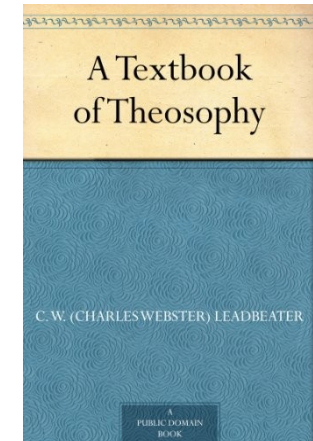
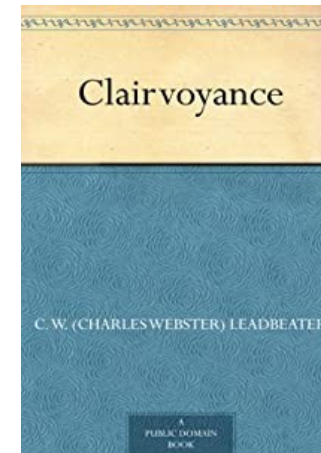
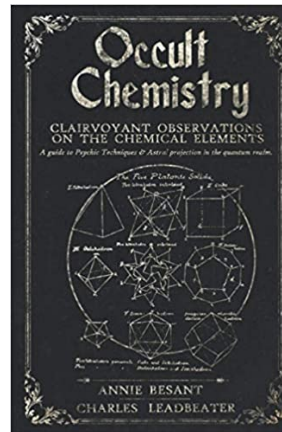


## **Subject Two: Mysticism and Science Charles Leadbeater and Annie Besant**

**Mysticism: Where Science, Art, and Religion Meet  
©2021, Aleph Talks  
1 December 2021**

# Information Sources

- **Occult Chemistry**, Charles Leadbeater and Annie Besant, Theosophical Society, 1908
- **Clairvoyance**, Charles Leadbeater, Theosophical Society, 1899
- Stephen M. Phillips website.
- Wikipedia.



# Charles Leadbeater Biography

- **Charles Webster Leadbeater** (/ˈlɛdˌbɛtər/; 16 February 1854 – 1 March 1934) was a member of the Theosophical Society, Co-Freemasonry, author on occult subjects and co-initiator with J. I. Wedgwood of the Liberal Catholic Church.
- Originally a priest of the Church of England, his interest in spiritualism caused him to end his affiliation with Anglicanism in favour of the Theosophical Society, where he became an associate of Annie Besant. He became a high-ranking officer of the Society and remained one of its leading members until his death in 1934, writing more than 60 books and pamphlets and maintaining regular speaking engagements.



# Annie Besant Biography



- **Annie Besant** (*née Wood*; 1 October 1847 – 20 September 1933) was a British socialist, theosophist, women's rights activist, writer, orator, educationist, and philanthropist. Regarded as a champion of human freedom, she was an ardent supporter of both Irish and Indian self-rule. She was a prolific author with over three hundred books and pamphlets to her credit. As an educator, her contributions included being co-founder of the Banaras Hindu University. For fifteen years Besant was a public proponent in England of atheism, scientific materialism. Besant's goal was to provide better employment, living conditions, and education for the poor.
- Besant then became a prominent speaker for the National Secular Society (NSS), as well as a writer, and a close friend of Charles Bradlaugh. In 1877 they were prosecuted for publishing a book by birth control campaigner Charles Knowlton. The scandal made them famous, and Bradlaugh was subsequently elected as a Member of Parliament (MP) for Northampton in 1880.
- Thereafter, Besant became involved with union actions, including the 1887 Bloody Sunday demonstration for Irish Home Rule and the London matchgirls strike of 1888. She was a leading speaker for both the Fabian Society and the Marxist Social Democratic Federation (SDF). She was also elected to the London School Board for Tower Hamlets, topping the poll, even though few women were qualified to vote at that time.

# Annie Besant Biography



- In 1890 Besant met Helena Blavatsky, and over the next few years her interest in theosophy grew, whilst her interest in secular matters waned. She became a member of the Theosophical Society and a prominent lecturer on the subject. As part of her theosophy-related work, she traveled to India. In 1898 she helped establish the Central Hindu School, and in 1922 she helped establish the Hyderabad (Sind) National Collegiate Board in Bombay (today's Mumbai), India. In 1902, she established the first overseas Lodge of the International Order of Co-Freemasonry, *Le Droit Humain*. Over the next few years, she established lodges in many parts of the British Empire. In 1907 she became president of the Theosophical Society, whose international headquarters were, by then, located in Adyar, Madras, (Chennai).

# Annie Besant Biography



- Besant also became involved in politics in India, joining the Indian National Congress. When World War I broke out in 1914, she helped launch the Home Rule League to campaign for democracy in India, and dominion status within the British Empire.
- This led to her election as president of the Indian National Congress, in late 1917. In the late 1920s, Besant traveled to the United States with her protégé and adopted son Jiddu Krishnamurti, who she claimed was the new Messiah and incarnation of Buddha. Krishnamurti rejected these claims in 1929.
- After the war, she continued to campaign for Indian independence and for the causes of theosophy, until her death in 1933.

# Clairvoyance Research into Microcosm



- The Theosophists Annie Besant (1847–1933) and Charles W. Leadbeater (1854–1934) carried out researches over thirty eight years, and claimed to use a type of clairvoyance to describe what they thought were atoms and molecules (in fact they were subquarks!)
- Before we discuss their work and demonstrate its consistency with established facts of nuclear physics and with the theories of quarks and superstrings once it is *correctly* interpreted, we will review the events that led to their collaboration in this systematic psychic investigation of the subatomic world. The severest critic of parapsychology would have to admit that this study, which remains little-known even to parapsychologists, is unique.

# Clairvoyance Research Into Microcosm



- This is not because it demonstrates that accurate information about the world *can* be obtained paranormally (although this proves to be the case) but because it represents perhaps the only recorded example of alleged extra-sensory perception (ESP) where one can be *completely and absolutely certain* that both fraud and unconscious use of sensory clues — the escape clauses often favored by sceptics and debunkers of the paranormal (although, sometimes, with no proof) — are ruled out *a priori* by the absence of relevant scientific data or ideas that might account for their significant nature.



