CHAPTER 5

MICRO-PSI ATOMS

5.1 A scenario for formation of MPAs

It was found in chapter 3 that the hypotheses that UPAs are subquarks and that MPAs contain the subquarks present in two atomic nuclei fit the UPA population data of 95 MPAs to a scientifically acceptable statistical degree in that the probability that the observed agreement is due to chance is less than five per cent. Moreover, these data were found to be better fitted by the equation:

$$Y = 18X$$

if X is the mass number of the most appropriate nuclide selected according to three criteria than if X is the atomic weight of the element. This indicates that the UPA populations are more accurately proportional to a property of atomic nuclei - mass numbers - which the investigators could *not* have known more about than a chemical parameter about which they did have information, namely atomic weights.

This chapter will present the qualitative counterpart to this remarkable quantitative correlation between MPAs and the mass numbers of atomic nuclei. By consistently interpreting the particles displayed in the disintegration diagrams published in *Occult Chemistry* for fifty-three MPAs, we shall demonstrate that an MPA is a quasi-nuclear system of nuclear, quark and subquark matter formed from two atomic nuclei of an element. Unlike nuclei, which are aggregates of protons and neutrons - the two different states of the nucleon - MPAs have no single type of unit from which they are built, although the hydrogen triplet is their most common constituent, a feature which is highly significant in view of its identification in section 3.3 as an up or down quark.

The fact that (with some notable exceptions) nucleons as hydrogen triangles are not generally present in MPAs, being replaced by exotic, multi-quark bound states, means that MPAs are very different from excited nuclear states and what nuclear physicists call 'compound nuclei,' which particle accelerators create through the induced collision of high-speed, heavy ions with atomic nuclei in stationary targets. The problem posed by the multiplicity of particles in MPAs, namely, what permits exotic, multi-quark bound states and even bound states of other than three subquarks to coexist in MPAs, when QCD allows only colourless bound states of either three quarks or a quark and antiquark, is one which *any* theory of MPAs has to address. It will be discussed shortly.

This question cannot be separated from the issue of why nucleons in the nuclei selected randomly at a pre-conscious stage in the process of micro-psi observation are destabilized by this intervention of the human observer. Why do nucleons break up into quarks and subquarks prior to observation, yet remain intact and stable in the MPAs of a few elements? How can supposedly permanently confined quarks and subquarks be released in the break-up of the nucleons in two nuclei, only to recombine to form in MPAs many types of bound states of quarks and subquarks? How can such exotic particles exist, let alone be stable enough to last at least for the time it took for Besant & Leadbeater to examine an MPA? (This length of time is not actually known, but several hours would seem a plausible period). They never, of course, reported observing MPAs being formed at any stage of their investigations - if they had, they would not have persisted in their erroneous belief that MPAs were atoms because they would have realized that their interpretation was wrong. Nor did they describe any MPA that spontaneously disintegrated as they watched it. That micro-psi has such a catastrophic effect on atomic nuclei coming under its focus is something that can only be inferred a posteriori from the micro-psi observations. Besant & Leadbeater said that they had to retard the motion of particles before they could make them visible, but claimed that objects were undisturbed by this intervention: 'The object examined, whether an atom or a compound, is seen exactly as it exists normally, that is to say, it is not under any stress caused by an electric or magnetic field. As each object is in rapid motion, the only forces brought to bear on it is a special form of will-power, so as to make its movement slow enough to observe the details.'[1] This exertion by the mind of mechanical action at a distance would be a microscopic version of what parapsychologists call 'psychokinesis.' But this statement was more a declaration of belief than a statement of fact because the investigators could not know with certainty that what they saw was how it existed normally: this could be no more than a working assumption. Even if it were true that micro-psi imposes no stress on an object whilst it is observed, it does not follow that the object seen is what came under observation. Certainly, contrary to what Besant & Leadbeater believed, the observed object cannot be 'as it exists normally' because its movement has to be slowed down before it can be seen, and this motion may be not only translational but also vibrational and rotational. Physicists know that observation of quantum systems like atoms and subatomic particles disturbs their state in a random, unpredictable manner. It is therefore reasonable to expect micro-psi to conform to the quantum-mechanical rules governing observation of quantum systems by being perturbative as well. The question is: what is the physical effect on atoms of their micro-psi observation that converts pairs of them into MPAs?

In the absence as yet of definite facts concerning the modus operandi of micro-psi, the answer to this question can only be speculated. The following picture of the formation of MPAs from atoms is offered: the braking force applied by the micro-psi observer retards the thermal vibrations of atoms, effectively lowering the temperature of the material in the region under examination. Nucleons inside their nuclei are also made to move more slowly by this external force, changing whatever quantum states they occupied. This de-acceleration is accompanied by emission of Bremsstrahlung radiation consisting of photons and perhaps even gluons and hypergluons, if quarks and subquarks themselves become subject to the psychokinetic braking force. This radiation is absorbed by the Higgs vacuum in the region of the affected nuclei, heating it up until it reaches its critical temperature, when it undergoes a phase change from the superconducting state to the normal state. This destroys the vortices in the Higgs field so that the colour (and hypercolour) gauge fields emanating from subquarks are no longer squeezed into bundles, i.e. subquarks cease to be permanently confined. The de-excited nucleus transforms into a plasma of free subquarks, gluons and hypergluons in chaotic motion. The braking force applied by the micro-psi observer continues to slow the freed subquarks. Because it tends to reduce particles to rest, i.e. to prepare particles with a *known* state of zero momentum ($\Delta P_x \rightarrow 0$), the tendency of this preparation procedure prior to micro-psi observation is, according to Heisenberg's uncertainty principle:

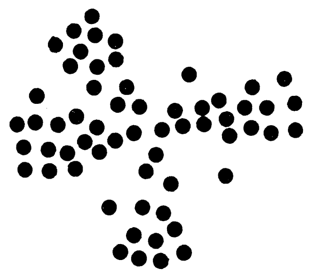
$$\Delta P_x \Delta X \geq h/4\pi,$$

to create complete uncertainty ($\Delta X \rightarrow \infty$) in the position of particles subject to this preparation. A free particle whose momentum is known with certainty is described in wave mechanics by an infinite plane wave because its position is completely uncertain. The wavelength of this wave is given by de Boglie's equation:

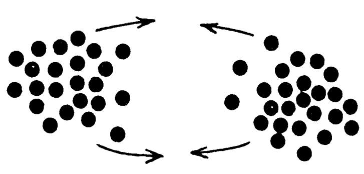
$$\lambda = h/P_x,$$

where h is Planck's constant and P_x is the momentum of the particle. Slower the particle, longer is the wavelength of its associated wave. As particles are brought to rest, their probability wave trains become stretched until they overlap with the similarly stretched wavepackets of particles being slowed down in a neighbouring nucleus. This makes the interaction between subquarks belonging originally to *different* nuclei just as likely as that between subquarks originating from the same nucleus. As a consequence, two plasma clouds of subquarks and quarks originating in two nuclei coalesce. Three or more clouds resulting from the break-up of three or more nuclei do not intermingle either because this process is not energetically more favourable or because for some as yet unknown reason the 'observational apparatus' of micro-psi affects only two nuclei at a time.

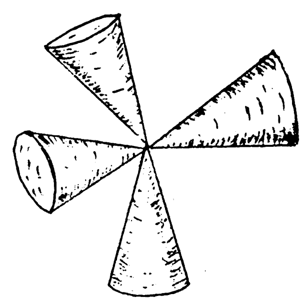
1. Atomic nuclei are selected randomly at a pre-conscious stage of observation.



3. Quark and subquark bound states aggregate symmetrically into nuclear-sized clusters, globally bound by nuclear forces.



2. Nucleons in two nuclei break up: freed quarks and subquarks interact strongly to form new bound states.



4. MPA is resulting, quasi-nuclear system of quark and subquark bound states.

Figure 5.1 : The stages of formation of an MPA.

The critical temperature of the Higgs field is higher, smaller the number of vortices that saturate the hypercolour force. This means that, when the domain of the Higgs field in a normal state cools down and becomes superconducting again, the hottest parts of the subquark plasma will nucleate at first into pairs of subquarks bound by strings because the highest critical temperature will be reached first. Other cooler parts of the plasma can sustain larger numbers of subquarks bound by string forces, such as quarks or diquarks, as well as smaller groups, because their temperatures will be below the critical temperature corresponding to these more complex configurations of vortices. Non-uniformity in the initial heating-up of the Higgs field in the vicinity of an atom selected for observation will result in the plasma condensing into different multi- subquark bound states, each embedded in a domain of one of the possible phases of the Higgs field. These aggregate into larger clusters due to interaction between their strings, which in turn become bound together by global, quasi-nuclear forces. The resulting system of multi-quark and multi-subquark bound states is the MPA. Figure 5.1 summarizes the proposed process of formation of MPAs. (For more details about this process and the factors influencing the symmetry of the large-scale structure of MPAs, see ESPQ, pp. 102-116).

This scenario explains why nucleons as hydrogen triangles are generally absent from MPAs. Having been broken up into quarks or even subquarks when the Higgs field underwent the phase transition to a normal state, protons and neutrons would be the last type of multi-quark bound state to condense out of the quark/subquark plasma as the Higgs field cooled below the various critical temperatures corresponding to superconducting phases whose vortex excitations terminated in progressively larger numbers of subquark monopoles. In the hot, inhomogeneous Higgs field resulting from the slowing down of particles inside atomic nuclei, three-quark bound states would not be the stable subatomic particles that they are when the Higgs field is in its superconducting ground state. Instead, exotic, multi-subquark bound states unknown to high-energy physics would be the norm.

An implication of this scenario is that MPAs may be metastable. As the domains of different phases of the Higgs field cool down towards the temperature of the ambient ground state, string-bound states of ever larger numbers of subquarks become possible, the maximum of nine being reached when the Higgs field returns from a transition through all its excited states to its ground state. This means that groups of different numbers of UPAs could coalesce into groups of larger numbers of UPAs, if this were energetically favourable in the environment of an MPA. This would be the reverse of the step-by-step process of disintegration of particles in MPAs which was carried out by Besant whenever she examined an MPA. They noticed no kinds of instability in MPAs. But this could be simply because they did not look long enough at MPAs. The final fate of the MPAs they created cannot yet be determined.

5.2 The test sample

In this chapter we shall test further the theory proposed in ESPQ that the MPAs recorded by Besant & Leadbeater were formed from pairs of atomic nuclei of an element prior to their observing micro-psi images. In addition to the twenty-two MPAs (the first twenty elements of the periodic table and two extra isotopes) analysed in ESPQ, the MPAs of twenty-eight more elements will be discussed, making a total test sample of fifty-three MPAs (forty-eight elements) to compare theory with the observational data compiled in *Occult Chemistry*. These test elements are shown shaded in table 1.1. Their analysis will proceed from left to right, starting with hydrogen and helium, and then proceeding to the elements in the spike, dumb-bell, etc. groups, working down each group in turn.

Unlike in ESPQ, where analysed MPAs were chosen for their relative simplicity, the twenty-eight additional elements are selected for the following reason: whereas Leadbeater was responsible for describing the nature, arrangement, and number of particles inside an MPA, Besant specialized in the task of using her micro-psi powers to break up all the types of particles in the MPA into simpler ones with fewer UPAs, repeating this disintegration in successive stages until only either free UPAs, pairs, or triplets of UPAs were left in her field of vision. Presumably, this step-by-step process was carried out *in situ*, in which case it may have destabilized the remainder of an MPA, requiring a number of similar MPAs to be sampled before the task of disintegration was completed. She recorded what she observed at each stage in disintegration diagrams. These provide information about the X and Y subquark composition of the particles inside MPAs that proves of great value to the task of testing the theory that MPAs are formed from two atomic nuclei. Indeed, whereas Leadbeater's work (assisted by his colleague Jinarajadasa) in describing the arrangement of particles in MPAs and determining their UPA populations can be said to have provided the information that confirmed the author's theory in a quantitative sense, the mass of information in Besant's observations of the positive and negative groups of UPAs in MPAs gives a remarkably thorough, qualitative confirmation of its basic proposition, as well as a vast amount of evidence in support of the predicted subquark compositions u = X-X-Y and d = X-Y-Y.

