersed? These are questions of immense importance that we shall certainly not answer without going inside the nucleus (using. probe beams) and looking at nucleons as individuals - if such they are - ... ." [Wilkinson (1969)]].

TABLE 1

Relation of Crookes Table to **nuclear** shell filling.

(Agreements underlined; brackets mean n is a minor shell closing number)
(Z) is first number under each element; (Z-n) is second number under each element.

Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	Cs	Ba	La
40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7
Ce	Pr	Nd	Pm	X	Y	Z	Sm	Eu	Gd	Tb	Dy	Ho	Er	Ka	Tm	Yb	Lu
58	59	60	61	62	63	64	62	63	64	65	66	67	68	72	69	70	71
8(0)	9(1)	10(2)	11(3)	12(4)	13(5)	0	12(4)	13(5)	O	1*	2*	3*	4*	8(4)	5	6	7
Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	Fr	Ra	Ac
72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
8	9	10	11	12	13	14	15	16	17	0	1	2	3	4	5	6	7

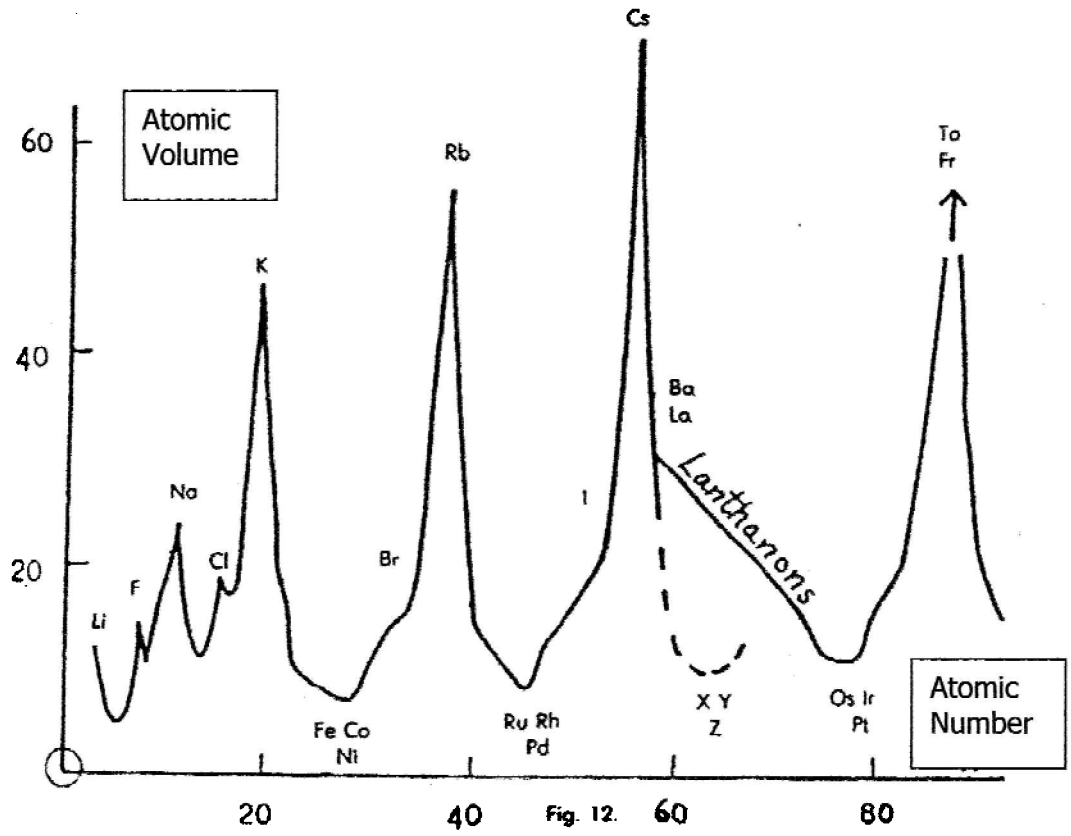

Fig. 12. Graph of Atomic volume (y-axis) vs Atomic Number (x-axis)

Acknowledgements
Thanks are due to Dr. S.M. Phillips and Dr. D.M. Eagles for very helpful correspondence and discussions.

APPENDIX 1

Some difficulties of the double nucleus fusion hypothesis of Phillips (1977, 1978, 1979, 1980, 1996), are given in the questions which follow. None of the questions below, which were listed by Hocking (1983) have been replied to.

Questions on the Phillips nucleus fusion hypothesis:

(1) How could a single free arnoo be observable:
(i) if all structures should only be observed as fused doubles,
(ii) if it is bound to other quarks by a strong quark string bond?

(2) On dissociation to atoms, how can a single H atom, or a proton, be seen on level E-4 [in Besant & Leadbeater's book (1951)]?

(3) A single oxygen spiral (rather than a fused double) was seen by Besant & Leadbeater to go off when ozone decomposed.

(4) If the remote viewer's 'will' causes fusion of two atoms, there should be many occasions when fusions of 3 or more atoms could have been observed. The ternary collision frequency in a gas at 25ºC is 10^{25} per cc per sec; the binary frequency is 10^{28} [Glasstone (1951)]. Even if the remote viewer does not have to rely on such collisions but simply "collects" a few atoms or molecules himself, there is still this problem of why triple and higher fusions are not obtained.

(5) If the Uncertainty Principle perhaps operates to cause fusion by spreading out the wave functions of atoms, why should its application cease after only 2 atoms fuse, i.e. it could be applied over again to the fused di-nucleus, prohibiting it from being observed at rest and requiring *ex hypothesi* a third atom to fuse to it, etc.

(6) If 'occultum' were to be identified as tritium, it could not be observed as a fused di-nucleus since hardly one HT or T atom is present in a large room, meaning that two could not be collected together for Phillips' fusion mechanism. This would mean that tritium could not be observable by remote viewing, using Phillips' fusion mechanism.

(7) Why are protons and neutrons not observable in the structures described? This question applies to both hypotheses, if protons and neutrons are indeed present as such in nuclei, as is the orthodox view.

(8) A doubling or fusion process would have been noticed as the atom was slowed down for observation. But no mass or size change has been reported by Besant & Leadbeater. Single atoms or protons were observed by them on level E-4.

(9) It seems unlikely that the valency funnel structure (and their orientations, giving 2 funnels = 1 valency) could survive a nuclear fusion in which all the protons and neutrons are disintegrated.

(10) It is worth noting that if the triangles of 9 arnoo in Fig. 2 are each a separate proton (or fermion of any kind), as originally suggested by Phillips, there would then be two protons overlapping each other and with the same spin (½). This is forbidden by the Exclusion Principle. If the spins are opposite (as originally in Phillips' hydrogen variety 2 double nucleus) the pair of protons would have insufficient binding energy. These are reasons why a pair of protons is not a known bound state [Feynman et al, 1966)]. The hypothesis of Phillips has been changed, avoiding this problem.

(11) The very strong quark string bonds which bind protons (and neutrons) would have to break during the fusion process, since protons and neutrons are not evident in the atoms observed by Besant & Leadbeater (except for

hydrogen). In the 'compound nucleus' of high energy nuclear physics, the neutrons and protons are still intact, suggesting that the energy required to break quark string bonds is very high.