# Background on Clairvoyance



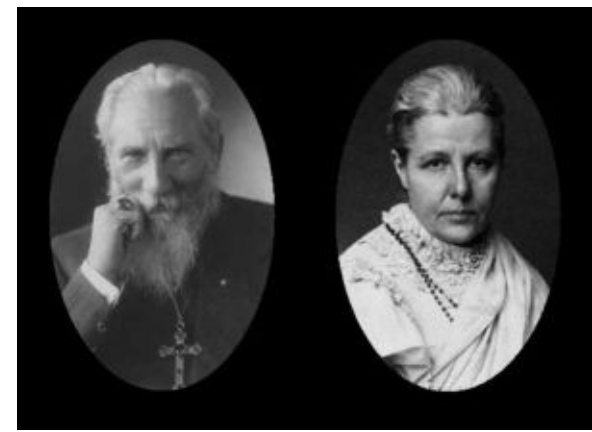
- Quite apart from the resistance toward the paranormal shown by the scientific establishment, the problem for recognition of this particular kind of ESP — remote viewing of subatomic particles — is that parapsychologists rarely have enough knowledge of nuclear and particle physics to be able to evaluate adequately their purported, paranormal descriptions. It hardly needs to be pointed out that atoms, atomic nuclei, electrons, quarks, etc do not have an 'appearance' that readily enables their recognition in the way that psychic description of targets hidden in the parapsychology laboratory can.
- This means that judging failure or success in the remote viewing of subatomic particles is not straightforward. In order to assess the validity of someone's claim to be able to "see" objects too small to be visible even in an electron microscope, parapsychologists have to rely on the opinions of experts with the necessary professional knowledge of what is scientifically known about their structure. But such consultants realise that they will be risking their academic reputations (if not even their careers) if they offered positive assessments that might become public and attract scornful publicity or adverse comment from their colleagues.

# Background on Clairvoyance



- It is far easier for critics to put the issue to rest by making some distorted, biased evaluation that focuses on what they regard as a weakness of the claim but which ignores all its merits. Negative evaluations of claims about ESP are not going to get picked up by science journalists as an interesting story because they are not newsworthy.
- They merely confirm what most scientists already believe about the paranormal! Scientists examining the paranormal tend to get into the news only when they appear to debunk long-held, popular beliefs about the supernatural, thereby perpetuating the illusion of yet another triumph of scientific materialism over irrational superstition.
- The few that are brave enough to confirm or defend such claims publicly are ignored for the most part, often being refused publication in mainstream, peer-reviewed academic journals unless the latter specialize in paranormal topics.

# Historical Background



- In 1894, Annie Besant met Charles W. Leadbeater, who was a clergyman in the Church of England and the secretary of the London Lodge of the Theosophical Society. The next year, she invited Leadbeater and his Indian colleague, C.J. Jinarajadasa, to live at the London Theosophical Headquarters, a house in Regents Park where Madame Blavatsky had passed away in 1891 and which was now Annie's home. Thus began a literary collaboration that lasted until Annie's death in 1933.
- Besant and Leadbeater professed to have received instruction by their Indian gurus in a certain form of yoga known as kundalini yoga in order to develop certain psychic powers. In particular, they claimed to have acquired the paranormal ability to see invisibly small objects, such as atoms. This is one of the eight *siddhis*, or psychic powers, mentioned often in Hindu folklore about great yogis and in the ancient sacred writings of India. In Aphorism 3.26 of the *Yoga Sutras* (date unknown, possibly circa second or third century CE), which is the earliest known treatise on yoga, its author, Patanjali, refers to this siddhi by stating that a yogi can gain "knowledge of the *small*, the hidden or the distant by directing the light of a superphysical faculty."

# Historical Background



- The Uttara Tantra is a treatise on Buddha nature. It is a highly revered Mahayana Buddhist text said to have been written in a previous incarnation of Maitreya, whom Buddhists believe will be the future Buddha. Verse 44 (see above) of the Uttara Tantra also makes reference to this ability as one of the powers of a Buddha. In modern parapsychological terms, the faculty to acquire "knowledge ... of the hidden or the distant" is called *remote viewing*.
- The ability to gain "knowledge of the small" or "see ... small things" may likewise be understood as remote viewing of the microscopic world. As a form of remote viewing, it is virtually unknown to parapsychologists, although long recognized in India as one of the siddhis that can be acquired by yogis, having the Sanskrit name of *anima*. For this reason, Steven Phillips has given it the name of *Micro-Psi*.

# Patanjali Yoga Sutra 3.26

## Uttara Tantra Verse 44

२६. प्रवृत्त्यालोकन्यासात् सूक्ष्मव्यवहितविप्रकृष्टज्ञानम् ।

26. “Knowledge of the small, the hidden or the distant”

*Yoga Sutras, Pantanjali*

---

### Verse 44 of the Uttara Tantra

“The essence of Buddhahood at fruition has the qualities of clear cognition, jnana, and freedom from impurities. The quality of clear cognition has five powers relating to the variety of phenomena. The first power of cognition is ‘divine vision,’ which is the ability to see extremely distant and small things ...”

# Annie Besant Letter on Her Clairvoyance

July 1889

Fontainebleau, France



I will tell you about the first occasion on which I saw my Master. Soon after I had joined the Society, it happened that I was in England at a time when H.P.B. was in Fontainebleau, France, where *The Voice of the Silence* was written. She wrote me to go over and join her, which I did with joy. She was living in a delightful old house out in the country, and I was put in a bedroom near hers, a door connecting the two. One night I awoke suddenly owing to an extraordinary feeling that there was in the room. The air was all throbbing, and it seemed as if an electric machine was playing there; the whole room was electric. I was so astonished (for it was my first experience of the kind) that I sat up in bed, wondering what on earth could be happening. It was quite dark, and in those days I was not a bit clairvoyant. At the foot of the bed a luminous figure appeared, and stood there from half a minute to a minute. It was the figure of a very tall man, and I thought, from pictures I had seen, it was H.P.B.'s Master. Near him was another figure, more faintly luminous, which I could not clearly distinguish. The brilliant figure stood quite still, looking at me, and I was so utterly astounded that I sat perfectly still, simply looking at Him; I did not even think of saluting Him. So I remained motionless and then gradually the figure vanished. Next day I told H.P.B. what had happened, and she replied: 'Yes, Master came to see me in the night, and went into your room to have a look at you.' This was my first experience of seeing a Master; it must have been clearly a case of materialisation, for as I have said, I was not in the least clairvoyant at the time.