Sixty-one MPAs recorded in the third edition of *Occult Chemistry* do not have disintegration diagrams. This is either because these MPAs contained no particles that had not been previously observed by the time they were studied and whose break-up had therefore not been already recorded or because many of them were so complex as to make impractical a comprehensive account of their disintegration. As these MPAs sometimes contain particles which are not found in other MPAs and whose predicted quark and subquark compositions cannot therefore be compared with observation, they lack the necessary information to test the theory thoroughly. Twenty-eight elements in addition to those analysed in ESPQ do have disintegration diagrams enabling a detailed comparison between theory and observation. The elements manganese and argon are included with these, even though they have no disintegration diagrams, because their MPAs contain only particles found in MPAs with such diagrams. These additional elements provide a more stringent test of any theory of MPAs because their MPAs contain as a rule more types of particles than those discussed in ESPQ, all of which must be identified in terms of u and d quarks and X and Y subquarks in a way that not only is compatible with both theory and information embodied in disintegration diagrams but also agrees with what is found for similar particles in other MPAs. The more complex an MPA, the more severe is the test of self-consistency that it poses for analysis. The forty-eight elements whose MPAs (apart from manganese and argon) have disintegration diagrams constitute the largest possible sample provided by *Occult Chemistry* to enable comprehensive testing of the theory that MPAs are formed from pairs of atomic nuclei.

Although Besant never explained how she induced the break-up of MPAs, she depicted this psychokinetic process in disintegration diagrams by four successive stages which -

starting from the initial one - she labelled 'E4,' 'E3,' 'E2,' and 'E1.' Her reason for using this nomenclature was that, together with Leadbeater, she ascribed to and promoted the theosophical doctrine that there are seven states of physical matter: solid, liquid, gas, and four 'etheric' states unknown to science existing on four 'etheric subplanes.' The two Theosophists believed that, when particles were released from MPAs, which they thought were the atoms making up matter in the solid, liquid, or gaseous state, these subatomic objects existed on one or other of these four subplanes, creating four subtle states of matter. So it was natural for them to divide the process of disintegration into four stages. But many different disintegration diagrams indicate the same type of subatomic particle being sometimes released from MPAs at *different* stages, so that invoking the theosophical notion of subplanes is not useful in the context of analysing these particles, irrespective of whether it is true. For the sake of convenience, however, but not because of adherence by the author to the theosophical doctrine underlying them, the labels E1, E2, E3, and E4 will be retained as names of the stages of break-down when disintegration diagrams displaying these indicators are discussed. The reader should note that the particles released by the disintegration of a given group of UPAs are depicted (as far as space allows) at the next stage directly above it in the same vertical line.

5.3 Mirror states

Two nuclides of different elements with the same mass number ($A = Z + N$) have nuclei containing the same number of nucleons. They are said in nuclear physics to be 'mirror nuclei' if the number of protons (Z) in one is equal to the number of neutrons belonging to the other, so that the number of neutrons (N) in the former is equal to the number of protons in the latter. Neglecting effects arising from their different Coulomb energies* due to their different numbers of positively charged protons, similar states of mirror nuclei are known to have almost the same energy. This is because the strength of the nuclear force is the same for two interacting protons as it is for two neutrons or for a proton and a neutron (the two isospin states of a nucleon, whose 'third component T_3 of isospin' has, respectively, values $T_3 = +\frac{1}{2}$ and $T_3 = -\frac{1}{2}$), i.e. this force is independent of their isospin state, so that different isospin states of a system of nucleons should have the same energy. A nucleus with Z protons and N neutrons has $T_3 = \frac{1}{2}(Z-N)$, which means that two mirror nuclei have opposite values of T_3 and are members of an isospin multiplet of states with the same energy. According to quantum chromodynamics, the currently accepted theory of the strong forces between quarks, the nuclear force acting between nucleons in atomic nuclei is independent of their isospin state because it is the residual coupling between colourless, bound states of three quarks, and the colour force between up and down quarks, which is mediated by exchange of virtual gluons, is independent of their isospin states. If, firstly, isospin is not a global property of composite quarks but is a property of (at least one of) their constituent subquarks and, secondly, the generalized (hyper) colour force (this includes the colour force between quarks) acting between subquarks is also independent of their isospin state, as the analogy with quarks makes it reasonable to assume, then the concept of mirror nuclei should have its counterpart at the subquark and quark levels.

* This is the energy due to the electrostatic forces between the protons in a nucleus.

Analysis of MPAs proves this to be the case, indicating that they are systems of multi-quark and multi-subquark states bound together in a way that makes them analogous to atomic nuclei and for which isospin can be a meaningful quantum number despite the multiplicity of these types of constituents.

Let us therefore define the mirror state of a system of A X subquarks and B Y subquarks bound by hypercolour forces as a system of B X subquarks and A Y subquarks, similarly bound. Examples of pairs of mirror states would be:

1) u and d quarks, because the analysis of MPAs presented in this book provides strong evidence that the former consists of two X subquarks and one Y subquark and that the latter comprises one X subquark and two Y subquarks;
2) protons and neutrons, because the former, as u-u-d bound states, consist of five X subquarks and four Y subquarks (5X-4Y), whilst the latter, being u-d-d bound states, consist of four X subquarks and five Y subquarks (4X-5Y).

More generally, mirror states mX-nY and nX-mY are bound systems of particles made up of multi-quark and/or multi-subquark bound states in which all the m X subquarks of one system are replaced in its mirror state by m Y subquarks and all its n Y subquarks are replaced by n X subquarks - the X and Y subquarks merely exchange places. Mirror nuclei (Z, N) and (N, Z) are themselves pairs of mirror states, according to this definition, because the subquark composition of the former should be:

$$Z(5X+4Y) + N(4X+5Y) = (5Z+4N)X + (4Z+5N)Y = AX + BY,$$

where A = 5Z+4N and B = 4Z+5N, whilst the subquark composition of the latter is:

$$N(5X+4Y) + Z(4X+5Y) = (5N+4Z)X + (4N+5X)Y = BX + AY.$$

The mirror state of a given group G will be denoted $\tilde{G}$. Clearly, $G=\tilde{G}$ if $m=n$. But the definition does not apply to two composite systems made up of *different* sets of particles, that is, multi-subquark bound states that differ in either the numbers of their subquarks, the geometry of their various orbital configurations, or both, even if the number of X subquarks in one system equals the number of Y subquarks in the other, and vice versa. Two bound systems of composite particles are mirror states only if to every bound state in one system there is a mirror state counterpart in the other. This means that, as *depicted in disintegration diagrams*, the orbital configurations of subquarks in pairs of mirror states must look alike, apart from the following important difference: as stated in chapter 3 during the discussion of the hydrogen MPA, Besant & Leadbeater distinguished 'positive' and 'negative' groups of UPAs, a distinction which they depicted in disintegration diagrams by representing positive groups with their heart-shaped UPAs pointing outwards away from one another and negative groups with their UPAs pointing inwards towards one another. Analysis of twenty-two MPAs in ESPQ showed that positive and negative groups invariably have, respectively, positive and negative electric charges. Since Besant & Leadbeater did not explain what they meant by describing particles as positive or negative, this elucidation cannot be anything other than an interpretation. But so often will analysis reveal in this chapter a consistent correlation between the stated positivity or negativity of groups and their *deduced* electric polarity that it leaves no doubt that this distinction is interpreted correctly. This remarkable correlation running throughout many hundreds of particles depicted in disintegration diagrams demonstrates an aspect of the micro-psi faculty of Besant

& Leadbeater that they never discussed, namely, their very accurate ability to distinguish between positively and negatively charged subatomic particles held in their field of vision. One can only speculate that the information-gathering 'observational probe' of micro-psi is sensitive to the direction of the electrostatic field due to the subatomic particle under observation.

Analysis reveals that mirror states are often *oppositely* charged, although their electric charges may not have the same magnitude. In fact, most pairs of (+) and (-) groups are predicted to be mirror states of each other. This implies that many mirror states were noticed and recorded in *Occult Chemistry* by the two investigators. But many MPAs in the test sample are predicted to contain mirror states which were not noticed by Besant & Leadbeater. There are two plausible reasons why such particles were not detected:

1) mirror states may be predicted only for particles in some (not all) of the funnels of certain MPAs. As, according to their own admission, Besant & Leadbeater did not examine every funnel in an MPA but limited their examination to just one, whenever the funnels appeared to contain the same set of particles, they would have missed those particles in unexamined funnels that, being mirror states, are predicted to have opposite electric polarity to their counterparts in the funnel they did examine;
2) when they found MPAs to contain either several similar bound states of UPAs, aggregates of groups or a number of similar segments in each funnel, Besant & Leadbeater did not bother to observe every one in detail. Instead, they usually examined only one representative group or segment, making the tacit but unwarranted assumption that bound states of UPAs whose orbital configurations were similar were identical in terms of their positivity or negativity. In this way Besant & Leadbeater would have missed detecting mirror states because, being composed of analogous bound states with similar spatial configurations, these could have been distinguished only by detailed examination of their positive and negative constituents.

This limitation in the extent of their investigation of MPAs was inevitable, given the time and labour that systematic examination of every particle would have entailed. But it means that one must not always accept uncritically at their face value statements in *Occult Chemistry* that, for example, each of the funnels of an MPA contains the same set of particles, or that, say, all segments of a funnel which appear similar consist of the same types of particles. This frequently made extrapolation from what they believed was a representative particle may or may not be valid, so it must not be assumed prior to analysis. It is clear that the information in a disintegration diagram really applies only to those groups of UPAs that were studied in detail because they were assumed to be typical of what the other funnels or structural components of the MPA contained.

The fact that Besant & Leadbeater did not examine every funnel or structural component of an MPA does not, however, mean that its unexamined ones contained groups wholly dissimilar to those displayed in its disintegration diagram. It is clear that Besant & Leadbeater must have scrutinized *every* funnel or structural component sufficiently to be able to declare that they contained similar sets of particles, or even in some cases to be able to distinguish funnels with different sets of particles. But this check never extended to a determination of the positivity or negativity of individual particles in every funnel or component of an MPA. Nor, one suspects, did they always check whether all the members of a bound cluster of 'similar' particles in one funnel had the same positivity or negativity as the one that they studied. Such a thorough examination would have been too laborious and time-consuming. But its omission means that some funnels, spikes, bars, or arms of an MPA, although containing the same types of particles as the one Besant & Leadbeater examined in detail, may differ from what is displayed in the disintegration diagram to the extent that some members of a set of what they regarded as similar particles may have opposite polarity to those shown in the diagram, i.e. some funnels, etc., or even groups of identical particles in the same funnel, etc., may contain the mirror states of the particles depicted in the diagram. It is therefore reasonable to anticipate that particles which looked similar to superficial observation may differ in subquark composition to the extent that some of them are mirror states of the others. This, indeed, is what analysis of MPAs reveals.

Edition Variants

The interpretation of reported positive and negative versions of the same particle as mirror states explains why minor differences exist among the disintegration diagrams of some MPAs published in the first and third editions of *Occult Chemistry*, the latter including new material arising from re-examination of many MPAs after publication of the first edition. MPAs whose disintegration diagrams in the first and third editions differ slightly will be called 'edition variants.' They vary usually in the following way: whereas the disintegration diagram in the later edition may depict a given particle in an MPA breaking up into a set of 2n identical particles with the same polarity, the earlier edition shows that n positive and n negative similar particles are released. Theory must be able to reconcile this apparent discrepancy by showing that the total X and Y subquark composition of either set of particles is the same. This is because all the other particles in the MPA were recorded in the two editions of *Occult Chemistry* to be similar in their positivity or negativity. If a particle P is an AX-BY bound state (A and B even integers), its mirror state $\tilde{P}$ is a BX-AY bound state, and it is obvious that n P particles and n $\tilde{P}$ particles have the same number of X subquarks and the same number of Y subquarks as 2n identical particles Q with (A+B)/2 X subquarks and (A+B)/2 Y subquarks. The particle whose break-up was described differently in the two editions was similar in either case. But, being its own mirror state, it can dissociate either into 2n particles Q which are their own mirror state or n particles P and n mirror states $\tilde{P}$. As the electric charges of X and Y are, respectively, +5/9 and -4/9, P is positively charged and $\tilde{P}$ is negatively charged if 4A>5B. Two edition variants are not different vis-à-vis their subquark composition because both editions of *Occult Chemistry* always indicate that their UPA populations are the same, implying that they were formed from similar nuclides. Their difference solely arises from the two dissimilar ways the same type of particle was observed to break up. For example, it is obvious that a bound state of 2n X subquarks and 2n Y subquarks could in principle break up into either 2n X-Y bound states, which are their own mirror states, or n X-X bound states ('positive particles,' because they each carry a positive electric charge) and their mirror states: n Y-Y bound states ('negative particles,' because they are each negatively charged).