(12) It is unnecessary to postulate a fusion of two atoms to satisfy the Uncertainty Principle. The vibratory motion of the internal parts (quarks or arnoo) of an atom could satisfy that principle, the atom being at translational rest. This is true for atoms in solids, liquids and gases (i.e. equally true for iron and for argon). Phillips' static postulated ESP-observed atoms violate the Uncertainty Principle.

(13) If nuclear fusion of two <u>different</u> atoms explains the unidentified elements X, Y, Z and kalon, then this type of fusion should have generated more than just these few examples.

(14) It is inconsistent (or, at least, just too 'convenient') to say that the observer inhibits the Meissner Effect between the quarks which make up the nucleons, but not later that between the quarks of the observed atoms! How could the supposedly released quarks join again to form the observed atoms if the Meissner Effect is inhibited by the observer (i.e. by Besant and Leadbeater)?

(15) Chemical bonds are likely to be broken during the observed molecules' nuclei fusion process [Phillips hypothesis], there would be irreversible decomposition to products like CO_2 and steam, or pyrolysis, with unstable organic compounds. There would be no chance of preserving organic compound structures during the high energy processes of the double molecules' formation required by Phillips' model. E.g. for hydrogen nuclei fusing, enough energy from this would be fed to chemical bonds to break them. It would be incredibly unlikely that molecules like acetylene and ether would survive with their (doubled) valency structures. The chemistry involved has been overlooked.

(16) Eagles (1981) pointed out an important difficulty in Phillips' theory concerning the valence structure of the tetrahedral, cubic and octahedral funnel structures observed in di-, tri- and quadrivalent structures. If the postulated fused compound nucleus is seen by the valence electrons as a single charged entity, then we would not expect the n valence electrons for a single atom to become 2n for a fused compound nucleus. Instead, we would expect the same number of valence electrons as there would be for an atom of twice the atomic number of the original atom, which (except in special cases) will not have 2n valence electrons.

<u>Additional</u>: Phillips (1995) has published his *ad hoc* nucleus fusion theory but the paper's referee Dobyns (1995), published a rebuttal of it in great detail in the same journal issue.

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with a preface added by the present author, or, without the preface from:
www.hermetics.org/occult.pdf
For the fine detail of some diagrams in the 1951 edition, the printed version is necessary (see above).
The earlier 1919 edition is available from Project Gutenberg at:
http://www.gutenberg.org/files/16058/16058-h/16058-h.htm which has much clearer fine detail in its diagrams in their HTML version than in their EBOOK or MOBI versions.
NOTE: If the author's website becomes unavailable, it should have been archived by the British Library web archiving service:
http://www.webarchive.org.uk

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"Clairvoyant Investigations of atoms & molecules by Geoffrey Hodson and David Lyness, 1957-1959", Edited by M.G. Hocking, Professor of Materials Chemistry, University of London. Probable ISBN: 978095210990783

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APPENDIX H1: Possible method to develop for Remote Viewing:

This is the title page of a (free) e-book by Hocking (2016):

Exploring the Sub-conscious using New Technology

Third enlarged edition (with 137 references + bibliography)

M.G. Hocking
Professor of Materials Chemistry, University of London

ISBN 9780952109938 **UDC** 200:159.96 **BIC** VXM, HRA

"... After using the electronic device for 10 minutes, I was very surprised to suddenly see a dark ghostly forest of trees, in twilight, moving slowly across my field of vision. The trees were in sharp focus, vivid and highly stereoscopic, not like a flat picture, and they maintained their correct relative perspectives as they slowly passed from right to left, which made me feel exactly that I was present in that forest. My eyes were closed, but I was fully wide awake ... ." *The Author, see Chapter A(ii)*

"I found myself within a forest dark ... I cannot well repeat how I entered, so full was I of slumber at the moment ... . But still we were passing onward through the forest, the forest, say I, of thick crowded ghosts." *Dante (1300)*

"... in the forest of the night ..." *William Blake (~ 1800)*

"When I took ayahuasca, which contains N,N-dimethyl tryptamine (DMT), I saw a dense Amazonian forest just outside my window, instead of the normal suburban view outside!"

A taker of DMT (2012) [NOT the present author!]

Note: The natural brain neurotransmitter serotonin is closely related to the DMT molecule, and it can be converted into DMT by the pineal gland when suitably stimulated. The pineal gland is connected, although circuitously, to the brain's optical system.

C.S. Lewis (*The Lion, the Witch and the Wardrobe)* wrote that at the back of the wardrobe, the entrance to Narnia was just beyond some trees there. This, written as fiction, may have been an induced vision which he himself had experienced?
In an actual wardrobe, CO_2 narcosis, known to submariners, would occur. Very unwise! See "Mechanism" section in Chapter A(ii).

"Who looks outside, dreams,
Who looks inside, awakens" *CG. Jung (Also, cf. Gurdjieff and Ouspensky)*

APPENDIX B: Binding Energy.

Atoms:
Conventionally, nuclear binding energy is the energy needed to disassemble or dissociate the nucleus of an atom into its component parts, protons and neutrons.

The nucleus of an atom is stabler than its disassembled constituents and this energy difference appears as the mass of the nucleus being slightly less than the mass of the individual neutrons and protons: Energy and mass are equivalent, as shown by Einstein's famous equation, $E = mc^2$.

The mass difference is called the "mass defect", and this amount of mass represents the "binding energy" of the nucleus, via Einstein's Equation.

Elementary particles:
Binding energy also applies to sub-atomic particles. Consider Fig. 1.5 (page 22) or Fig. 2 (page 39) for the H atom nucleus (i.e. the proton):

Each of the 3 quarks in the proton, is stabler than the 3 anoos which B&L report as constituting it. So, if one of these 3 quarks were to be broken up into the 3 arnoos in it (see Fig. 1.5 or Fig. 2), a large energy would be required, obtainable, for example, from a collision such as two high speed particles colliding head-on in the CERN Hadron particle collider. This energy would then be observed as mass, in each of the 3 resulting single arnoos released. But because no such event has been observed in the CERN Hadron collider, the energy required must be beyond the maximum available in the collider, which means that a single individual arnoo must be a very massive particle (equivalent to an extremely high binding energy).

This reasoning is similar to the mass of the Higgs boson being high, at 125 GeV, when it was produced in the collider in 2013 (125 GeV is roughly an "atomic weight" of 125 on the atomic weight scale; cf. the atomic weight of an Sn nucleus, tin, at 119; "atomic mass" or AMU is the preferred term, to be accurate). This is explained below:

The CERN Hadron collider can produce collisions with maximum energy about 14 TeV (= 14,000 GeV). In 2013, a particle of mass 125 GeV was discovered. The available energy of collisions available at CERN may be increased in the future. If there is an extremely high binding energy of the 3 arnoos reported to constitute each of the 3 sub-quarks in a proton, then much higher energies then 125 GeV may be required to produce an individual single arnoo or to split it out of a proton's sub-quark.

The classical "atomic weight" scale, where the atomic weight of an H atom is about 1, puts the atomic weight of H or a proton as about 1 GeV (using Einstein's mass-to- energy conversion equation above). So (over-simplistically), a collision with an energy of 14,000 GeV (available in the CERN Hadron collider), could in theory produce a particle of atomic weight 14,000, if there were no losses etc. In practice, a much higher collision energy would be needed, from a hadron collider vastly larger than the one at CERN, to produce a single arnoo.