Source: Besant, Annie. "In the Twilight." *The Theosophist* (Adyar, Madras, India), May 1910, pp. 1098-1100.

# Periodic Table of Elements 1900

- Democritus hypothesizes atoms make up matter
- Chemistry suggests atoms are real
- J.J. Thomson discovers electron 1897
- Errera Periodic Table 1900 (Wikipedia)
- Future discoveries

- Rutherford discovers nucleus 1911
- J.J. Thomson discovers isotopes 1913
- W.D. Harkins discovers neutron 1920
- Gell-mann, Zweig predict quarks 1964
- Standard Model 1975



Ряды	Группы										
	0	I	II	III	IV	V	VI	VII	VIII		
1		H=1.01									
2	He=4	Li=7.03 -très faible (-)	Be=9.1 +720 ?	B=11 +50 ?	C=12.00 -50 +?	N=14.04 ? ?	O=16.00 + + (Quincke)	F=19 (-10) ?			
3	Ne=20	Na=23.05 (-5) (-)	Mg=24.36 +14 (-)	Al=27.1 + +	Si=28.4 +0.02 +?	P=31.0 -7 -(Quincke)	S=32.06 -11 -16	Cl=35.45 (-20) ?			
4	Ar=40	K=39.15 (-10) (-)	Ca=40 (-3) (-)	Sc=44.1 ?	Ti=48.1 +90 (?)	V=51.2 +170 ?	Cr=52.1 + +	Mn=55.0 +	Fe=56.1 + +	Ni=58.7 + +	Co=59.0 + +
5	Kr>45	Cu=63.6 -5.9	Zn=65.4 -9.5	Ga=70 ?	Ge=72 ?	As=75 ?	Se=79.1 -25.3 (Curie)	Br=79.96 -32.6 (Quincke)			
6	X>65	Rb=85.4 (-20) (-)	Sr=87.6 (-20) (-)	Y=89 +3200 ? ?	Zr=90.7 -14 (+)	Nb=94 +490? ?	Mo=96.0 +24 +172		Ru=101.7 + ?	Rh=103.0 + ?	Pd=106 +550
7	—	Ag=107.93 -15.7	Cd=112.4 -15 ?	In=114 (-10) ?	Sn=118.5 +4 ? + ?	Sb=120 -69 -18.8 (Curie)	Te=127 -38.9	I=126.85 -39.5 (Curie)			
8	—	Cs=133 (-30) (-)	Ba=137.4 (-20) (-)	La=138 +13000 +	Ce=140 +34000 +	Pr=140.5 +	Nd=143.6 +	Sa=150 +		Gd=156 +	
9	—	—	—	—	—	Didyme +	—	—	—	—	—
10	—	—	—	Yb=173 +? ?	—	Ta=183 +1020? ?	W=184 +100 +129	—	Os=191 +74 ?	Ir=193.0 + ?	Pt=194.8 +Mouton +227
11	—	Au=197.2 -30.7	Hg=200.3 -30 -48.8 (Quincke)	Tl=204.1 -93	Pb=206.9 -24.8	Bi=208.5 -203 -293 (Curie)	—	—	—	—	—
12	—	—	—	—	Th=232.5 +16000 ? ?	—	U=239.5 +210 (+)	—	—	—	—

# Periodic Table of Elements Investigation



- Besant and Leadbeater said that they began using micro-psi in 1895 to study the atoms of the elements. Firstly, they examined with micro-psi the atoms (let us call them "MPAs" (multiple physical atoms) in order not to prejudge whether they really were atoms) of hydrogen, oxygen and nitrogen, publishing diagrams of what they had seen in the November 1895 issue of the Theosophical journal *Lucifer*.
- During a summer vacation in Germany, they visited a museum in Dresden and studied many minerals on public display. Sir William Crookes, the famous chemist and inventor of the cathode ray tube, was a member of the London Lodge of the Theosophical Society. He provided the two Theosophists with specimens of some elements that are difficult to obtain in a pure state.



# Periodic Table of Elements Investigation



- By 1907, they had examined 59 more elements, noting variations in the MPAs of the elements neon, argon, krypton, xenon and platinum despite the fact that scientists did not then suspect that an element could have more than one type of atom.
- Indeed, the English chemist Frederick Soddy did not give the name "isotopes" to atoms of an element differing in mass until five years after Besant and Leadbeater reported in November 1908 in the Theosophical journal *The Theosophist* (vol. 30) their discovery by psychic means of a variation of neon.
- Their discovery of isotopic variations in atoms years before scientists even suspected that such variations exist and many more years before the latter detected the isotopes in question must count as one of the rare occasions in the history of parapsychology referred to earlier when ESP has been used to make predictions (later confirmed by science) about things no one at the time even imagined existed, let alone knew of.

# Discovery of Isotopes



- A sceptic might argue that this could have amounted merely to a fortuitous piece of imaginative thinking. However, astute guessing can plausibly explain neither the mathematical correlation between the details of the Theosophists' observations of isotopic MPAs and the known mass numbers of these isotopes nor the detailed, qualitative consistency between these observations and facts of nuclear and particle physics, such information not existing during the period 1895-1908 of the major part of their investigations.
- If, therefore, the sceptic wants to dismiss their anticipation of isotopes as lucky guessing, he is forced to regard in the same way the encyclopedic volume of similar correlations with nuclear and particle physics.
- Such a position stretched credulity beyond its breaking point — at least for minds that are not unbalanced by ideological prejudice towards the paranormal. For this reason, chance and guessing are completely untenable alternative explanations for how Besant and Leadbeater described isotopic variations in MPAs years before any scientist suspected that isotopes existed.

# Nobel Laureate F.W. Martin and Isotopes



Leadbeater and Besant published a note in 1908 about an isotope of neon that they had observed.