Edition variants are fairly common among the MPAs analysed in this chapter. Their existence is evidence supporting the process of formation of MPAs described in section 5.1 because minor differences in some of the types of particles formed by recombination of subquarks and quarks from the two parent nuclei should be expected if the resulting mirror states have the same mass, which (apart from electromagnetic differences) should be the case if they are states of opposite isospin and if X and Y subquarks have the same mass. Their existence would be problematic if MPAs were not *formed* from nuclei.

5.4 Mirror states and the structure of MPAs

If the total number (n) of X subquarks predicted to be in the MPA formed from two similar nuclei with atomic number Z and neutron number N:

$$n = 10Z + 8N$$

and the total number (m) of Y subquarks present:

$$m = 8Z + 10N$$

both cannot be equally divided among the F funnels or other major component of an MPA, i.e. if F is not a *common* factor of n and m, then either the MPA has a central globe containing enough X and Y subquarks for the remainder to be distributed uniformly among the funnels or the MPA has no central globe, in which case the set of particles in some funnels is the mirror state of the set in the others. n and m must be such that, if p funnels each contain A X subquarks and B Y subquarks, where A + B = (n+m)/F, then (F-p) funnels each contain B X subquarks and A Y subquarks and

$$pA + (F-p)B = n,$$

$$pB + (F-p)A = m.$$

These two equations can be solved for the two unknowns p and A (or B), allowing the predicted subquark composition of all the particles in a funnel or other structural component of an MPA to be compared with that implied by its disintegration diagram.

Irrespective of whether an MPA has a central globe, if its funnels each contains several similar sets of particles, the latter either have the same subquark composition or, if the numbers of available X and Y subquarks cannot be uniformly distributed among the funnels, differ to the extent that some sets are mirror states of the others. In the case of funnels made up of three identical segments, analysis often reveals that, if theory prohibits each segment having the same subquark composition, one segment must be the mirror state of the other two. This 2:1 division of the particles in a funnel was observed frequently by Besant & Leadbeater as a feature of MPAs, and its explanation is simple: suppose that the subquarks in m up quarks and n down quarks released from the two parent atomic nuclei make up the particles in one funnel. Since u = X-X-Y and d = X-Y-Y, there are (2m+n) X subquarks and (2n+m) Y subquarks in the funnel. These can constitute two particles, each with m X subquarks and n Y subquarks, and one particle with n X subquarks and m Y subquarks, i.e. the mirror state of the former. So the funnel should contains three composite particles, one of which is the mirror state of the other two.

Particles in MPAs belonging to the tetrahedron group B and cube group B are distributed within a funnel into three identical segments, each consisting of three similar sets of particles. This, once again, is due simply to either the 2:1 division of X and Y subquarks in u and d quarks or, sometimes, the 2:1 division of u and d quarks in the protons and neutrons of the parent nuclei. If m and n have a common factor p, a funnel may contain p multiples of three identical segments, or each of the three segments may be made up of p multiples of three similar particles, one of which is actually the mirror state of the other two. Examples in tetrahedron group B are the MPAs of magnesium, sulphur, and zinc, which will be analysed in this chapter. In cube group B the MPAs of indium, antimony, gadolinium, dysprosium, thallium, and bismuth display two types of funnels:

MPA = 3 type A funnels + 3 type B funnels,

where

type A funnel = (2 segment A + segment B) + segment C,

and

type B funnel = (segment A + 2 segment B) + segment C or D.

It is found that segment A in a type B funnel is the mirror state of segment A in a type A funnel, and similarly for segment B. Furthermore, the three type A funnels consist of two identical funnels and one containing the mirror states of the particles in the former. Similarly with the type B funnels. Here, the segments A and B are not mirror states because not every bound state of UPAs in one has an exact counterpart in the other: they contain dissimilar particles. The pairing of mirror states takes place in different funnels instead of in the same funnel.

The purpose of this chapter is restricted to testing further the hypothesis proposed in ESPQ that the MPA of an element consists of the subquarks present in two of its atomic nuclei. No attempt will be made to derive from fundamental principles of particle physics the structure of an MPA as a quasi-nuclear system of quark and subquark matter because such an ambitious project is made impossible by the current lack of experimental facts about as yet undetected subquarks, as well as the limited understanding by particle physicists of the properties of quark matter. Instead, our analysis will demonstrate in a partly phenomenological way that the detailed descriptions of the MPAs of forty-eight elements are consistent with this hypothesis. We shall use no more than elementary facts of nuclear physics and the quark model, as well as the basic assumptions: u = 2X-Y and d = 2Y-X for the subquark composition of u and d quarks. Analysis of the oxygen MPA will demonstrate that these compositions are actually deducible from micro-psi observations, so *that they are not in fact independent model assumptions at all.* An astounding degree of consistency between theory and observation, as well as of self-consistency between results of analysis, will be seen to emerge. The consistency is so considerable that it cannot be plausibly dismissed as due to coincidence. Nor can it be contrived in any way because this is made impossible in practice by the requirement of self-consistency, which demands that, after allowance is made for the possibility of mirror states (these provide a degree of analytical freedom which is limited by the information in disintegration diagrams), the same type of particle in different MPAs should always have the same subquark composition. Indeed, given all the following constraints:

1. the working hypothesis: MPAs consist of the subquarks in two atomic nuclei;
2. facts about the mass numbers of nuclides corresponding to MPAs;
3. the quark model: proton = u-u-d, neutron = u-d-d;
4. the X and Y subquark composition of up and down quarks: u = X-X-Y, d = X-Y-Y;
5. the key interpretations (discussed below);

6. consistency with disintegration diagrams: positive and negative versions of a particle are mirror states;
7. self-consistency of analysis: similar particles in different MPAs have the same subquark composition,

it seems miraculous that a coherent picture could emerge from a theoretical interpretation of hundreds of pictures allegedly obtained by the use of ESP. Any error in the subquark composition assigned to a group of UPAs would have made itself felt in the analyses of every other MPA containing this type of particle, particularly if it were amplified by the MPA having several of these groups. The presence of such systematic errors of interpretation would make it impossible to reconcile either the number of X or Y subquarks (or both) predicted to be in two atomic nuclei of an isotope with the number implied by self-consistent interpretation of all the particles in its MPA. Even supposing the unlikely event that reconciliation with theory had proved possible just by accident - perhaps by several unwitting errors happening to cancel one another - the problem of reconciliation with the types of particles depicted in the disintegration diagram would remain. The fact that hardly any discrepancy without plausible attribution to a mistake of observation arises between theory and a vast body of observational data - even in the case of MPAs containing thousands of UPAs, such as the gold MPA - permits only one possible conclusion: several decades before the modern era of atomic and nuclear physics began, Besant & Leadbeater described accurately by some kind of ESP systems of strongly interacting subatomic particles that they had unknowingly fabricated from pairs of atomic nuclei through the psychokinetic intervention of their ESP powers.

5.5 Labels and keys

Labelling of UPAs depicted in disintegration diagrams follows that employed in ESPQ:

= X subquark

= Y subquark

= X or Y subquark. This also depicts either several free UPAs which were released from different particles and which include both X and Y subquarks, UPAs which should not have been observed or UPAs belonging to particles which are predicted to have been misobserved, e.g. a group of UPAs described as being negative instead of positive, as predicted.

The key interpretations of the two types of hydrogen triplets and the three types of duads of UPAs recorded in disintegration diagrams are given for reference in figure 5.2. The reader is recommended to memorize them, as they will be referred to frequently during the remainder of this chapter.

The diagrams of the hydrogen triplets portray *free*, not confined, quarks (notice that the lines of force (strings) binding together three UPAs in a triplet form closed configurations). The fact that this interpretation of triplets as quarks implies that the latter were sometimes observed in the free state does not imply that the colour force does not permanently bind quarks together, as physicists currently believe. Rather, it could indicate that the mechanism (Meissner effect) responsible for quark confinement can be nullified (if only temporarily) by the micro-psi observer, as explained in section 4.3.

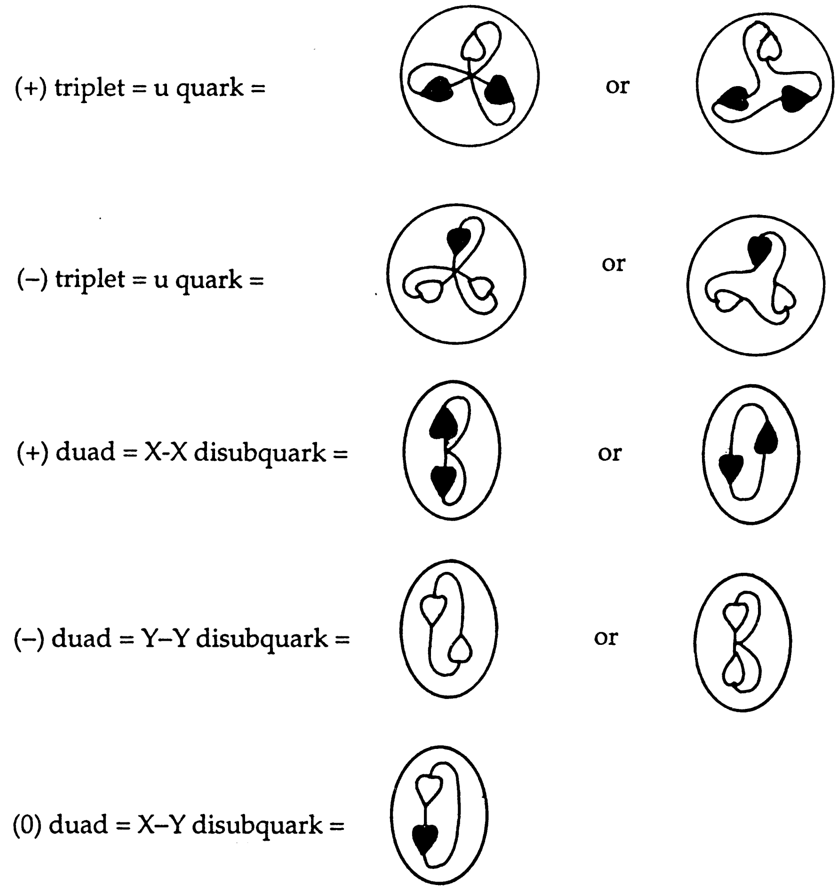


Figure 5.2 : Key interpretations

5.6 Hydrogen and deuterium MPAs

Hydrogen MPA

The confining wall of the MPA (fig. 5.3) is egg-shaped and contains two triangular arrays of three spheres. Each array, or 'hydrogen triangle,' interpenetrates the other. The spheres contain groups of three UPAs ('hydrogen triplets'), which are arranged as triangles ('H3') in the lower hydrogen triangle and as one H3 group and two linear arrays ('H3″') in the upper hydrogen triangle. In the first edition of *Occult Chemistry* the two linear triplets are shown as being one in each triangle.[2] The third edition states[3] that this form is rare because it was not observed when Leadbeater re-examined hydrogen in 1932. Hydrogen triplets are either 'positive' or 'negative.' Positive H3 groups are depicted (as are all positive groups of UPAs) with their heart-shaped UPAs pointing outwards from the centre of the triangle; negative H3 groups (and all negative groups) are shown with their UPAs pointing inwards towards the centre of the group. The upper hydrogen triangle contains one positive (+) H3 triplet, one