Comments: If the 3 arnoos reported by B&L to constitute a proton's sub-quark, were easily released from it, this would mean that the proton would be too vulnerable to adventitious energy input events (e.g. collisions, cosmic rays, etc).
To avoid this, the three sub-quark arnoos need to be extremely stable, with a very high binding energy, to prevent their unwanted disassembly into their constituent arnoos. Otherwise, high energy events could make protons unstable, which could prevent stars from existing, and from evolving chemical elements (stars contain protons, which aggregate to form the nuclei of the 92 heavier elements).

If a universe has ultimate particles (like arnoos) which could not aggregate stably into sub-quarks etc, then life (which depends on the chemical elements) would not exist. But, if time is infinite, another universe with different types of particles (e.g. arnoos) which can stably aggregate to build up chemical elements, is eventually certain to occur! Probably, this is the type of universe in which we now find ourselves!

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APPENDIX H2

Journal of Scientific Exploration 21 (1), 13-26 (2007)

Linking String and Membrane theory to Quantum Mechanics and Special Relativity equations, avoiding any Special Relativity assumptions

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Abstract

M-brane quark string theory and the Supergravity theory require 10 spatial dimensions. But if dimensions greater than 3 do exist, this must have important effects in other branches of physics, as quark theory cannot be compartmentalised-off. This paper shows how the concept of multi-dimensional space, essential to explain particle physics phenomena, removes conflicts between quantum theory and relativity. This leads, extremely simply, to both Schroedinger's Equation and to the Special Relativity equations in terms of absolute motion instead of assuming the two Principles of Relativity. The origin of the Big Bang provides an absolute spatial reference frame.

Keywords: Schroedinger, relativity, M-brane, supergravity, particle physics, multiple dimensions.

Introduction

String theory and M-brane theory predict 10 or 11 dimensions but suggest that 7 spatial dimensions are coiled up to a very small diameter so that we only perceive the remaining 3. If it is assumed that the extreme temperature of the Big Bang prevented any complexity of structure, then it is likely that at the beginning there was no coiling and so matter initially was in 10 dimensional space. As temperatures dropped, structuring became possible and on this model matter then evolved into the lower dimensions. In this case, ordinary 3 dimensional matter is formed by an energy entering from the next higher 4^{th} dimensional space. This model leads to the equations of quantum mechanics and Special Relativity in 2 lines but without requiring either of the two Relativity Principles.

About 96% of the matter in the universe is described as "missing", meaning missing from 3-D space, but this could be because it is distributed among the higher 7 dimensions, which gravity can access but not photons, electrons etc, so it would be apparent only from gravity measurements and be missing from all other observations.

Schroedinger's Equation $d\psi/dt = (hi/4\pi m)\,[d^2\psi/dx^2]$ is functionally exactly like Fick's 2nd Law of Diffusion $dC/dt = (\text{const.})\,[d^2C/dx^2]$, if C (concentration of a diffusate) is replaced by ψ. This comparison suggests the following simple model**:**

A hypothesis of Dirac (1962) is that an electron resembles a bubble, rather than a point of matter, and this idea also accords with current membrane theories of space. "An atom is a hole with a tenuous envelope around it" - Schroedinger. This is supported by other indications that space is not "empty" but is filled with a continuous all-pervading background medium (Besant & Leadbeater, 1994), in which bubble-like particles move. Their movement through such a "space" (even in a vacuum) must then be by a diffusion process and hence Fick's Laws of Diffusion would be expected to apply, and in fact Fick's Law does appear, in the form of Schroedinger's Equation which is Fick's Second Law of Diffusion but with an imaginary diffusion coefficient. 3-D matter in space would then be bubbles in the continuous medium of space, inflated by containing an energy of creation (rest mass) welling up from 4-D space as mentioned above.

Schroedinger's Equation

Individual pollen grains in air diffuse jerkily due to molecular kinetic motion. Their diffusion follows Fick's Second Law of diffusion, $dC/dt = D(d^2C/dx^2)$. But there is no wavelike effect at all in the microscopically-observed diffusive jumps. Fick's Equation (1855) is <u>exactly</u> similar to Schroedinger's Equation (written 70 years later) which describes the motion of an elementary particle through free space, except that the "diffusion constant, D" becomes imaginary. Nature may be trying to tell us something here.

Fig.1 shows a solution of Schoedinger's Equation for the motion of an elementary particle in free space and ψ is imaginary in between the points on the trajectory where ψ = 1. This is like diffusive jumps but where the particle is imaginary during its jump. An obvious interpretation of this imaginary feature is that the particle may perform its diffusion jumps via a hidden dimension, the 4th dimension, in which it is momentarily absent from 3-D space and hence is "imaginary" during its jumps. This is an interpretation of Schroedinger's Equation. In earlier years, before the advent of M-brane quark string theory, which requires multi-dimensional space, many standard textbooks avoided this problem by an (unjustified) assertion that "the particle must be somewhere" at all times and they then (in effect) square ψ to prevent it from being imaginary (nowhere in 3-D space).

Pursuing the analogy between Fick's Law of Diffusion and Schrodinger's Equation, assume that elementary particles move in a similar way as diffusive jumps, but at their size, comparable to a 4th dimension's coiling-up size, there is some accessibility to a 4th spatial dimension (thus appearing to us as a "quantum mechanical tunnelling"). An ad-hoc assumption of diffusive jumps into 4-D is not required if the Zero-Point energy oscillations routinely involve

very frequent regular excursions into 4-D where motion is not restricted by the 3-D background medium - a continuous medium would trap bubbles (see Dirac's hypothesis mentioned above) static in 3-D, like tiny air bubbles are trapped static in a block of ice (discussed later).

It would be strange if the existence of higher spatial dimensions required by string and membrane theories had no effect at all on fundamental physical processes such as atomic-scale motion.

So here now is a 3-line derivation of the Schroedinger Equation for motion in "free space" of an atomic size particle, which does not require any kind of wave:

A remarkable equation in pure mathematics (Euler's Equation) is:

$\exp[-2i\pi] = 1$ .....(i),

Write: $\exp[-2i\pi\{x/\lambda - t\nu\}] = \psi$ .....(ii),

so that whenever the item in { } brackets is an integer, then
$\psi = 1$, but ψ otherwise contains an imaginary component.
Ψ is not a wave (in 3-D space): see Fig. 1.

The choice of $x/\lambda - t\nu$ for the term in {} brackets is explained as follows:

x is the distance of a moving elementary particle along a free-space trajectory and t is its time along that trajectory.
λ is the jump distance of the particle along its trajectory and ν is its jumping frequency - a diffusion-type model. So x/λ is an integer if the distance x is a whole multiple of λ. $t\nu$ is the number of jumps in time t.

Whenever x/λ and $t\nu$ are both integers, the particle is at a jump halt and is considered to be "present" (here in 3-D), but otherwise it is in transit and is considered to be in a higher (4^{th}) spatial dimension and thus not present (imaginary) in our 3-D world.

The difference of two integers is also an integer, so they can be conveniently combined as in Equation (ii) above, to represent travel through both space and time. Fig. 1 plots this equation, showing ψ is unity where and when x and t both correspond to an integer number of jumps, but ψ contains an imaginary component elsewhere as required on the above model.

Finally, apply De Broglie's Equation to the x/λ term,
and Planck's Equation to the $t\nu$ term, to get:

$\exp[-2i\pi\{xmv/2h - tE/h\}] = \psi$ ……(iii), which is a well-known solution of

Schroedinger's Equation, where E is kinetic energy only:
Schroedinger's time equation is $d\psi/dt = (hi/4\pi m)\,[d^2\psi/dx^2]$.