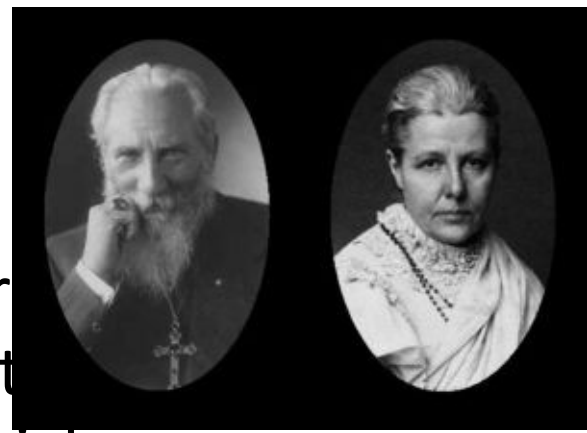
F.W. Martin, inventor of the mass spectrometer, cited this work in 1913 in a published paper.

F.W. Martin received the Nobel Prize in 1922 for his work on isotopes.

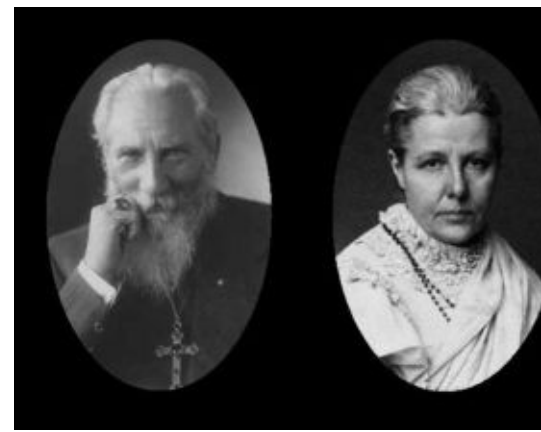
F.W. Martin did not acknowledge that the work of Leadbeater and Besant had given him a direction for his research in atomic isotopes.

# Summary of Research Program

- Besant and Leadbeater published in 1908 a summary of their initial work in their book *Occult Chemistry*. A year later, twenty more elements were studied, notably so-called "illinium," which was recognised later to be the element promethium, discovered by science in 1945.
- A second edition of *Occult Chemistry* appeared in 1919, though it contained none of the new material that had been published since its first edition. Purported descriptions of the molecules of methane, benzene and other chemical compounds were published in 1924. The following year, Leadbeater published in *The Theosophist* (vol. 46) a model of the atomic structure of the diamond. In 1926, he correctly described the hexagonal arrangement of carbon atoms in graphite.



# Third Edition of Occult Chemistry



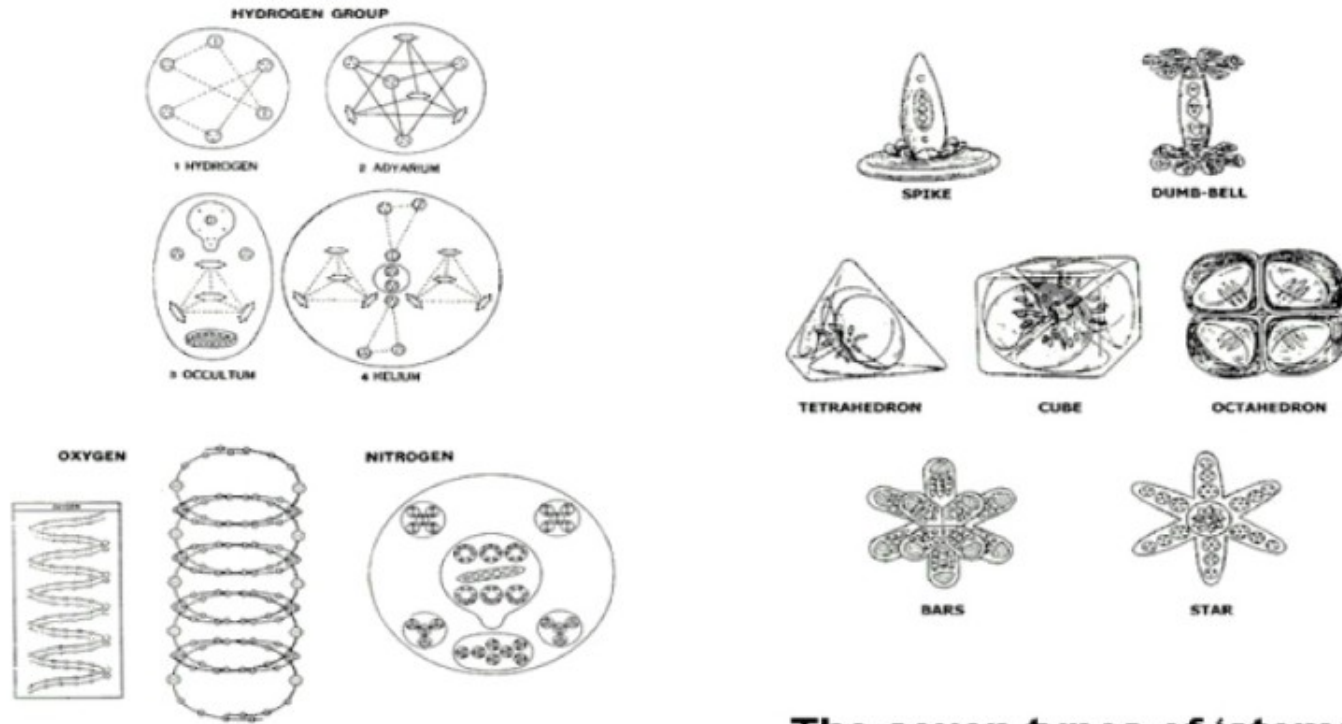
- Included descriptions of the MPAs of so-called "element 85" (named "astatine" by science in 1940), "element 87" (called "francium" by science in 1939) and "element 91" (isolated by chemists in 1921 and called "protactinium").
- In 1909, Besant and Leadbeater had recorded (though never published) their observation of the MPA of an element they called "masurium." Moreover, it can now be seen that they placed it correctly in the periodic table used by chemists to classify the chemical properties of elements. Leadbeater described it again in 1932 in *The Theosophist* (vol. 54) five years before the element was detected and called "technetium" by science.