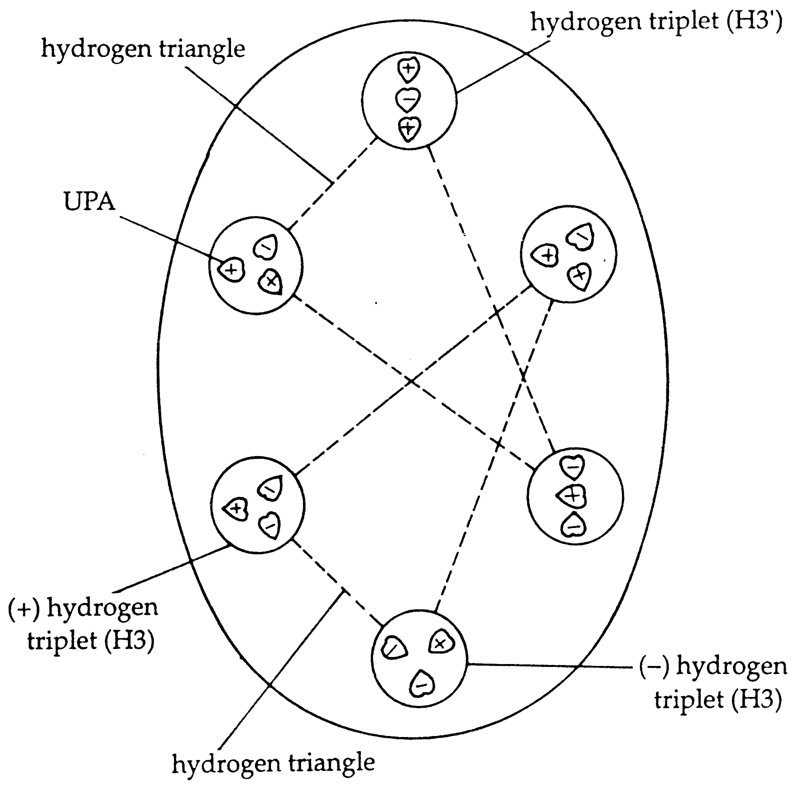


Figure 5.3 : The hydrogen MPA

negative (-) H3′ triplet and one H3′ triplet whose polarity is indeterminate because (for a reason to be discussed shortly) its depiction does not conform to this convention for indicating positivity and negativity, a schematic rule which was otherwise followed strictly throughout the investigations. The lower hydrogen triangle consists of two positive H3 triplets and one negative H3 triplet. Leadbeater reported in *The Theosophist* (vol. 54, 1933) two varieties of the hydrogen MPA: hydrogen variety 1, which contains nine (+) UPAs and nine (-) UPAs, and hydrogen variety 2, which contains ten (+) UPAs and eight (-) UPAs, their difference arising from the replacement of a (-) UPA by a (+) UPA in one positive H3 triplet belonging to the upper hydrogen triangle of hydrogen variety 1.

Hydrogen MPA = (2H3′ + H3) + (3H3).

When observed during the micro-psi examination of hydrogen gas, the hydrogen MPA is formed (fig. 5.4) from the two protons in a molecule, the hydrogen triangles being bound states of three quarks (baryons), the hydrogen triplets being u and d quarks and the UPA being a subquark. This would explain why hydrogen MPAs 'were not observed to move in pairs.'[4] It cannot, however, be a hydrogen molecule itself because the two hydrogen triangles overlap each other, implying that - if nucleons - their separation is on the nuclear scale of one fermi (10^{-13}cm), whereas the atomic-scaled distance between the protons in a hydrogen molecule is about 100,000 times larger than this. Nor can the MPA be simply one end of a diatomic hydrogen molecule because this would imply that MPAs are atomic nuclei, irrefutable arguments against which were presented in ESPQ. It cannot be the deuteron in an HD molecule because Besant & Leadbeater observed the hydrogen MPA on numerous occasions, including when they examined with micro-psi chemical compounds containing hydrogen atoms, and they would have reported usually observing single hydrogen triangles instead of pairs of triangles because they would have examined more often the relatively more common H_2 molecule, which means that they would have described a hydrogen MPA consisting of pairs of triangles as rare.

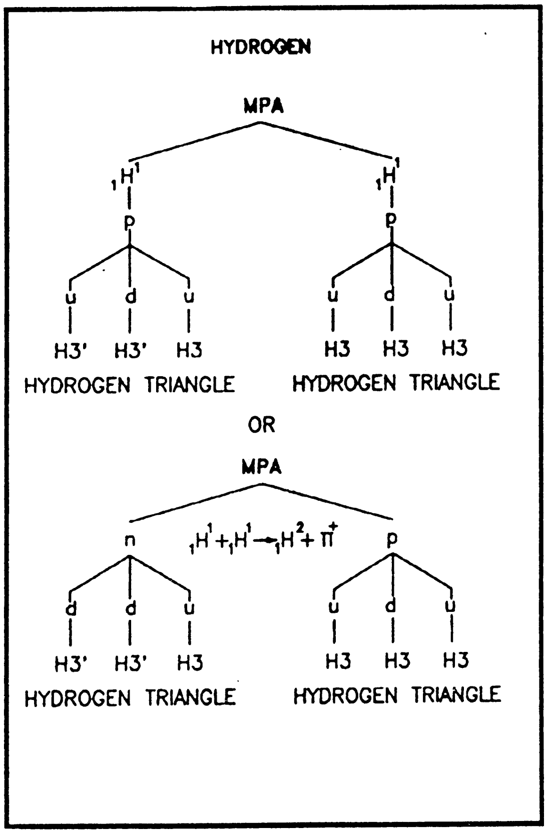


Figure 5.4

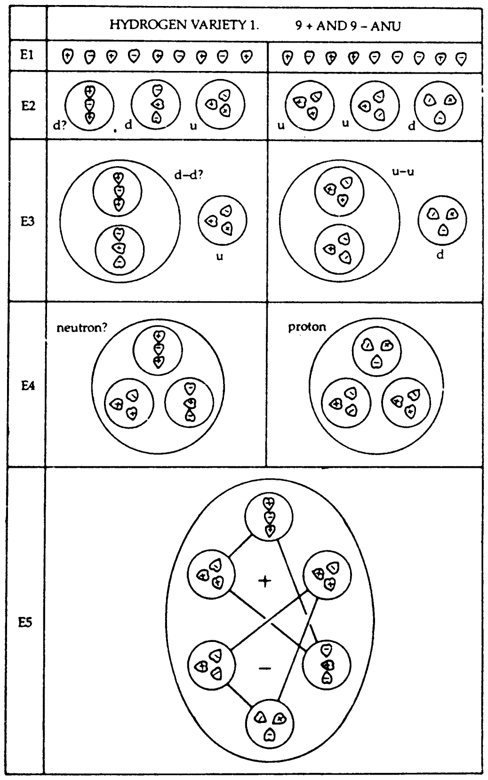


Figure 5.5

In the author's book (ESPQ) *both* hydrogen triangles were identified as protons. Certainly, the lower one can be interpreted as such because it consists of two positive triplets and one negative triplet, thus being consistent with the quark model of the proton as a bound state of two positively charged u quarks and one negatively charged d quark. This is also indicated by the disintegration diagram (fig. 5.5) of the hydrogen MPA, which shows that the lower hydrogen triangle breaks up at the E2 stage into two positive triplets (u quarks) and one negative triplet (d quark). The positive H3 triplet in the upper hydrogen triangle is a u quark and its negative linear hydrogen triplet H3′ is a d quark. But the outer UPAs of its other linear H3′ triplet point in the same direction instead of in opposite directions, as positive and negative linear triplets are depicted throughout *Occult Chemistry*. This violates the convention referred to above, making its polarity ambiguous and its interpretation as a u or d quark uncertain. Moreover, it is depicted at the E2 stage in the second disintegration diagram (fig. 5.6) as made up of three UPAs *unlinked by lines of force*, i.e. as free, unconfined subquarks! This broken-up, linear triplet cannot represent the natural, three-subquark bound state of a quark - whether confined or freed by the intervention of the micro-psi observer. Rather, it must be regarded as an artefact of observation which was never recognized as such by the investigators, although it should have been, and so went uncorrected even by Jinarajadasa when he prepared the third edition of *Occult Chemistry*, published after their deaths. The pointing inwards of the outer UPA on the left of this linear triplet depicted at the E2 stage and the pointing of the two other UPAs in the same direction are suggestive of a u quark consisting of a negatively charged Y subquark (the inward pointing UPA) and two subquarks which are identical because they point in the same downward direction and which therefore must be X subquarks. But the fact that both outer UPAs do not point in *opposite* directions makes this unique departure from the customary diagrammatic depiction of positive and negative groups of UPAs sufficient to render uncertain the identification of this hydrogen triplet as a u quark. It is unfortunate that the text of either edition of *Occult Chemistry* says nothing about the polarity of this triplet. It could therefore be a d quark, which would make the upper hydrogen triangle a neutron and the hydrogen MPA a deuteron. This particle might have been created by an inelastic collision between the two protons in a hydrogen molecule induced by the processes accompanying micro-psi observation:

$$p + p \rightarrow d + \pi^+.$$

The positively charged pion (π^+) has a half-life of about 10^{-8} seconds and would have decayed into a neutrino and a positive muon long before a micro-psi image of the deuteron became visible. The nuclear force binding the proton and neutron together in the deuteron would then explain why 'each of the three groups making one half of Hydrogen are linked to each other across space by lines of attraction.'[5] Furthermore, the stability of the hydrogen MPA is consistent with its being the stable deuteron. Additional strong evidence supporting this interpretation is provided by the helium MPA, which will be discussed shortly. It cannot be a diproton, which is very unstable, although this argument may not be completely conclusive if the possibility is allowed that the MPA was not actually observed in real time but, instead, was viewed as an extremely slowed down recording of a brief moment in the short life of a diproton created through the disturbing act of micro-psi observation, which induced for some reason a collision of the two protons in a hydrogen molecule. This could have happened because it was pointed out in section 3.3 that, according to *Occult Chemistry*, Leadbeater described some MPAs by playing back images that he had experienced during earlier examinations of elements.

One question raised by the interpretation of the hydrogen MPA as a bound state of two nucleons is: why is the d quark in the proton (lower hydrogen triangle) a triangular bound state of three subquarks, whilst in the other proton or neutron it is a linear bound state of three subquarks? It must be emphasized that all particles depicted in *Occult Chemistry* were described as they were observed whilst held in the field of micro-psi vision. This entrapment — perhaps in a potential well created by the observational apparatus of the observer — must be perturbative to some degree, and so what is seen may not necessarily always refer to the ground state of the particle. The linear H3' bound state may be an excited p-wave state (an

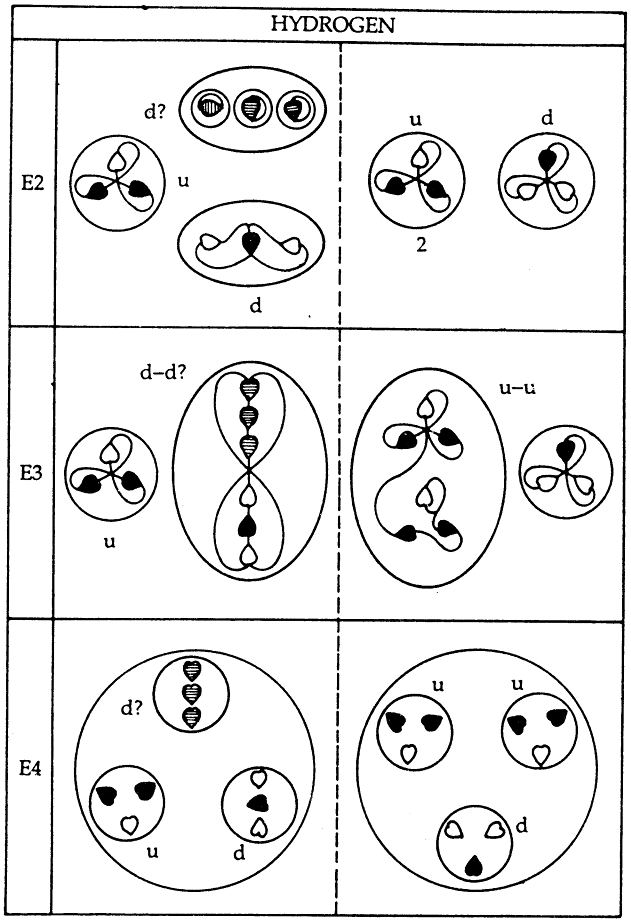


Figure 5.6

orbital excitation) of the spherically symmetric ground state of three confined subquarks with zero total orbital angular momentum, namely, the triangular H3 triplet. One cannot assume a priori that quarks present in MPAs formed from pairs of atomic nuclei are made up of subquarks always in the same internal state of orbital motion as they were when present in the parent nuclei, although this nevertheless is true in most MPAs because H3 groups are far more common as their constituents than H3′ groups.