Cf Fick's Second Law: $dC/dt = D[d^2C/dx^2]$, derived 70 years earlier.

As mentioned above, diffusion of pollen grains, or of ions jumping through a lattice, have no wavelike character, so Schroedinger's Equation need not have, either.

Schroedinger's Equation gives correct results for atomic-scale phenomena and so must form a part of any valid theory of Nature.

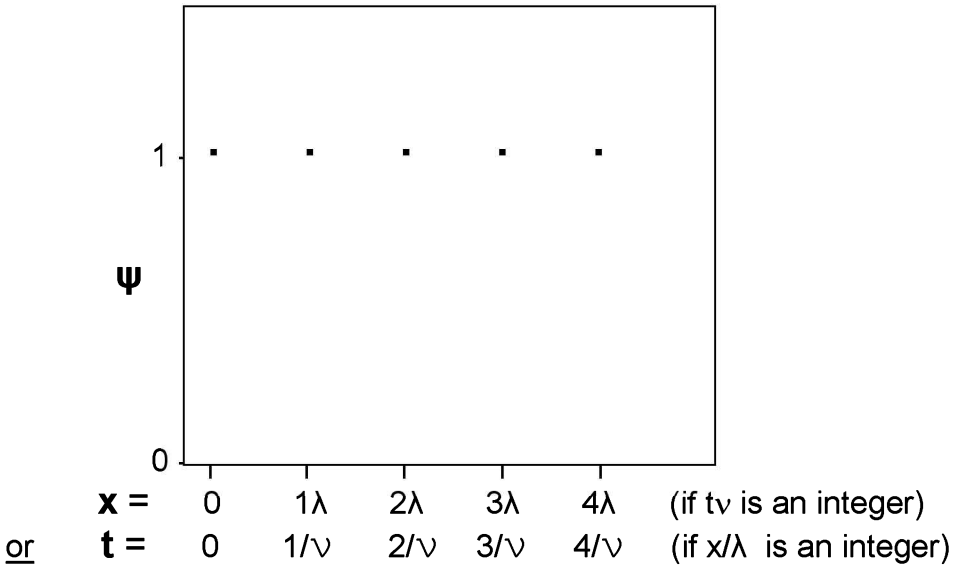

Fig. 1. Plot of equation (ii), $\psi = \exp[-2i\pi\{x/\lambda - t\nu\}]$
or equation (iii), $\psi = \exp[-2i\pi\{(xmv/2h) - tE/h\}]$

$\psi = 1$ whenever the particle has made an integral number of jumps, n (of length λ), which is when its distance travelled = $x = n\lambda$, or when its time of travel = $t = n/\nu$.

No Wave Function:

Thus the "diffusivity", D, of a moving elementary particle is imaginary, meaning simply that it does not continuously exist in 3-D space. Prior to the introduction of 10-D space by quark string theory, the imaginary values of ψ embarrassed physicists, who only considered 3 dimensions and thus decided in effect to square ψ to force it to be real and thereby artificially created "matter waves". They called this process "normalising" ψ and it compelled ψ to conform with the then "world view" of what Nature was felt to be. This understandable attitude at that time (that there are no higher dimensions) is very well illustrated by many standard textbooks which assert that "the particle must be somewhere", to "justify" effectively squaring ψ to prevent it from being imaginary (nowhere in 3-D space)**!** This procedure discounts the possibility that it actually could sometimes be nowhere in our 3-D space, if it oscillates or

spins in and out of 4-D space. This "normalising" approach artificially creates a fractional probability (i.e. an uncertainty) that a particle is present at any given location, which creates the notion that particles can somehow exist as waves and leads to interpreting ψ as a "wave function". But De Broglie intuitively said that "matter waves" are "ondes fictives".

The following assertions are cited from classic texts which pre-date quark string theory and are based on the then "world view" of Nature. In considering these, a remark by Huxley should be recalled**:**

"Nature is not only stranger than we have thought,
*It is stranger than we can think**!**"*

Moelwyn-Hughes (1961) asserts, "the particle must be somewhere".
Margenau & Murphy (1961) remark, "if initially there was a certainty of finding a particle somewhere in space, there might later be uncertainty, this is a situation which would clearly be physically untenable".
Cottrell (1960) asserts, "… the chance of finding the free electron somewhere in the metal must be unity".
Moore (1962) remarks, "ψ must be finite and continuous for all physically possible values of x. The requirement of continuity is helpful in the selection of physical reasonable solutions for the wave equation".
They then all (in effect) use ψ^2 to ensure that this view prevails and discard ψ.

Margenau & Murphy (1961) grumble that a function like equation (ii) above, which, when plotted, is a series of horizontal points separated by imaginary gaps, "is a monstrosity"**!** It is shown in Fig.1. But it comes directly from Euler's Equation, whose equations (18th century) are also used in modern quark string theory.

Feynman (1966) avoids being so blunt, but instead asserts, "*We want* a function to be zero everywhere but at a point". But he admits, "there is no mathematical function which will do this**!**" (his **!** mark). But instead of accepting this strong hint from Nature not to do it (you can lead a horse to water but you cannot make it drink!), the unnatural step is then customarily taken of artificially *defining* such a made-up function, called the Dirac delta function.

Schroedinger (1926) with some insight said, "One may be tempted to associate ψ with a vibrational process in the atom, a process possibly more real than electronic …" and "The ψ function itself cannot and may not in general be interpreted directly in terms of 3-D space - because it is in general a function in configuration space and not in real space". Before the advent of 10-D quark string theory, "configurational space" was the only term that could be used.

Quantum-Mechanical Tunnelling

"Quantum mechanical tunnelling" (well named) then becomes the ability of an elementary particle to pass in a non-3D-material form, from one 3D location to another without moving through any of the three 3D dimensions - i.e. via a "worm-hole" in 3-D (but without any Relativity connotations - its motion is absolute – see below). There is no need for a “wave-nature” explanation for quantum mechanical tunnelling.

In diffusion through oxide layers for example, quantum mechanical tunnelling allows electrons to reach the outer surface of the thin highly insulating oxide film on aluminium and thus creates a billion volts/metre field, which then drives further oxidation unless prevented (Moussa & Hocking, 2001). These electrons cannot have reached the outer surface of the alumina layer by moving through the alumina, as there is no electronic conductivity.

Special Relativity Equations derived assuming absolute motion:

Rest Mass; Length and Time Dilation; $E = mc^2$

On the basis of the “Big Bang” theory with its residual microwave radiation, it is concluded that there is an absolute reference point of origin (the “Big Bang” site) in space. This negates the First Principle of Special Relativity, which denies an absolute reference point in space. A Big Bang point of origin in 3-D space would also be accessible in higher dimensional spaces.

Although Special Relativity is an idealisation for gravity-free space, and so strictly does not apply to the Big Bang universe, it is nevertheless widely used in practice in physics and should not thus be “sheltered” from the existence of a point of origin of the Big Bang. To ingeniously avoid the problem (for relativity) of having a central reference point, the analogy is sometimes given of the universe being like a balloon being inflated, starting at a point (Big Bang origin), but later when large (when the universe had expanded) anyone anywhere on the surface of the balloon would think his location was the original centre. But if space pre-existed the Big Bang, this balloon model would be wrong. Who can say?

A two-line derivation is given below, of the mass, time and length dilation formulae of Special Relativity but without assuming any relativity.