# Third Edition of Occult Chemistry



- In the same year, the two Theosophists reported finding atoms of an element with an atomic weight of 2. They assumed (mistakenly, as it turned out) that it was a new element unknown to science. They did not correctly identify the element as deuterium (a heavy isotope of hydrogen), which the American chemist Harold Urey and his colleagues had discovered the previous year, because they had earlier misidentified another MPA as that of deuterium.
- In the last year of their investigations, Besant and Leadbeater published their observations of the MPAs of all the inert gases (including several isotopes) and reported the existence of two forms of the hydrogen MPA, three isotopic varieties of oxygen and two species of ozone.
- Finally, Jinarajadasa, with the able assistance of Elizabeth Preston, a fellow Theosophist and former convener of the Science Group of the Theosophical Society in England, compiled all the research material that had accumulated over thirty-eight years and published it in 1951 in a third, enlarged edition of *Occult Chemistry*.

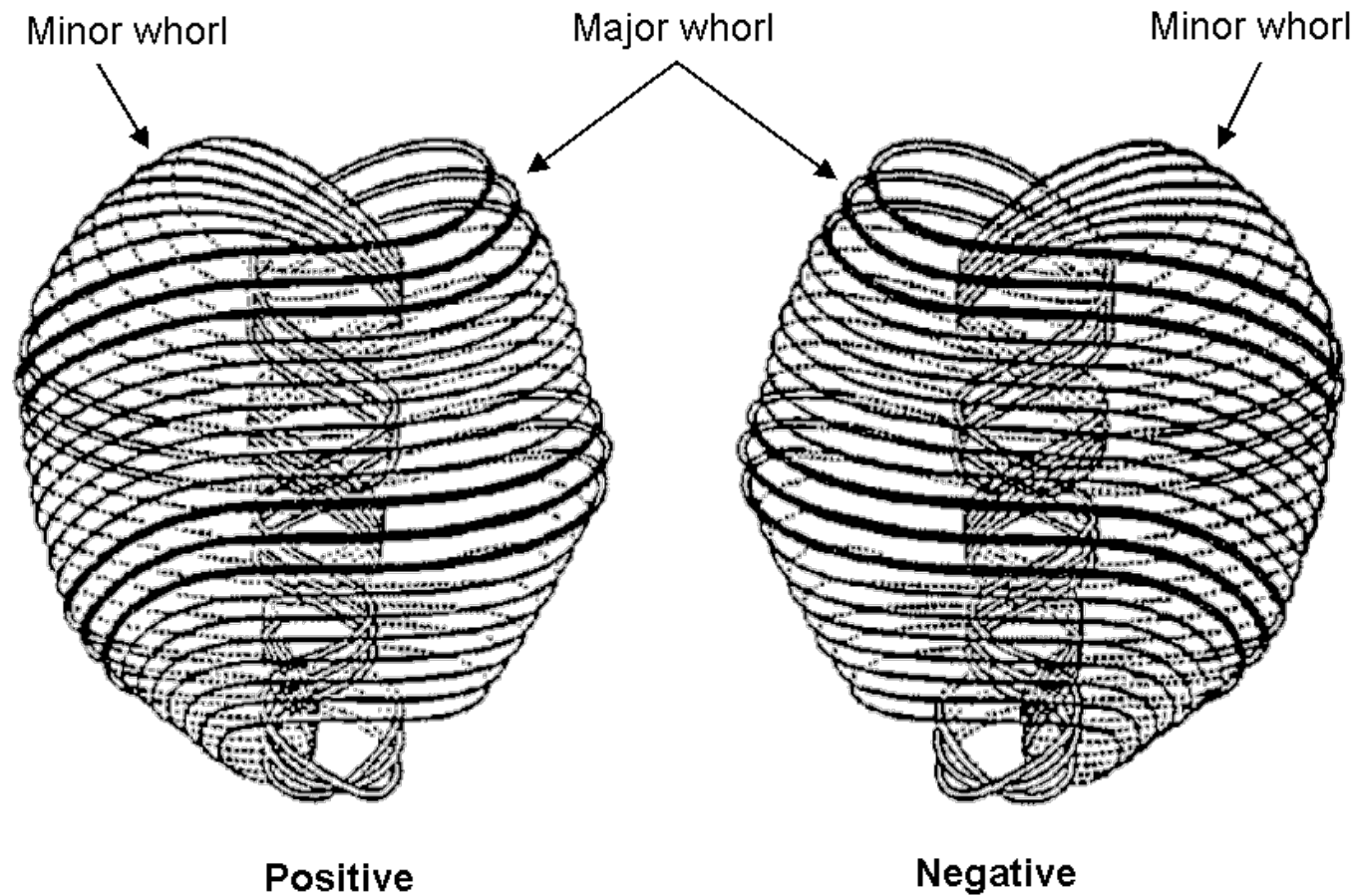
# Besant and Leadbeater MicroPsi Observations



Exceptions

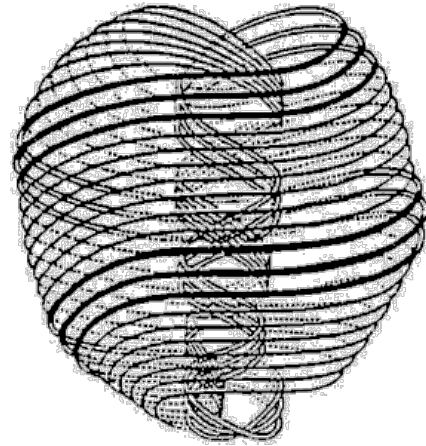
The seven types of 'atoms'  
observed by Besant & Leadbeater