The identification of hydrogen triplets as u and d quarks (and, perhaps, sometimes their orbital excitations) raises the question whether the (+) and (-) types of UPAs differ in the signs of their electric charges. This chapter will show that self-consistent analysis of the MPAs of forty-eight elements proves conclusively that u and d quarks have the subquark composition:

u = X-X-Y, d = X-Y-Y,

where the subquark X is positively charged and the subquark Y is negatively charged. A proton (u-u-d) should therefore consist of five X subquarks and four Y subquarks, whilst a neutron (u-d-d) should comprise four X subquarks and five Y subquarks. If the hydrogen MPA were a deuteron, it would contain nine X and nine Y subquarks. The fact that one of the two varieties of the hydrogen MPA contains nine (+) UPAs and nine (-) UPAs invites the suggestion that a (+) UPA is an X subquark and that a (-) UPA is a Y subquark. But these identifications are inconsistent with the fundamental interpretation of positive and negative triplets as, respectively, u and d quarks because, although - in agreement with this idea - one of the two positive triplets in the lower hydrogen triangle consists of two (+) UPAs and one (-) UPA, the other positive triplet consists of one (+) UPA and two (-) UPAs. Of the five triplets whose quark identity can be inferred with certainty, only this one does not have the right numbers of (+) and (-) UPAs for the suggestion to be valid. The problem remains even if positive and negative triplets are interpreted alternatively as, respectively, d and u quarks and/or if (+) and (-) UPAs are identified as, respectively, Y and X subquarks, for the two positive triplets in the lower hydrogen triangle *comprise* different numbers of (+) and (-) UPAs. The identification of the X subquark as a (+) or a (-) UPA and the identification of the Y subquark as, respectively, a (-) or a (+) UPA must therefore be wrong. Further evidence and arguments in support of this conclusion will be offered during the analysis of the oxygen MPA. The internal chirality of a UPA does not indicate its electric polarity, i.e. some (+) UPAs in the hydrogen MPA are positively charged X subquarks, whilst others are negatively charged Y subquarks (similarly for (-) UPAs).

[Note added for physicists: the author proposed in ESPQ that, because magnetic charge is, mathematically speaking, a pseudoscalar with respect to spatial inversion, changing sign when coordinate axes are reversed, (+) and (-) UPAs, being mirror images of each other, carry magnetic charges of opposite sign, the former carrying a positive charge and the latter a negative charge because this assignment is consistent with the statement on p. 13 of *Occult Chemistry* (3rd ed.) that 'force comes out' in (+) UPAs and that force 'disappears' in (-) UPAs if this force is interpreted as an non-abelian gauge field whose magnetic monopole sources are UPAs. Protons made up of nine monopole sources of the gauge fields of a multiple-connected, hypercolour gauge symmetry group could, because of this multiple-connectedness, consist of either five positive magnetic charges and four negative charges, five negative and four positive charges or six positive and three negative charges, the lattermost explaining why, when Leadbeater examined a molecule of water in 1932, he observed a second variety of the hydrogen MPA with one hydrogen triangle made up of six (+) UPAs and three (-) UPAs (see p. 120 of ESPQ for details)].

Deuterium ('Adyarium') MPA

This MPA was announced in the December, 1932 issue of *The Theosophist*. It was found in the atmosphere at Adyar, a suburb of Madras in India (hence its name), but was regarded as a new element by Besant & Leadbeater, even though it had a number weight of exactly 2, thus making deuterium the only possible source (this isotope of hydrogen had been discovered the previous year by H. Urey and his colleagues). Besant & Leadbeater did not make this identification because they had earlier come to believe that an object seen during the electrolysis of water was an atom of deuterium, even though they reported it to be unstable[6] yet presumably knew by then that the atom of heavy hydrogen was stable. Adyarium consists (fig. 5.7) of a sphere containing a tetrahedral array (Ad24) of four cigar-shaped groups of six UPAs (Ad6) and a tetrahedral array (Ad12) of four H3 triplets. The two tetrahedra interlace each other. Each Ad6 revolves rapidly around its long axis, making it look 'like a pencil sharpened at both ends.'[7]

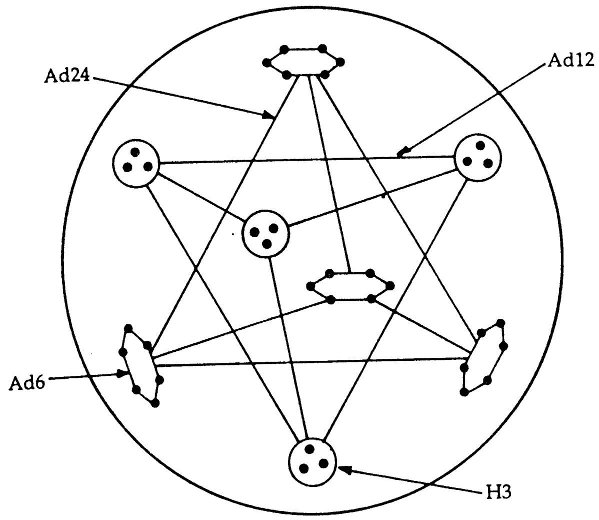


Figure 5.7 : The adyarium MPA

Deuterium MPA = Ad12 + Ad24.

Adyarium is the MPA of deuterium resulting from micro-psi examination of a molecule of deuterium (fig. 5.8). Each of the two protons in the two deuterons in the molecule breaks

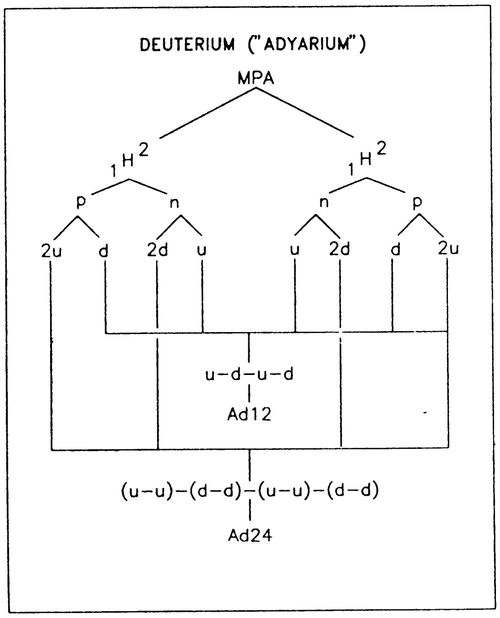


Figure 5.8

up into a d quark and a u-u diquark and each of the two neutrons breaks up into a u quark and a d-d diquark. The two u quarks and the two d quarks interact to form a bound state. This is the Ad12. The two u-u diquarks and the two d-d diquarks interact to form a bound state - the Ad24 (this revises the analysis presented in ESPQ, which assumed that the Ad6 groups in the Ad24 group were identical, so that they were u-d diquarks). The Ad6 is either a u-u or d-d diquark. Since the u quark has an electric charge of +⅔ and the d quark has a charge of -⅓, two Ad6 groups in the Ad24 are predicted to be positively charged and two Ad6 groups are negatively charged. This is confirmed by the text in both the first and third editions of *Occult Chemistry*, the former stating that 'two cigars' are positive and two negative'[8] and the latter stating that 'On the E3 level the Ad24 gives 4 sextets, 4 Ad6, two positive and two negative.'[9] Furthermore, the disintegration diagram (fig. 5.9) shows that the Ad24 breaks up into four positive triplets (u quarks) and four negative triplets (d quarks), confirming this predicted quark composition. It also indicates that the Ad12 breaks up at stage E3 into two positive triplets (u quarks) and two negative triplets (d quarks), in agreement with the predicted composition of this particle.

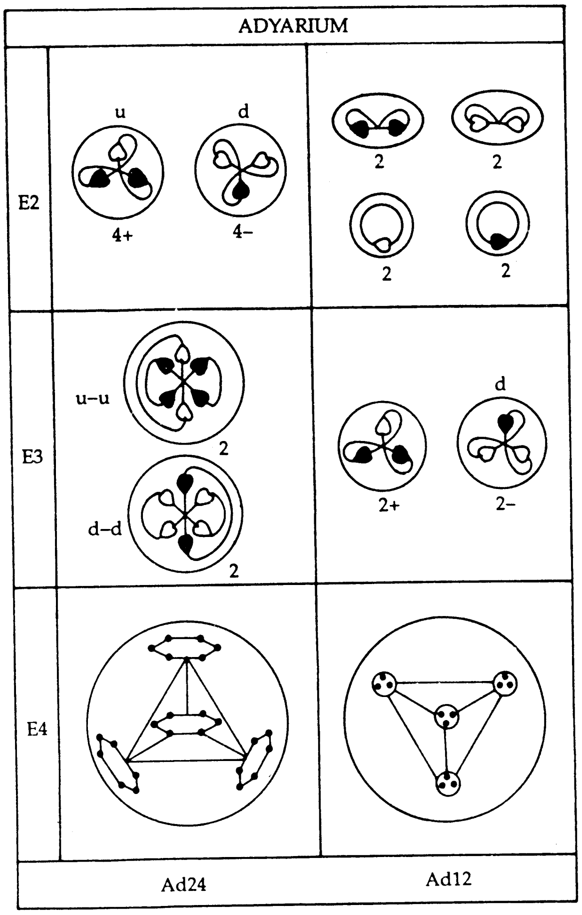


Figure 5.9

The deuterium MPA is thus the result of each proton in the two deuterons under micro-psi examination dissociating into a d quark and a u-u diquark and each neutron breaking up into a u quark and a d-d diquark, the freed quarks forming the Ad12 and the diquarks forming the Ad24. The simplicity of the perfect correlation between the quark model, facts of nuclear physics and the particles in the deuterium MPA constitutes convincing evidence of the author's theory that the MPA of an element is formed by the interaction and recombination of all the particles making up two atomic nuclei of that element.

5.7 Helium and occultum MPAs

Helium MPA

The helium MPA (fig. 5.10) is a sphere enclosing two separate hydrogen triangles with a sphere between them containing two H3 triplets, and two tetrahedral arrays (Ad24) of four Ad6 groups. The Ad24 groups are reported to 'revolve round an egg-shaped central body consisting of two H3 spheres, and the triangles spin on their own axes while performing a similar revolution.'[10] Also: 'A positive tetrahedron of 4 Ad6 groups is counterbalanced by a similar tetrahedron which is negative.'[11]

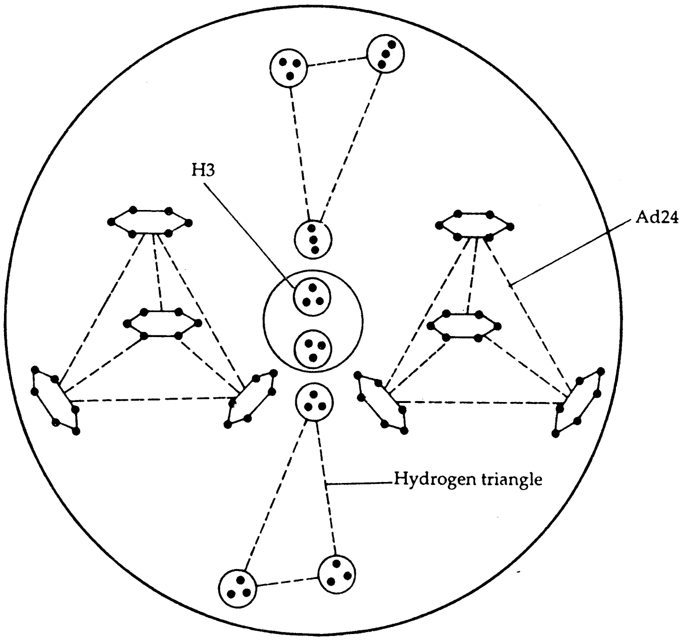


Figure 5.10 : Helium MPA.