2-D space is not viable for the existence of life forms because the complexity required for brain interconnections, digestive tracts, etc requires 3-D. Simple calculations show that electron orbitals in atoms would not be stable for dimensions higher than 3, which makes only 3-D space uniquely suitable for life:

The electrostatic force falls off as the inverse square of distance in 3-D but it would fall off as the inverse cube in 4-D space (it would then be too weak to bind electrons to their atoms). The inverse square arises

simply because a given flux through unit element of area on the surface of a 3-D sphere is spread out in proportion to the square of the radius, as the area of a 3-D sphere is $4\pi r^2$, but the volume of the 4-D analogue of a sphere is proportional to r^3. (Cf the perimeter of a circle is proportional to r, for a 2-D case.)

A 3-D elementary particle and derived particles like atoms and molecules cannot make up a 4-D object, because they have no extension in the direction of a 4th spatial dimension. So they (and any larger body they constitute) are thus confined to 3-D space only and so cannot enter 4-D space, with the one very localised exception described in the section on Rest Mass below, as part of a very small amplitude oscillation. For a larger scale excursion into a 4th or higher dimensions, the 7 orders of coiling-up of the 7 higher dimensions in 3-D particles must be reduced by 1 order, each time the next higher dimension is reached.

Rest Mass

In 3-D space, elementary particles which constitute molecules, etc, are proposed in the Introduction above as being like gas bubbles in a continuous medium (Dirac, 1962; Besant & Leadbeater, 1994). However, a continuous medium cannot be described as a "fluid" because a fluid is able to flow and to thus permit particles to move through it due to mobile atomic-size "holes" in it (in the conventional well-known “hole theory” of fluid flow). E.g. a solid metal does not flow - its viscosity is extremely large, but in the liquid state metals contain a large proportion (about 10%) of “holes”, which confers a very low viscosity to them and they then flow very easily.

An analogy is the common observation of a solid block of ice which has a few tiny bubbles of air trapped in it - these bubbles are "locked up solid" and cannot move at all.

Thus it is proposed that 3-D elementary particles (bubbles) in the continuous background medium can only have a zero velocity in it. Actual physical movement which is of course commonly observed in 3-D space can then be postulated as occurring by the following mechanism, which is necessarily similar to diffusion (being movement through a medium). This accords with the identical functional forms of Fick’s Second Law of Diffusion and Schroedinger’s Equation**:**

If 3-D space consists of a 3-dimensional continuous background medium (Besant & Leadbeater, 1994) as explained above (Cf. air bubbles in block of ice model) an elementary particle (bubble) would be unable to move in any of the 3-dimensional directions. But if it were able to jump out as part of an oscillation into a higher spatial dimension where there is no such continuous medium, it could then move and then land back in the 3-D space medium in a different place.

An elementary particle might be rotating and vibrating continuously (even if at rest in 3-dimensional space) in a path which takes it continuously in and out of the fourth dimension (an effect similar to zitterbewegung). "Zero-Point Energy" means that even at zero degrees Kelvin "rest", a particle is still oscillating incessantly (called "zitterbewegung", *Ger.* "trembling"). If the energy (welling up from a 4^{th} spatial dimension) creating the 3-D bubble, has a characteristic velocity of **c**, then an observed average velocity v through the 3-dimensional medium would consist of periods at zero velocity in 3-D (due to its very large viscosity) alternating with jumps at velocity **c** in 4-D. A characteristic velocity of **c** is not extraordinary - e.g. a photon in free space has only got this one velocity, **c**, the velocity of light.

Jumps into the next higher dimension would only be possible for elementary particles as the amplitude of an excursion into 4-D space would be limited to the very small diameter of the coiled-up 4^{th} dimension for 3-D particles, and not available to large bodies, and it is called "quantum mechanical tunnelling" in physics but not yet interpreted as involving jumps into 4-D space. If there are higher dimensions, it would be very odd if they were not involved at all in atomic-size processes. They cannot just apply to quark physics and nothing else.

Such a model leads immediately to Schroedinger's time and distance equations (for a case with zero potential energy), as shown above. It also provides a theory of rest mass, and leads to the same experimentally verified equations of Special Relativity but for absolute motion. The derivation is far simpler than that from Special Relativity. This absolute motion derivation uses the assumption of quark string physics that there are more than 3 dimensions in space**:**

The mass, length and time dilation equations are easily obtained immediately by solving a Pythagorean triangle with sides m_oc, mv and the resultant mc (Fig. 2)**:**

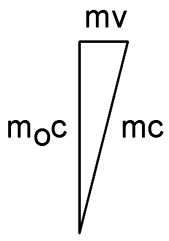

Fig. 2. $(m_oc)^2 + (mv)^2 = (mc)^2$

m_oc can be regarded as the momentum of creation of a particle at rest in 3-dimensional space, due to an energy welling-up from the direction

of a fourth spatial dimension (which is at right angles to any 3-D direction); m_o is the rest mass of the resulting stationary particle in 3-dimensional space, which this force creates. If the particle is then made to move in 3-D space, by giving it momentum in a direction in 3-dimensional space, it will then have an extra momentum mv (see Fig. 2), at right-angles to its rest-mass (4-D) momentum-of-creation vector, where m is its mass and v is its observed velocity in 3-dimensional space. The resultant total momentum content of the particle due to these two momenta is mc (see Fig. 2), m being the dilated (increased) mass of the particle due to incorporation of its extra energy of motion in one of the 3-D directions (this is additional to its rest-mass energy welling up from the fourth dimension). The momentum of creation must be at 90º to any momentum of motion in 3-D, because the 4th dimension direction by definition is at 90º to all 3-D directions - hence the Pythagoras triangle in Fig. 2.
So, from Fig. 2: $(m_oc)^2 + (mv)^2 = (mc)^2$, which rearranges to:

$$\mathbf{m_o = m\sqrt{(1 - v^2/c^2)}.}$$

This is the well-known and experimentally verified "relativistic" mass dilation formula but has been derived above for absolute motion in only 2 lines and without assuming the two principles of Special Relativity.

Time Dilation

Time dilation will also occur, because when a particle (e.g. a meson) is jumping in the fourth dimension, its internal decay processes will be frozen for the duration of that jump and so its lifetime will be extended. The well-known time dilation formula can then also be obtained immediately, as above, from a Pythagorean triangle (Fig. 3) with sides t_o, t_{OUT} and t, as explained below.

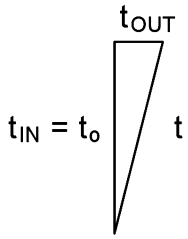

Fig. 3. $t^2 = t_o^2 + t_{OUT}^2$.

To explain this, pursuing the analogy with diffusion, assume that the motion of an elementary particle occurs by very short jumps alternating with longer stationary periods, thus allowing any observed overall velocity to be made up, modelled on the conventional mechanism of

diffusive jumps of atoms or ions through a lattice, from site to site. The identical functional forms of Fick's Second Law of Diffusion and Schroedinger's Equation was discussed earlier. In diffusion of an ion through a lattice, a jump down a concentration gradient occurs when the chemical energy gradient (Gibbs Free Energy) gives sufficient activation energy for a jump to the next lattice position. This model is used below for motion of a particle, where a mechanical energy gradient drives it.