# Subquark String Structure

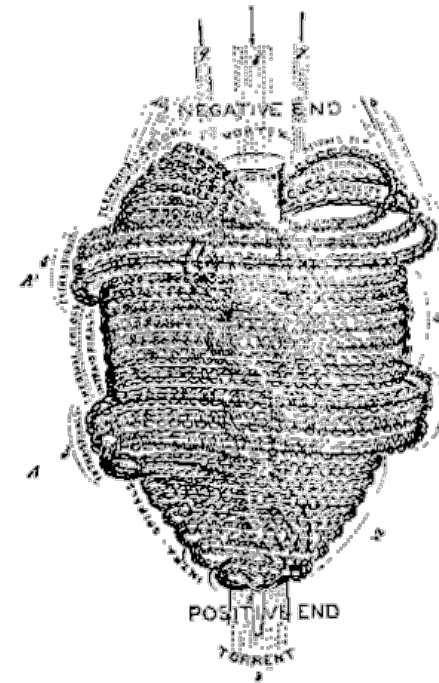




# Besant and Leadbeater(1905) vs. Babbitt (1878)



**Besant's and Leadbeater's  
'ultimate physical atom' (UPA)**



**Babbitt's 'atom'**

# Periodic Table of Elements



## **Mendeleev**

- Elements arranged in seven columns by atomic weight
- Atomic weight is the weighted average of protons and neutrons in the nucleus of an element
- Noble gasses required eighth column

## **Modern Periodic Table**

- Elements arranged in eight columns by atomic number
- Atomic number is the number of protons in nucleus of element

## **Leadbeater and Besant Periodic Table**

- Ten columns based on seven subquark combinations in nucleus



# PERIODIC TABLE: ELEMENT NAME ORIGINS

**Symbol Key**

[Box with H] [Box with He]

[Box with H] [Box with He]

**Language of Origin**

Latin	German
Greek	French
Italian	Spanish
Portuguese	Dutch
English	Other

**Table Colour Key**

Alkali	Alkaline Earth
Transition	Post-Transition
Non-Metal	Halogen
Noble Gas	Other

**Var = Source**

Latin	German
Greek	French
Italian	Spanish
Portuguese	Dutch
English	Other

H	He																	He																														
Li	Be																	Ne																														
Na	Mg																	Ar																														
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr																															
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe																															
Cs	Ba	La		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																														
Fr	Ra	Ac		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og																														
<table style="width: 100%; text-align: center; font-size: 0.7em;"><tr><td>La</td><td>Ce</td><td>Pr</td><td>Nd</td><td>Pm</td><td>Sm</td><td>Eu</td><td>Gd</td><td>Tb</td><td>Dy</td><td>Ho</td><td>Er</td><td>Tm</td><td>Yb</td><td>Lu</td></tr><tr><td>Ac</td><td>Th</td><td>Pa</td><td>U</td><td>Np</td><td>Pu</td><td>Am</td><td>Cm</td><td>Bk</td><td>Cf</td><td>Es</td><td>Fm</td><td>Md</td><td>No</td><td>Lr</td></tr></table>																			La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu																																		
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr																																		

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11/18/2020

Is Mysticism Where Science, Art and Religion Meet?

65

# Leadbeater and Besant: Hydrogen Nucleus

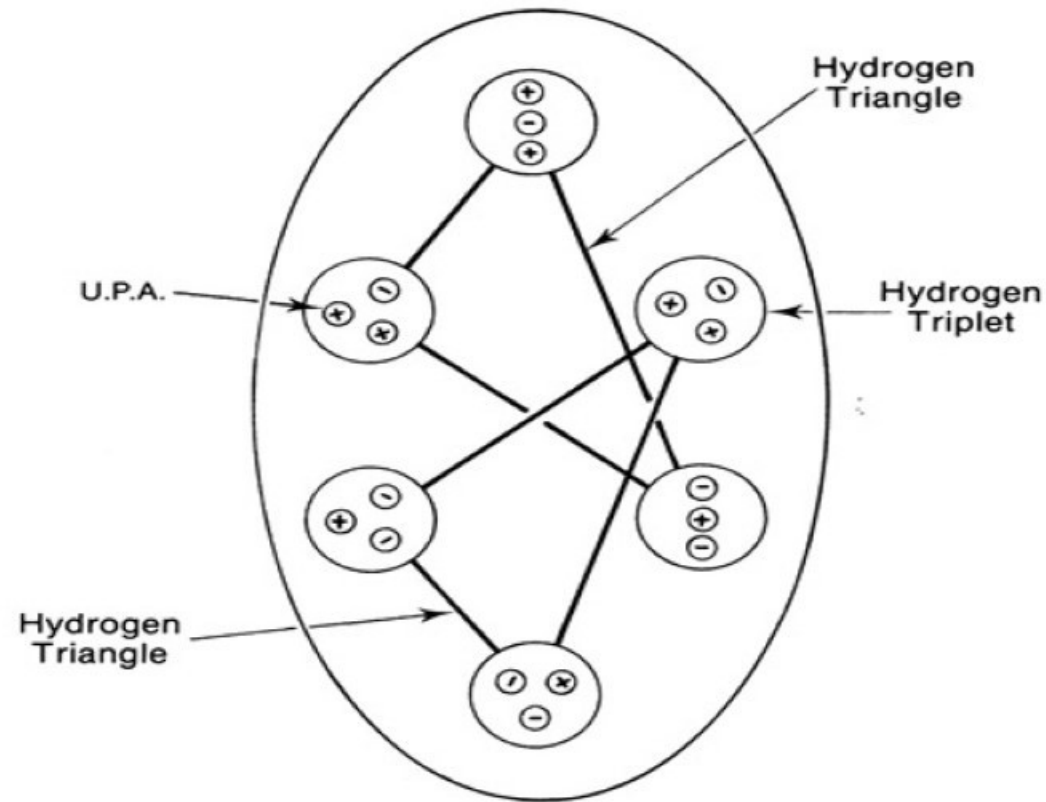
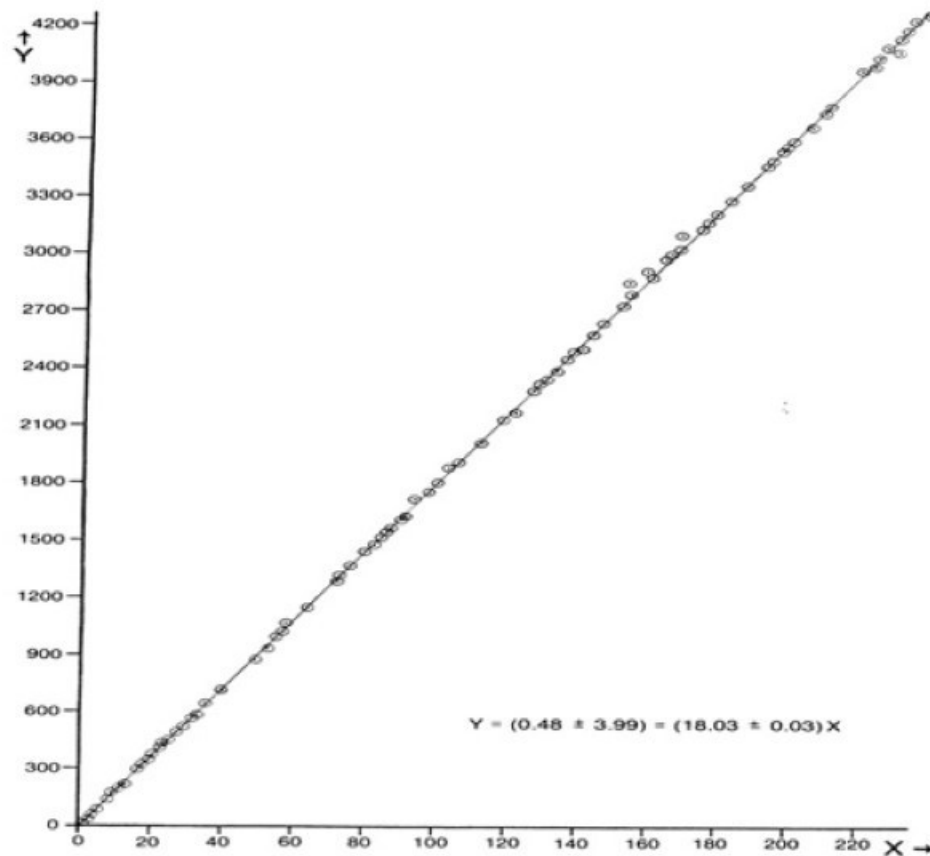