Helium MPA $\doteq$ 2H3 + 2Ad24 + (2H3′ + H3) + 3H3.

The helium MPA is formed (fig. 5.11) from two He^4 nuclei, which provide seventy-two subquarks - the same number as the number of UPAs. The two hydrogen triangles are a proton and a neutron, the positive Ad24 is a bound state of four u-u diquarks, the negative Ad24 is a bound state of four d-d diquarks and the two H3 triplets are a u and a d quark. Each Ad24 was identified in ESPQ as a bound state of four u-d diquarks. But the quotation above differentiates between positive and negative Ad24, indicating that the former is the bound state of four u-u diquarks with an electric charge of +5⅓ and the latter is the bound state of four d-d diquarks with a charge of -2⅔. The prediction that the two H3 triplets between the two hydrogen triangles are a positively charged u quark and a negatively charged d quark is confirmed by the statement that 'in the centre of all the two groups of 3 Anu, being positive and negative, satisfy each other.'[12]

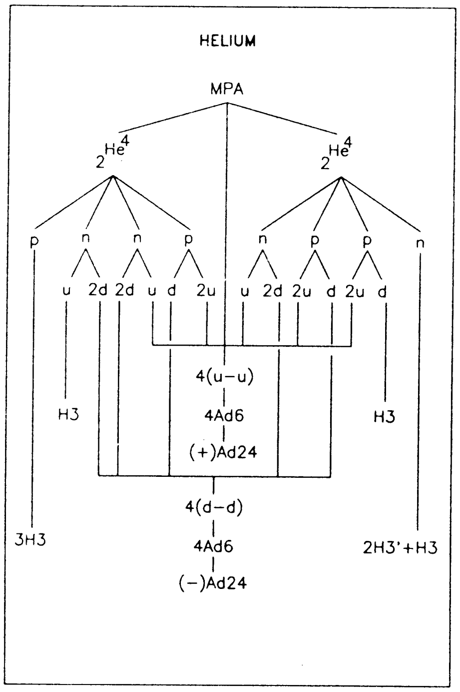


Figure 5.11

Occultum MPA

First observed by Besant & Leadbeater in 1895 and reported to be rare, the occultum MPA was originally believed to be a helium atom, although this could not be verified because samples of helium were not available at that time. But this view was rejected when the MPA of helium was observed in 1907 to be quite different. Although they may be forgiven for believing at that time that occultum represented a new element because another five years would pass by before the scientific notion of isotopes of elements was proposed, the two Theosophists persisted in their belief even when isotopes began to be discovered by scientists! This is, of course, hardly the behaviour of fraudsters keen for their claims to be corroborated by science. But it did not even occur to their colleague Jinarajadasa that occultum was the He^3 isotope when he edited the third edition of *Occult Chemistry* in 1951. The occultum MPA (fig. 5.12) consists of an Ad24 group, two H3 triplets, a ring of fifteen UPAs (Oc15) and a balloon-shaped body of nine UPAs (Oc9).

Occultum MPA = 2H3 + Ad24 + Oc15 + Oc9.

The occultum MPA is formed (fig. 5.13) from two He^3 nuclei, which provide fifty-four subquarks - the same number as the number of UPAs. The relative abundance of this stable helium isotope is 0.00013%, which explains the reported rarity of its MPA. The Ad24 group

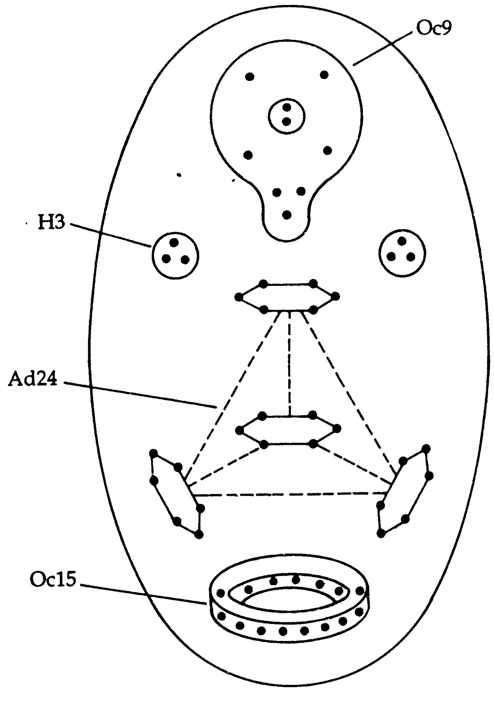


Figure 5.12 : Occultum MPA

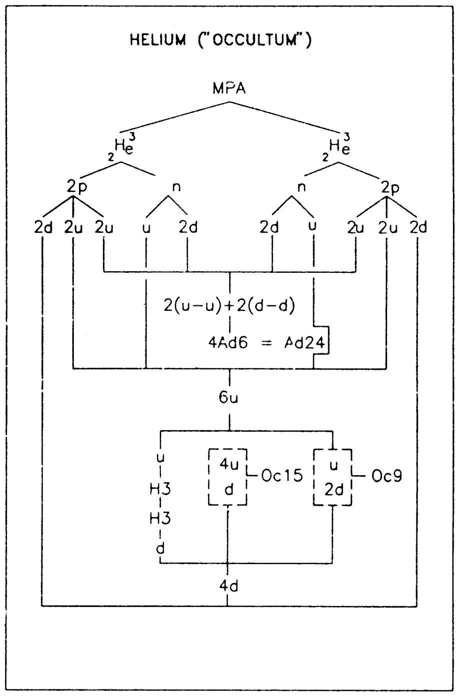


Figure 5.13

is a bound state of two positively charged u-u diquarks and two negatively charged d-d diquarks. This is confirmed by the statement that 'Two of the Ad6 are positive and two negative.'[13] This prediction corrects their interpretation in ESPQ as four u-d diquarks. The two H3 triplets are a u and a d quark. Its disintegration diagram (fig. 5.14) confirms this by indicating that a (+) triplet (u quark) and a (-) triplet (d quark) are released at the E3 stage. The Oc15 group is made up of the nine X subquarks and six Y subquarks in four u quarks and one d quark. This predicted composition cannot be tested against figure 5.14 because the groups of four and five UPAs that it releases at the E2 stage are not the common types of bound states recorded by Besant & Leadbeater whose composition can be inferred and because they were not further broken up into duads, although the fact that the Oc15 releases a (-) duad means that it must contain at least two Y subquarks. The Oc9 group is made up of the subquarks in two d quarks and one u quark. This is confirmed by the fact that it releases at the E3 stage two (-) triplets (d quarks), a (+) duad (X-X) and a free UPA, the latter two particles originating in a u quark:

$$u\ (= 2X\text{–}Y) \rightarrow X\text{–}X + Y.$$

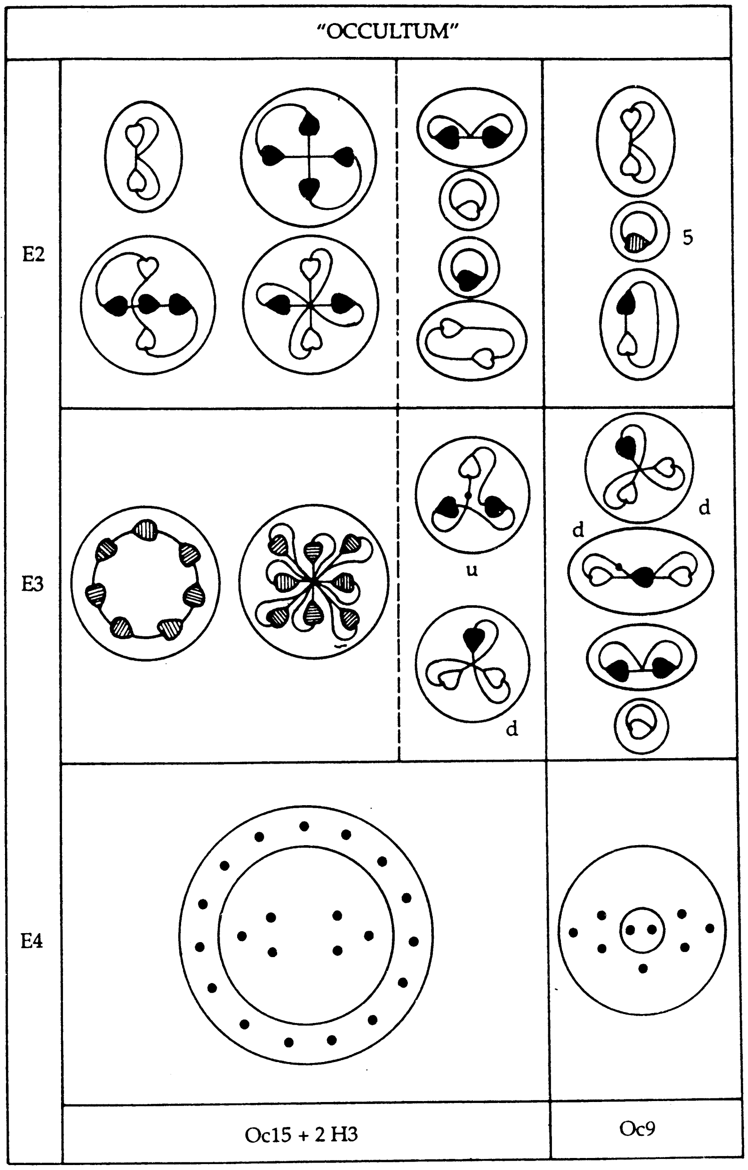


Figure 5.14

5.8 Spike group

Lithium MPA

The lithium MPA (fig. 5.15) consists of a central, spike-shaped aggregate of particles, at the base of which is a globe containing four spheres, each enclosing a tetrahedral array of four UPAs (Li4). Eight Ad6 groups radiate like petals from the globe. The spike formation revolves rapidly on its axis, carrying these groups with it. The spike (Li63) contains sixty-three UPAs in two globes and a long ovoid. The four spheres containing H3 triplets within each globe revolve as a cross. Within the ovoid are five spheres, one at each end enclosing three duads of UPAs, two enclosing groups of nine UPAs and the central one having an axis of three UPAs surrounded by a spinning wheel of six UPAs.

Lithium MPA = 4Li4 + Li63 + 8Ad6.