There are only two velocities possible, zero for the periods at rest in the 3-D world, and **c** for the periods when the energy constituting the particle is moving in 4-D space. Any actually observed overall velocity, v ($0<v<c$), is then made up of rapidly alternating combinations of these two values. The moving particle travels in a series of very small jumps each of which is at velocity **c**, separated by a series of short pauses at velocity zero (analogous to the movement of the frames of a cine film - a film strip), so that the overall actually observed velocity is apparently v. This 4-D jumping model is consistent with the explanation given of the imaginary values of ψ given above.

A moving atomic-size particle is thus a "particle" when stationary and may appear to be an apparent "wave" (a non-particle) when jumping. Light photons alternately jump a distance λ in λ/c seconds followed by a stationary instantaneous wait or appearance. It is thought that photons (unlike gravitons) cannot move appreciably away into 4-D and so are bound to continually intersect our 3-D world.

Let the total stationary time (spent residing at successive positions) be t_{IN} and the total transition time (spent in jumping between these positions) be t_{OUT}.
t_{IN} is the inactive stationary time elapsing between jumps, and can have any value ($0 < t_{IN} < \infty$). t_{OUT} is the time taken for a transition or jump between residences, and represents a non-material (non-particle, apparently wavelike) condition in between the physical sites at which the moving particle successively resides. It means that there is no physical movement at all and that all actual movement occurs during the time when the particle is in 4-D, by a series of non-material (non-3-D) jumps. It is somewhat analogous to the conventional diffusion mechanism for an atom or ion diffusing between fixed lattice sites. If Zero-Point energy involves continuous vibration, or rotation, into and out of 4-D, then this process is facilitated by that and does not need a separate ad-hoc mechanism for it.

Consider now the motion of a mechanical clock which contains a balance wheel. On the proposed theory, the balance wheel (=**B**) jumps have their specific discrete **B** activations (see activation energy, above), but when the clock (clock = **C**) as whole is also set in motion, specific discrete **C** activations will occur additionally. Any jump activation which becomes due to cause an imminent balance wheel (**B**) jump during the course of a clock (**C**) jump, would be inoperative, as the clock is "frozen" - already engaged in a jump and so its balance wheel cannot also

simultaneously move then. Consider the clock to be moving much faster than the balance wheel rotations. Then the balance wheel (**B**) jump frequency is comparatively very low and those **B** jumps which arise during a regular **C** jump will be lost. The consequent loss of some **B** jumps will (in effect) slow down the balance wheel. Consider now the motion of a clock whose tick-tick period is t_o at rest, which corresponds to t_{IN} as defined above. Let this clock travel with a constant overall velocity v and record the passage of one tick-tick time period t_o during its travel through a certain distance s. The total **C** jumping time (at velocity c) which is non-material (being in 4-D), is not sensed or recorded by the clock (by **B** jumps, as explained above) is t_{OUT}
where t_{OUT} = distance/velocity = s/c = vt/c ……(iv).

A stationary observer would have a total time t in (iv) above, elapsed on his watch, as being the time taken for the moving clock to travel the distance s. Now, $t > t_o$ or t_{IN} due to the additional time t_{OUT} taken for the journey, noticed only by the stationary observer, which must be added to t_o. This addition must be vectorial, because as the moving clock does not sense or record t_{OUT} there is no break (in its sensation of time) at which t_{OUT} can be added in a scalar manner. t_{OUT} and t_{IN} have no component in common and must thus be added as vectors at right angles (Fig. 3).

This gives $t^2 = t_{IN}^2 + t_{OUT}^2$ ……(v), by Pythagoras' Theorem,

or $t^2 = t_o^2 + t_{OUT}^2$.

Substituting t_{OUT} from (iv) above, $\mathbf{t_o^2 = t^2 - v^2t^2/c^2,}$

which is the well-known Time Dilation formula of Special Relativity, but all the assumptions of Special Relativity are avoided. This equation has been well-verified experimentally, e.g. by the increased lifetimes of decaying mesons which are moving very fast, compared with slow-moving mesons.

The time dilation formula can also lead to an alternative derivation of the mass dilation formula, already derived otherwise, above.

Fitzgerald-Lorentz Length Contraction Equation

Similarly, the length of a moving body will contract (only in the direction of travel) due to the interatomic cohesive forces pulling in its length across planes of jumps when it is in 4-D space (where it is not affected by 3-D electrostatic cohesive physical forces; only gravity can enter 4-D space and gravity is not involved in cohesive forces).

A similar Pythagorean triangle gives the well-known length contraction equation. The length of a moving object is proportional to the number of moving elements materially present ("**IN**") in it along any given line in the

direction of motion. The term "moving element" merely refers to an elementary particle of the moving object. Along any such line through the object, some of its moving elements will be jumping ("OUT") and thus materially absent from the object. At a steady velocity there will be a steady proportion of moving elements thus missing, and a consequent shrinkage of the length of the object in the direction of its motion (due to the attractive forces of cohesion acting across the OUT gaps). Planes of OUT gaps (analogous to vacancies) would be expected to sweep through the object (which is not imagined to jump all at once, but as individual particles or moving elements) in the direction opposite to that of the motion; the planes of moving elements would be set perpendicular to the direction of motion; thus there is no reason for shrinkage of the object in other directions than that of the motion. Consider now a moving object, of rest length L_o measured in the direction of its motion.
At rest, $L = L_o$ and $t_{IN} = t$.

The number of planes (perpendicular to the direction of motion), of moving elements which are materially present (IN), at velocity v, is
$n = n_o(t_{IN}/t)$ where n_o is the number of such planes present at rest (for which state $t_{IN} = t$).
$n_o \propto L_o$ and $n \propto L$, where n and L are number and length respectively, at a steady velocity v).

Thus, from $n = n_o(t_{IN}/t)$ above, we have:

$L = L_o (t_{IN}/t) = L_o [\sqrt{(t^2 - t_{OUT}^2)}] / t$, using (v) above,

so $L = L_o\sqrt{[1 - t_{OUT}^2/ t^2]}$, and then using (iv) above we obtain:

$L = L_o\sqrt{(1 - v^2/ c^2)}$, which is the Fitzgerald-Lorentz length contraction equation.

An alternative approach also follows from the assumption that when an object is travelling, some of the elementary particles constituting it are engaged in a jump in 4-D and are thus "missing" from the 3-D object, as suggested by the interpretation of Schroedinger's Equation given earlier. Consider the number of elementary particles in a line in its direction of travel to be n_o at rest and n at velocity v, where $n < n_o$ as some of them are jumping. n and n_o are their numbers in 3-D space.

As mass in conserved, $n_o m_o = nm$, [where m is the enhanced mass at velocity v given in $m_O = m\sqrt{(1 - v^2/c^2)}$].
Then, as $n_o \propto L_o$ and $n \propto L$, for a line in the direction of motion of the object, $L_o m_o = Lm$ and so **$L = L_o\sqrt{(1 - v^2/c^2)}$.**
This is the Fitzgerald-Lorentz length contraction equation.

$E = mc^2$ derivation

The well known Relativity equation $E = mc^2$ can also easily be obtained (for absolute motion), by elementary algebra**:**

From the Pythagoras triangle of the Rest Mass section above,

$(m_o c)^2 = (mc)^2 - (mv)^2$. (See Fig. 2)

Take differentials**:** $0 = 2c^2\, mdm - 2mv^2\, dm - 2vm^2 dv$

Divide both sides by 2m**:** $c^2\, dm = v^2\, dm + mvdv$ ……(vi)

By definition, force is rate of change of momentum, so

$F = d(mv) / dt = m(dv/dt) + v(dm/dt)$

By definition, a force is also an energy field or gradient, dE/ds

and velocity v = ds/dt where s is distance.