Fig. 4.1. The hydrogen M.P.A.



# Leadbeater and Besant: Subquark/UPAs vs Atomic Number



Graph 4.4. M.P.A. population (Y) versus mass number (X)

# Micro-Psi vs. Physics

## Some micro-psi anticipations of discoveries and ideas in physics

Micro-psi		Physics	
1895	Positive and negative hydrogen triplets observed in 'atoms'	1964	Quark model predicts nuclei are composed of positive u quarks and negative d quarks;
1908	"Meta-neon" (number weight = 22.33); Axes of UPAs observed to be aligned by electric field; UPAs depicted as joined by "lines of force" of "a magnetic nature;" some UPAs shown as endpoints of single lines of force; Y-shaped configurations of lines of force ending on UPAs published;	1912 1933 1970s	Neon-22 discovered; Magnetic monopoles with possible electric dipole moments discussed by Dirac; String model of hadrons; quarks regarded as ends of strings or flux tubes;
1909	"Illinium" (number weight = 146.66); "Masurium" (number weight = 100.11);	1945 1937	Promethium-147 discovered; Technetium-99 discovered;
1924	Processional motion of hydrogen triangles (protons);	1924	Spin of nuclei proposed;
1932	"Element 85" (number weight = 221.00); "Element 87" (number weight = 222.55).	1940 1939	Astatine-210 discovered; Francium-223 discovered.

# MicroPsi Observations

## Illustrative Micro-Psi Observers

- John Wilford Keeley, 1872-1890
- Edwin Babbitt 1878
- Nikola Tesla 1891-1943
- Charles Leadbeater and Annie Besant, 1894-1932
- Geoffrey Hodson, 1958-1959
- Ronald Cowen, 1990-2019

## Common Traits of Subquark Observations

- Spin like a top, regular pulsation, changing colors
- Wobbling when magnetic field turned on
- String theory confirmation: subquarks made of ten strings





# Why MicroPsi Claims Are Genuine

## *Main* reasons why the micro-psi claims of Besant and Leadbeater are genuine

1. UPA populations more accurately match mass numbers of nuclides than chemical atomic weights, so they were not concocted from the latter. These mass numbers did not become scientifically known until at least 25 years after they finished most of their study of the elements.
2. They reported different versions of MPAs years before isotopes were conceived and detected by scientists. Technetium & promethium were described several decades before their scientific discovery. Astatine & francium were described nearly a decade before their detection.
3. Their description of the lines of force binding UPAs and some of their configurations matches that of the QCD string/flux tube model of quark confinement.
4. **The level of quantitative and qualitative correlation between their observations of MPAs, facts of nuclear physics and experimentally established features of the quark model is far too high to be due to coincidence.**
5. UPAs *as closed curves* are consistent with heterotic superstring theory.
6. Six higher orders of circular spirillae match the 6-dimensional torus model that string theorists have considered for the 6-dimensional, compactified space predicted by superstring theory.



# Micro-Psi vs. Physics

man loop graphs. This is manifested as a singular zero-slope limit of the loop corrections to the string theory [3]. In any case it would be more interesting physically if the limiting theory were a four-dimensional one. To achieve this we formulate a generalization of the supersymmetric string theories in which  $10-D$  of the spatial coordinates form circles of radius  $R$ . This is described in sect. 2. In that section we also discuss certain issues relevant to the limit in which  $\alpha'$  and  $R \rightarrow 0$  so as to give a  $D$ -dimensional field theory. In this way we are able to define  $N=4$  Yang-Mills theory in four dimensions as a limit of theory I and  $N=8$  supergravity in four dimensions as a limit of theory II.

The limit of theory I that gives  $N=4$  Yang-Mills theory is studied in sect. 3. In particular, we obtain explicit expressions for the one-loop four-particle on-shell scattering amplitudes in  $D$  dimensions. We define a continuation in the number of compactified dimensions, which serves to regularize both infrared (IR) and UV divergences. The one-loop amplitudes of the Yang-Mills theory are shown to be finite for  $4 < D < 8$ , the lower limit determined by the IR behavior and the upper by UV behavior. When  $D$  approaches 4 from above, the leading IR divergence is proportional to  $(D-4)^{-2}$ .

In analogous fashion, the limit of theory II that gives  $N=8$  supergravity is studied in sect. 4. The expressions for one-loop four-particle on-shell amplitudes in  $D$  dimensions are derived. Once again the result is finite for  $4 < D < 8$ . In this theory the leading IR divergence is proportional to  $(D-4)^{-1}$ .