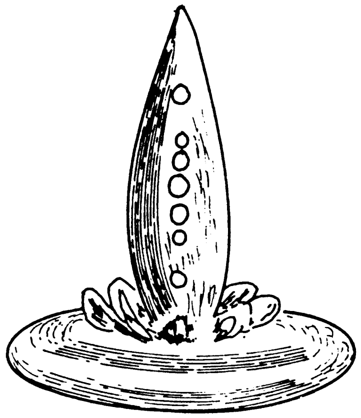


Figure 5.15 : Lithium MPA

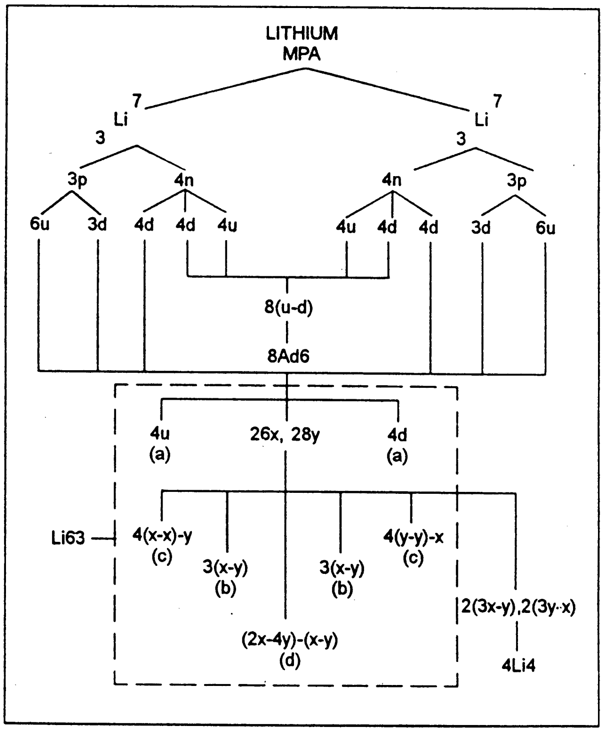


Figure 5.16

The lithium MPA is formed (fig. 5.16) from two Li^7 nuclei, which provided 126 subquarks - one fewer than the number of UPAs. One less UPA is predicted to be in the Li63 group, - in particular, because of the mirror symmetry of the arrangement of its particles - in the central sphere, where two, not three, UPAs should comprise the axis. The four neutrons in each lithium nucleus provide eight u-d diquarks as the Ad6 petals. This is confirmed by the disintegration diagram (fig. 5.17), which shows that the eight Ad6 groups break up at the E2

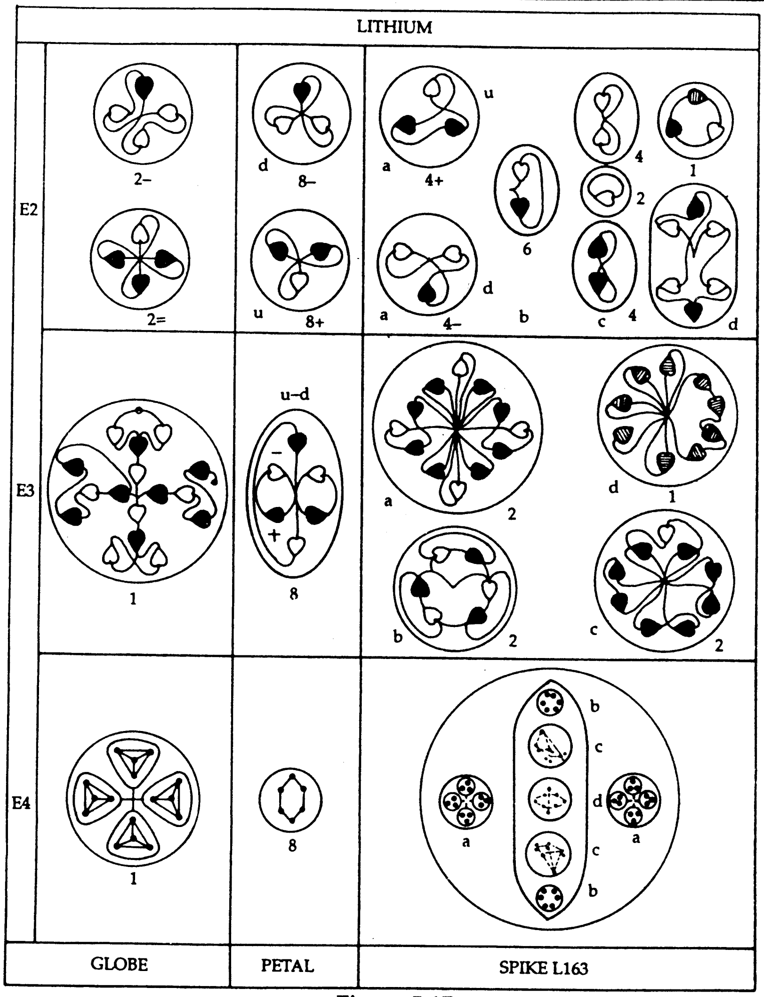


Figure 5.17

stage into eight (+) triplets (u quarks) and eight (-) triplets (d quarks), i.e. each Ad6 is a u-d diquark. The subquarks in the remaining twelve u quarks and fourteen d quarks make up the central globe and Li63 spike. The four Li4 groups consist of two 3X-Y bound states and two X-3Y bound states - the mirror state $\overline{\text{Li}}$4. This prediction cannot be tested because, unfortunately, the Li4 groups were not further broken up into duads of UPAs. Analysis, however, of the fluorine MPA and many other MPAs will reveal that the tetrahedral Li4 group can dissociate into a (+) duad (X-X) and a (0) duad (X-Y), which is consistent with its predicted composition:

$$3X\text{-}Y \rightarrow X\text{-}X + X\text{-}Y.$$

The four triplets at one end of the spike are u quarks; the four triplets at the other end are d quarks. The disintegration diagram confirms that one sphere (a) breaks up at stage E2 into four (+) triplets (u quarks) and the other sphere (a) breaks up into four (-) triplets (d quarks). The duads in the sphere inside the Li63 at each end are X-Y bound states. Figure 5.17 confirms this by indicating that the two groups b break up into six (0) duads, i.e. six X-Y bound states. One group (c) is four X-X disubquarks bound to a nucleus of one Y subquark, the other is four Y-Y disubquarks bound to an X subquark. This is confirmed by the fact that, according to figure 5.17, one group (c) breaks up at the E2 stage into four (+) duads (X-X) and a free UPA, whilst the other one breaks up into four (-) duads (Y-Y) and a free UPA. Group d consists of two X subquarks and four Y subquarks revolving in a common orbit around an X-Y bound state, not the reported three UPAs. This prediction cannot be tested because group d broke up into two particles whose quark/subquark composition is not deducible as they were not broken up further into triplets or duads of UPAs. The Li63 group should contain sixty-two, not sixty-three, UPAs. It has the subquark composition:

$$\text{Li63} = 30X + 32Y.$$

This is indicated in figure 5.18. The group also appears in the MPAs of potassium, manganese, rubidium, technetium, caesium, barium, promethium, thulium, rhenium,

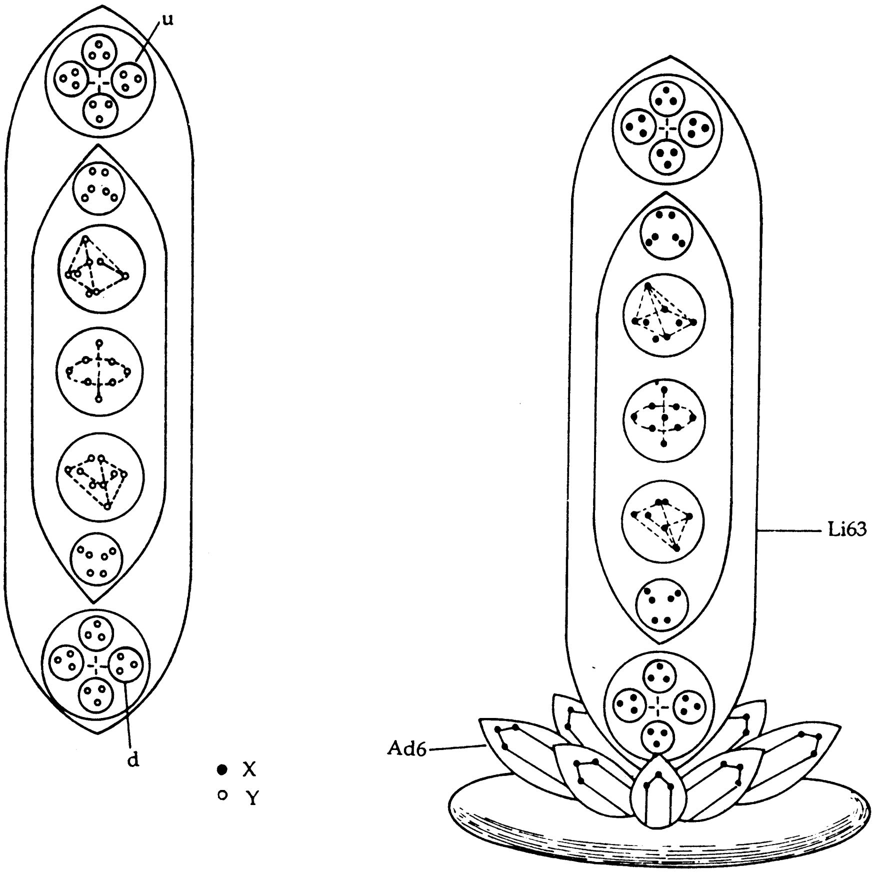


Figure 5.18

francium, radium, actinium, thorium and uranium, making it in principle a powerful test of consistency of analysis, although its effectiveness is somewhat reduced by the fact that most of these elements have no disintegration diagram to permit a *complete* comparision between the types of particles making up their MPAs and the theory that these pariicles originated in the protons and neutrons making up two of their atomic nuclei.

Fluorine MPA

The MPA (fig. 5.19) has a cylindrical body containing two N110 spheres and eight spikes, or reversed funnels, each of which contains three quartets of UPAs (two Be4 groups and one Li4 group) and a linear hydrogen triplet (H3′) similar to that present in one of the hydrogen triangles of the hydrogen MPA.

$$\text{Fluorine MPA} = 2N110 + 8(2Be4 + H3' + Li4).$$

The MPA is formed (fig. 5.20) from two F^{19} nuclei, which provided 342 subquarks - two more than the number of UPAs. One N110 group contains fifty-eight X subquarks and fifty-two Y subquarks (the same as that found for this group in the nitrogen MPA); the other

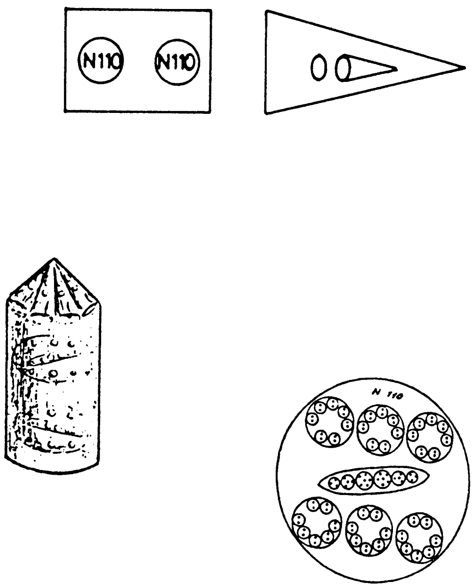


Figure 5.19

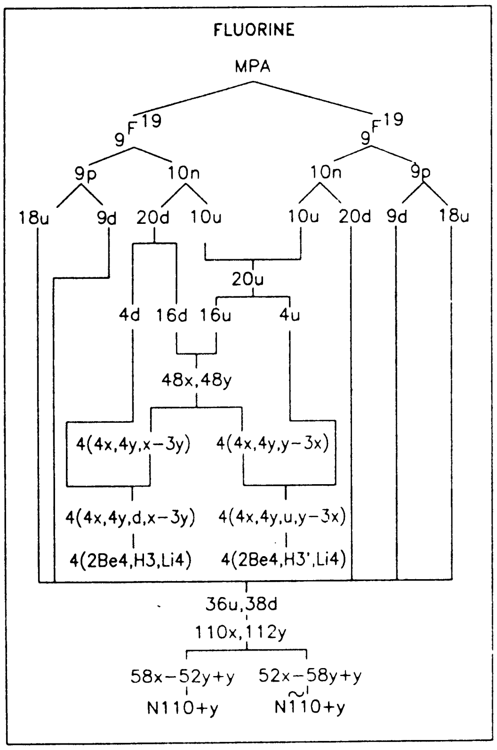


Figure 5.20

N110 is the mirror state N1$\tilde{1}$0, containing fifty-eight Y subquarks and fifty-two X subquarks. One extra Y subquark should be in each N110, accounting for the two additional subquarks which should be present in the MPA. The possibility that the same type of group in different MPAs could differ slightly in their UPA population was anticipated by Besant & Leadbeater, who remarked: 'In the heavier elements, such as gold, with 3,546 Anu, it would be impossible to count each Anu without quite unnecessary waste of time, when making a preliminary investigation. Later, it may be worth while to count each division separately, as in some we noticed that two groups, at first alike, differed by 1 or 2 Anu.'[14]