So $dE = Fds = m(dv/dt)ds + v(dm/dt)ds = mvdv + v^2 dm$

Compare this with equation (vi) above**:**

$dE = c^2 dm$, so, integrating, **$E = mc^2$** (Einstein's Equation).

The integration constant is zero, as E =0 when m = 0.

Heisenberg's Uncertainty Principle

Heisenberg's Uncertainty Principle takes on a new meaning**:** a moving particle will actually spend most of its time at rest (punctuated by very short times at c), but its experimentally observed velocity is measured as v and so a measure of the uncertainty in its velocity at any instant will be v - 0 = v. (This uncertainty depends on exactly when an observation is made and so is in the mind or control of the observer and is not a property of the particle.) From de Broglie's Equation, mv is proportional to h/λ, and so the Uncertainty Principle becomes an expression of de Broglie's Equation if λ is interpreted as the moving particle's smallest jump length on the above diffusion model for motion.

Spin

An object in 3-D requires a rotation of 360^o to return it to its original position, but a bizarre 720^o of rotation (not just 360^o**!**) is required to bring fermions

("spin-½" particles, such as protons) back to their original state. This is easily explained as follows, on the above model**:**

For clarity, a 2-D / 3-D analogue will be used, instead of 3-D / 4-D. If a lower-case letter "**d**" is lifted out of its 2-D paper sheet and turned over in 3-D space and then put back as a "**b**", then this would appear to a 2-D inhabitant to be a **d** ←→ **b** vibration with only its antinodes (**d** & **b**) being visible. If this **d** ←→ **b** vibration is analogous to Zero-Point Energy vibration, then if the "**d**" is also spinning in 2-D (**d** ←→ **p** ←→ **d**), then after 360° of spin in 2-D it could have simultaneously rotated to a "**b**" by the 3-D rotation, which means that the 360° spin in 2-D did not return the "**d**" back to its initial state and that a further 360° of 2-D spin is needed by which time the "**b**" would have rotated back to a "**d**" in its simultaneous 3-D rotation. Thus a bizarre (to a 2-D observer) 720° of spin is required for a "**d**" spinning in 2-D space to return to its original "**d**" state.

With this preamble, for our case in 3-D space, an observed (in 3-D) rotation of 720° is needed to return a proton to its original state, which can easily be explained analogously to the example above.

In 3-D to 4-D terms, this means that (to give an analogy) a tennis ball spins in 3-D and 4-D simultaneously but after 360° of observed (in 3-D) rotation the ball would be everted (i.e. having its fluffy side inside and smooth side outside, without loss of the gas pressure which it contains) by the simultaneous 4-D rotation and so clearly a further 360° of observed (in 3-D) rotation would be needed for it to return (by further 4-D rotation) to its original state with the fluffy side outside, making a total of 720°**!**

This can only be understood in terms of the existence of 4-D space and it happens routinely for elementary particles, which have access to 4-D space. Note**:** A rotation in 3-D could only be perceived by a (hypothetical) 2-D observer as a vibration (like Zero-Point Energy). And a rotation in 4-D could only be perceived by us (in our 3-D world) as a vibration (Zero Point Energy).

Access of large objects to 4-D space is problematical. Eversion of tennis balls has been reported anecdotally which is, of course, not scientifically acceptable, but there is a report in Nature by Hasted et al (1975) of a refractory crystal of vanadium carbide being removed from a sealed tube in laboratory conditions, without any contact being made with the tube, which could only be feasible by transfer out via 4-D space.

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APPENDIX H3

The Higgs Boson

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In physics there are 4 forces which underlie the stability of atoms, molecules and elementary (sub-atomic size) particles. The two best known to the general reader, are gravity and the electrostatic forces. The attractive parts of the latter prevents atoms and molecules from flying apart: negatively charged electrons are held around a positively charged atomic nucleus. (Atoms and molecules are all composed of sub-atomic particles). A theory in physics postulates that all 4 forces are aspects of a single force, but this theory only works if all sub-atomic particles have no mass! In other words, it requires that mass is not an **intrinsic** property of atoms, molecules and elementary particles. It requires mass to be **extrinsic** – i.e. to be due to something outside the sub-atomic particle.

Physicists then postulated that this extrinsic factor is an invisible 'fluid' pervading the whole universe.

At this point, one wonders if some of them had read of this in some classical books[1,2] in which *mulaprakrti* (Sanscrit) or *koilon* was reported, over a century ago, as such an all-pervading fluid, in which sub-atomic particles exist as empty 'bubbles'. Figure 1 shows strings of small 'bubbles:'[2] Besant and Leadbeater[2] described the **bonds** holding elementary particles together as 'strings' – a term used many **decades** later by physicists in the 'String Theory' of modern physics. Attempts to find out if physicists are aware of these early publications have so far produced no response. It is well known that Newton was very interested in mystical matters and spent a lot of time on them – a fact studiously ignored and not mentioned in modern physics!

Figure 1 here

Modern physics gives the analogy that the 'all-pervading fluid' is like honey, but we are not aware of it, rather like we are usually not aware of air when we walk (slowly) through it. Sub-atomic particles are massless empty bubbles moving through this imperceptible fluid. Of course, it is not a 'fluid' in the sense that we know a normal fluid such as honey, and the analogy with honey is not a good one. This is explained as follows:

If we push a heavy object (on wheels – assume frictionless) such as a washing machine, it resists: we have to apply force to make it move. But if we push a light

object like an empty cardboard box, the perceived resistance is very much less. This effect is called **inertia**. All objects resist changes in their state of motion and this property of matter is called **inertia**. This resistance to a change in the velocity of an object is (solely) directly-proportional to the **mass** of the object. Thus, mass is the quantitative or numerical measure of body's inertia, that is, of its resistance to being accelerated.

But there is an obvious problem with an all-pervading 'fluid like honey' analogy. In the **absence of gravity** (in empty space), imagine a ball-bearing moving through honey – it will gradually slow down to a stop. But this is not what actually occurs if an object moves through empty space (which is postulated to contain an all-pervading 'fluid'). The moving object will continue moving forever, at the **same** velocity without slowing down – i.e. the postulated all-pervading 'fluid' offers no resistance to motion at a constant velocity. It only resists a **change** in velocity (i.e. an acceleration).

Before considering this problem, resuming the view of modern physics, Higgs postulated that if such an all-pervading fluid were subjected to a large energy pulse, such as that occurring at the 'big bang' creation of the universe, it may cause the 'fluid' to temporarily manifest in the form of a highly energetic sub-atomic particle, called the Higgs Boson. This was recently discovered at CERN during high energy events in the CERN hadron collider. The observed Higgs Boson existed only for a small fraction of a second, only while the temperature was very high, but the background 'fluid' form is its **normal** form (as a 'fluid', not as a Higgs Boson particle) in the present-time much cooler universe. No Higgs Boson particles still exist in the present cooler universe. Physics has named the background 'fluid' as the 'Higgs Field', ignoring its earlier Sanscrit name, *mulaprakrti*,[1, 2] known for millennia and described over a century ago by Besant and Leadbeater.[2] Physics describes the Higgs Field as having imaginary mass.