The expressions for the amplitudes in sects. 3 and 4 have a structure that motivates certain speculations about higher-order loops, which are summarized in the concluding section.

## 2. Dimensional compactification of string theories

In this section we analyze the modifications of the supersymmetric string theories required by assuming that  $10-D$  of the spatial dimensions are circular with radius  $R$ . Different radii could be chosen for each compactified dimension, but in order to minimize indices we do not distinguish among them. Parts of the analysis follow that carried out for the Veneziano model in ref. [4]. The compactified space that we investigate may be viewed as a product of circles. This choice is convenient because the string wave equation,

$$\partial_\mu(\eta_{\mu\nu}\partial_\nu X') - \partial_\mu(\eta_{\mu\nu}\partial_\nu X'') = 0, \quad (2.1)$$

still has  $\eta_{00} = \delta_{00}$  so that the mode expansion in the open-string case is still given by [1]

$$X'_{open}(\sigma, \tau) = x' + 2\alpha' p' \tau + i\sqrt{2\alpha'} \sum_{n=0}^{\infty} \frac{1}{n} \alpha'_n \cos(n\sigma) e^{-in\tau}. \quad (2.2)$$

From: Nuclear Physics B198 (1982)

## THE NATURE OF MATTER

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quite infinitely denser—belonging to another order and type of density altogether. For the very kernel and nexus of the whole conception is that what we call matter is *not* koilon, but the *absence of koilon*. So that to comprehend the real conditions we must modify our ideas of matter and space—modify them almost to the extent of reversing our terminology. Emptiness has become solidity and solidity emptiness.

To help us to understand more clearly let us examine the ultimate atom of the physical plane. (See Figs. 3 and 6.) It is composed of ten rings or wires, which lie side by side, but never touch one another. If one of these wires be taken away from the atom, and as it were untwisted from its peculiar spiral shape and laid out on a flat surface, it will be seen that it is a complete circle—a tightly twisted endless coil. This coil is itself a spiral containing 1,680 turns; it can be unwound, and it will then make a much larger circle. There are in each wire seven sets of such coils or spirillae, each finer than the preceding coil, to which its axis lies at right angles. The process of unwinding them in succession may be continued until we have nothing but an enormous circle of the tiniest imaginable dots lying like pearls upon an invisible string. These dots are so inconceivably small that many millions of them are needed to make one ultimate physical atom. They appear to be the basis of all matter of which we at present know anything: astral, mental and buddhic atoms also are built of them, so we may regard them as fundamental units of which all material atoms on any plane yet attainable are composed.

These units are all alike, spherical and absolutely simple in construction. Though they are the basis of all matter, they are not themselves matter; they are not blocks but bubbles. They do not resemble bubbles floating in the air, which consist of a thin film of water separating the air within them from the air outside, so that the film has both an outer and an inner surface. Their analogy is rather with the bubbles that we see rising in water, bubbles which may be said to have only one surface—that of the water which is

From: Occult Chemistry, 3rd ed. (1951)

# Besant and Leadbeater: Strings and Subquarks



.A whorl is a closed, 1-dimensional curve. It appeared to Leadbeater to be, ultimately, a string of empty, spherical bubbles;

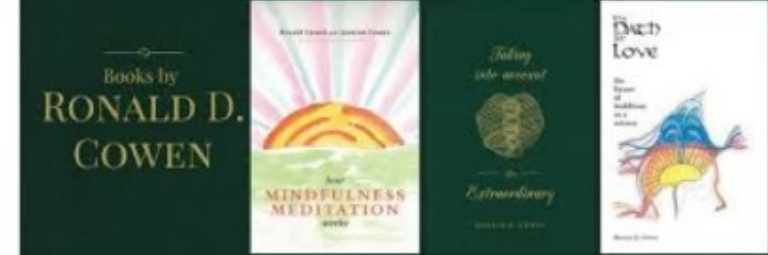
.The 2nd–7th orders of spirillae are the winding of a curve about the six circular dimensions of a 6-dimensional torus, the winding number  $N_n = 7$  (minor whorl) or 7.04 (major whorl) for the  $n$ th circular dimension being independent of  $n$ ;

.The reported existence of spherical, i.e., 3-dimensional, bubbles in koilon spaced along circular 7th-order spirillae implies that whorls are projections of *surfaces* that extend beyond the sixth compactified, superstring dimension in at least two more dimensions. This means that space-time is neither 10-dimensional nor 11-dimensional, as predicted by M-theory, but 26-dimensional, as predicted by quantum mechanics for bosonic strings;

.The UPA is the subquark state of a closed (therefore heterotic) superstring. However, instead of this being a single closed curve, it consists of a bundle of *ten* such curves, none of which touch or intersect another one.



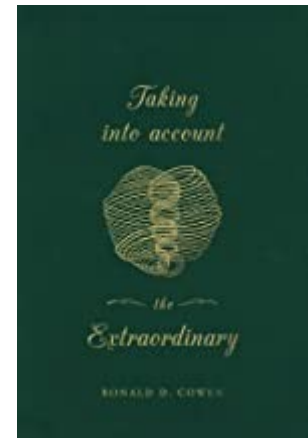
# Ronald Cowen



- Ronald Cowen (deceased 14 August 2019): Buddhist monk
- **The Path of Love: The Future of Buddhism as Science** 2015
- **Mindfulness Meditation**, 2016
- Re: The Strengths and Limitations of My Micro-Psi Perception
- The observer does not disturb the object under study
- If the observer does disturb the object in view, major change can occur
- There is a need to zoom in and zoom out to capture significant features
- The vision has a sweet spot in the center for viewing detail

# String Threaded Through a Subquark

## Cover of Book



This sketch shows a string (rope) entering and exiting a UPA. It is this string that threads together three UPAs into a quark. Source: Cowen, Ronald D.. *The Path of Love: The Future Of Buddhism as a Science* (p. 76). FriesenPress. Kindle Edition.

# Stephen M Phillips

• Stephen M Phillips

• **Extrasensory Perception of Quarks, 1980**

• **ESP of Quarks and Superstrings, 1999**

• **The Mathematical Connection Between Religion and Science, 2015**