An explanation of why *mulaprakrti* (the now so-called 'Higgs Field') offers no resistance to motion at a constant speed, has been suggested by the author[3] and is summarised here below. For a fuller explanation, see reference.[3]

By analogy, using the Hermetic '*As above, So below*', in reverse, a possible model could use the following analogies, based on common observations:

1. It is a common observation that very tiny bubbles of air are often seen trapped in blocks of ice (look in the icemaker tray in your refrigerator).

2. Motion of atoms through lattices at high temperature (i.e. diffusion) occurs by discrete jumps from one static stable lattice site to another nearby. Thus a hot copper bar touching a hot zinc bar will inter-diffuse to form an alloy: brass.
3. Elementary particles (atoms, quarks, etc) move according to Schroedinger's time Equation (derived simply, in[3]), which plots out (for a sub-atomic particle moving at a constant velocity in empty free space) but shows the particle's position is **imaginary** in between a series of **real** regularly spaced positions along its trajectory, like dots in a line: • • • • • • • • • •

   'Imaginary', means that its position (its 'position coordinate') contains the square root of minus one, i.e. the particle does not exist in 3-D space. Physicists reject this interpretation of the Schroedinger's Equation result, because it offends their view of what they think the world should be like! They then force their own 'world view' onto the result by (arbitrarily) deciding to mathematically remove the imaginary terms in the result, and they called this 'normalising.'[4]

   This unjustified (prejudiced) assumption arbitrarily creates artificial 'matter waves', because imaginary numbers like $0.3\sqrt{(-1)}$ then just become 0.3^2, which they then arbitrarily interpret as being the **probability** of finding (in 3-D space) the sub-atomic particle at that location (in between two regular positions at which its position coordinate is a **real** number). This has led to the idea that the 'quantum size world' is strange, in that one cannot be **sure** if a particle is actually present at a point or not! Physicists seem to readily accept this weird result (which leads, e.g., to the Schroedinger cat paradox), in preference to the other (equally weird?) possibility that the particle **actually *is* 'imaginary'** at such a coordinate, i.e. not **present** in our 3-D space (called the Heisenberg Uncertainty Principle).

   They do not consider the possibility that it may be able to transit in and out of 4-D space, a location which would appear mathematically as an imaginary number.

   But Besant and Leadbeater[2] report, by Remote Viewing, that atoms and sub-atomic particles are quite distinct to observe, and show no sign of having only a fractional probability of being present or not (i.e. no 'fuzziness' was observed).

   They observed that 3 Arnoo (*Sanscrit*: the smallest particle of physical matter) are in a quark, and 3 quarks are in a proton; the latter statement accords with modern particle physics.

Figure 2 shows an Arnoo[2] (pronounced: are-noo).

In Figure 2, the 3 'thicker' strings have 704 instead of 700 bubbles (see Figure 1) per a certain arbitrary length, which gives a thicker appearance.

There are 3 Arnoo in a quark, and 3 quarks in a proton.

Figure 2 here with sanskrit अणु

The Arnoo is very small and may never be detected by science.

The 3 quarks in a proton can just be 'detected', but with no indication of their internal structure as containing 3 Arnoo.

Note: Schroedinger's Equation correctly calculates the properties of matter, and the above discussion just gives a possible alternative **interpretation** of it. Existing alternative interpretations are possible, e.g. the Copenhagen interpretation, and Einstein's interpretation.

4. All atom-size and smaller particles have a Zero Point Energy, which is an irreducible oscillation persisting even at absolute zero temperature (when all thermal kinetic motion has been reduced to nil). Besant and Leadbeater's observations[2] accord with an interpretation of the Zero Point Energy as being an oscillation[3] or rotation[6] of atoms to-and-from the 3-D world and 4-D world, suggested by the present author[3] and Eagles.[6]

   This thereby gives an alternative interpretation of Heisenberg's Uncertainty Principle, not involving probabilities.

   When a particle is moving in 4-D space, it shows up as being imaginary in the mathematical solution of Schroedinger's Equation (the gaps between the dots shown above). But most physicists do not accept the existence of 4-D space, even though particle physicists do require higher dimensions for their theories to work.

Then, modelling by analogy with metal atoms jumping (diffusing) through a hot metal lattice, from one lattice site to another: consider that *mulaprakrti* is an infinitely dense 'fluid', analogous to the block of ice above. Sub-atomic particles are tiny empty bubbles in it, and so cannot move in 3-D space at all. But using sections 3 and 4 above, these bubble-like sub-atomic particles oscillate or rotate at high frequency between 3-D and 4-D space. While trapped in 3-D space, like a bubble in a block of ice, as in section 1 above, its velocity is zero, but in 4-D space it is free to move and so can jump in 4-D space to another position in 3-D space, as in section 2 above, thus forming a trajectory. Besant and Leadbeater[2] describe how, by an act of will, they were able to push a sub-atomic particle (an Arnoo) out of 3-D space into 4-D space.

This model explains how a sub-atomic particle could move (in tiny jumps) at a constant average velocity along a trajectory in 3-D space, without the 'background fluid', *mulaprakrti*, slowing it down.

There is some disagreement[5] on whether Einstein's famous equation $E = mc^2$ is derivable from Relativity, but the present author has given[3] a simple **non-relativistic** derivation of Einstein's mass dilation equation in **one line**, using ideas given by Besant and Leadbeater,[2] and other equations (time and length dilation), including $E = mc^2$, are all derived from basics[3]. The present author cites the principle of Occam's Razor in support of this!

Finally, it is interesting to note that the so-called 'Higgs Field' (*mulaprakrti*) can be considered to be the 'æther' of 19th Century science. But modern physics, which denounced the æther in the 20th Century, now studiously ignores this identity. They call it instead the Higgs Field.

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   Note: Complimentary copies: A book (400 pages with 80 illustrations) by Prof M.G. Hocking, with further information related to references 2 and 3 is available free, on request from: **mgh@4-D.org.uk**
   (The UK postage cost is £3, as stamps or cheque to:
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Figure 1. Detail of the strings in the Arnoo (see Figure 2), showing bubbles which give an appearance of "thickness" of a string.[2]

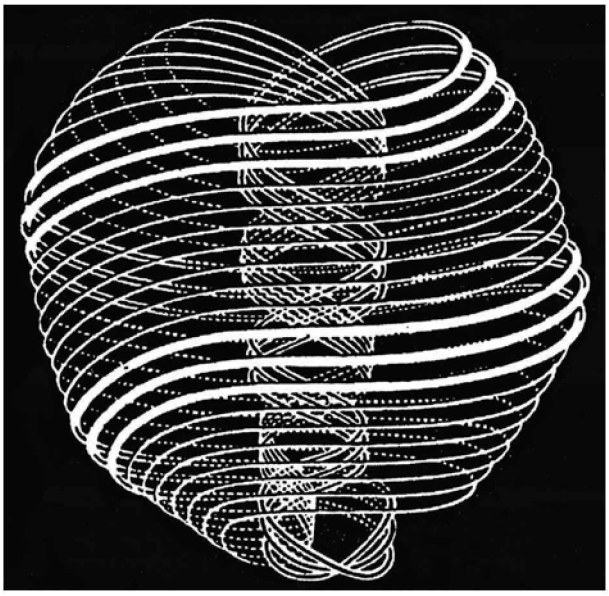

*Figure 2. Arnoo (*Sanscrit, *smallest particle of matter):*

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