Four spikes contain particles which are the mirror states of their counterparts in the other four spikes. Four spikes each contain a 3X-Y bound state (Li4), a u quark (H3'), a bound state of four X subquarks (Be4) and a bound state of four Y subquarks, the mirror state B$\tilde{e}$4 of the Be4 group. The other four spikes each contain an X-3Y bound state, the mirror state L$\tilde{i}$4 of the Li4 group, a d quark (H3'), a bound state of four X subquarks (Be4) and a bound state of four Y subquarks, the mirror state B$\tilde{e}$4 of the former particle. Figure 5.21 displays the identified UPAs in these two types of spikes. The disintegration diagram (fig. 5.22) confirms the identification of particles for the former set of spikes because it shows a spike having a (+) triplet (u quark), a (+) Be4 group (4X), which breaks up into two (+) duads (X-X), a (-) Be4 group (4Y), which splits up at stage E2 into two (-) duads (Y-Y), and an Li4 group which breaks up into a (+) duad (X-X) and a (0) duad (X-Y), in agreement with its identification as a 3X-Y bound state:

$$3X\text{-}Y \rightarrow X\text{-}X + X\text{-}Y.$$

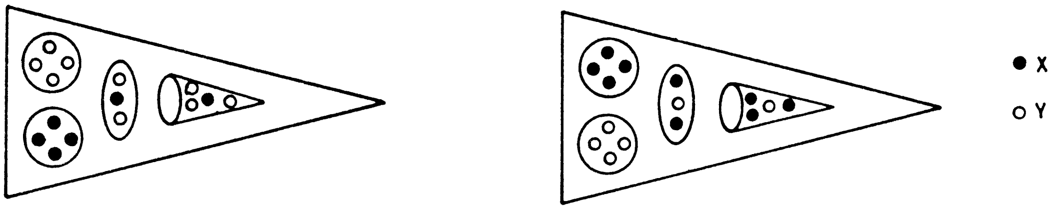


Figure 5.21 : Two types of spikes

Potassium MPA

Nine spikes containing Li63 groups project outwards from a central sphere containing an N110 group, which is surrounded by six spheres enclosing Li4 groups (fig. 5.23).

$$\text{Potassium MPA} = (\text{N110} + 6\text{Li4}) + 9\text{Li63}.$$

The MPA is formed (fig. 5.24) from two K^{39} nuclei, which contain 702 subquarks - one more than the number of UPAs. Sixteen u quarks and twenty-one d quarks break up into fifty-three X subquarks and fifty-eight Y subquarks, which regroup to form the particles in the N110 group. According to the analysis of the fluorine MPA, the N110 group can consist of either fifty-eight X and fifty-two Y subquarks or fifty-two X subquarks and fifty-eight Y subquarks - the mirror state N1$\tilde{1}$0. An extra X subquark should be in the N110

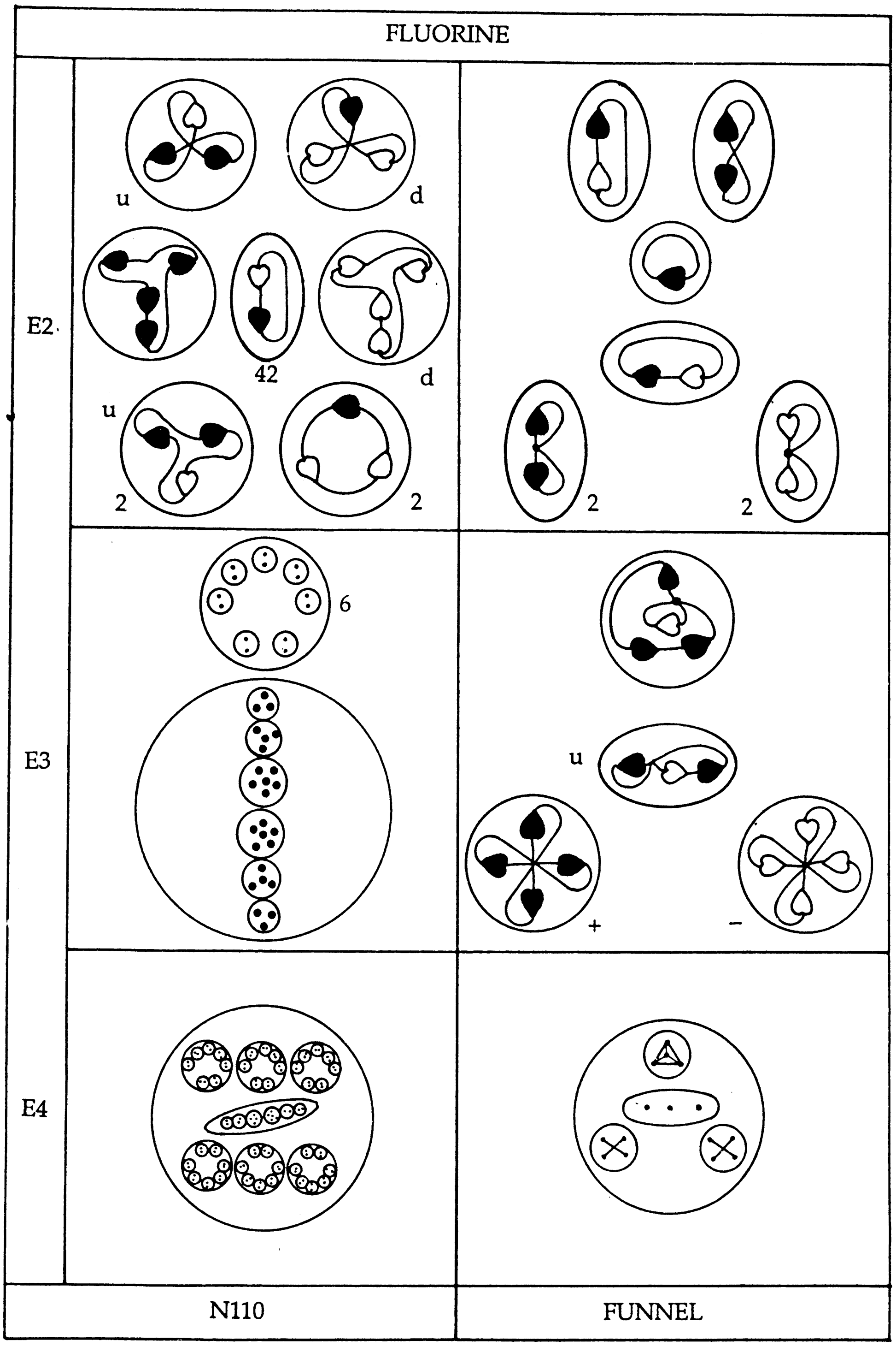


Figure 5.22

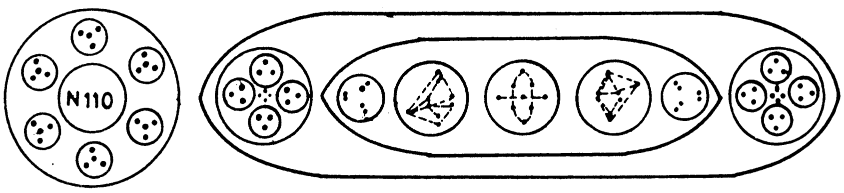


Figure 5.23 : Central globe and one spike of the potassium MPA.

group, which is actually an N1̃10. It is most probably in one of the particles inside the long ovoid at the centre of the ballooon-shaped N110. This accounts for the discrepancy of one between the counted number of UPAs and the predicted 702 subquarks in the MPA. Such small variations in generic groups will be encountered from time to time during the course of the analysis of MPAs. They would have gone unnoticed by Besant & Leadbeater because they did not bother to examine in detail every generic particle that they had studied on previous occasions.

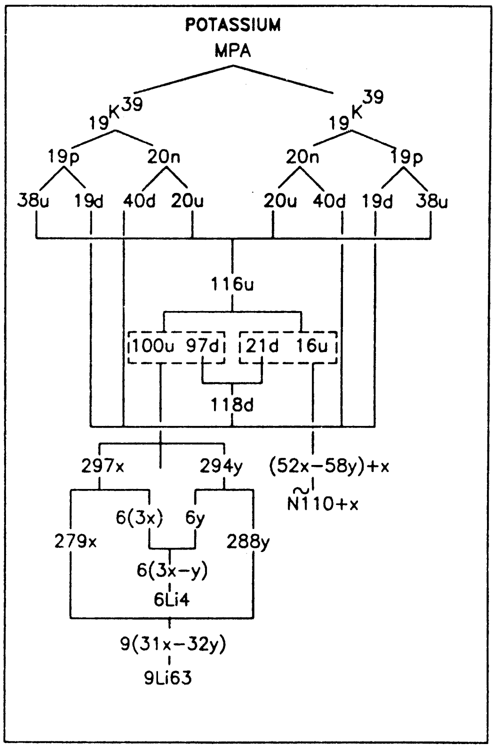


Figure 5.24

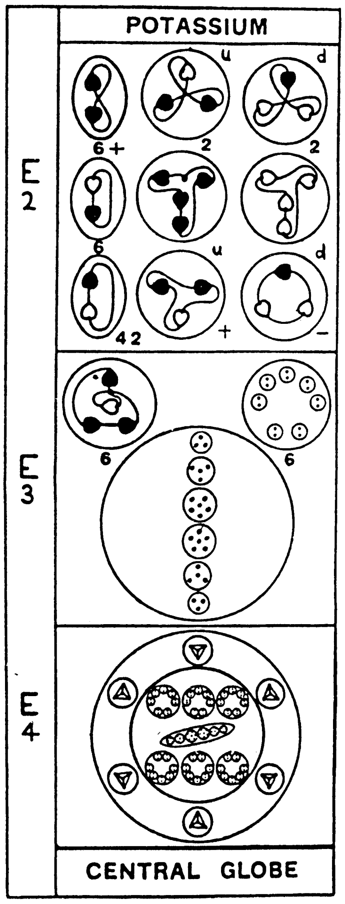
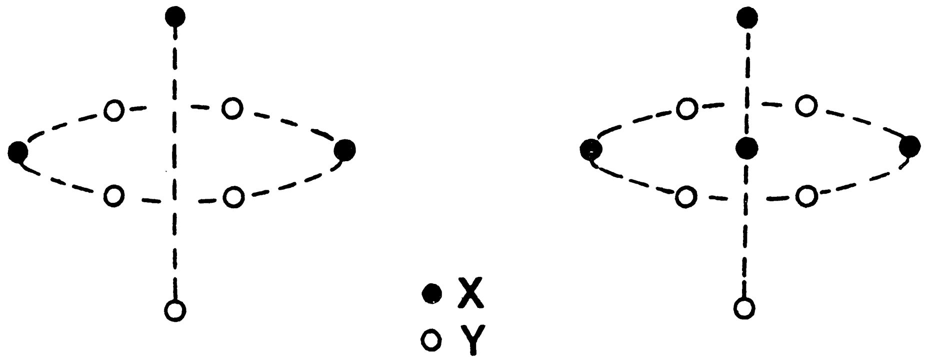


Figure 5.25

Each Li4 group is a bound state of three X subquarks and a Y subquark. The disintegration diagram (figure 5.25) shows that an Li4 group breaks up at the E2 stage into a (+) duad (X-X) and a (0) duad (X-Y), i.e. it consists of three X subquarks and one Y subquark, in agreement with analysis.

Each Li63 group contains thirty-one X subquarks and thirty-two Y subquarks. The analysis of the lithium MPA revealed that the Li63 group had thirty X subquarks and thirty-two Y subquarks, i.e. it should have contained one less UPA. Here, an extra X subquark is predicted to be present in the particle inside the sphere at the centre of the Li63 spike, giving it the structure actually observed (fig. 5.26).



Central group in the Li63 group of the lithium MPA.

Central group in the Li63 groups of the potassium MPA.

Figure 5.26

Manganese MPA

The MPA (fig. 5.27) consists of fourteen Li63 spikes that project outwards from a central globe containing an N110 group.

Manganese MPA = N110 + 14Li63.

The MPA is formed from two Mn^{55} nuclei (fig. 5.28), which provide 490 X and 500 Y subquarks - two fewer subquarks than the number of UPAs in the MPA. It is more likely that the N110 group is overcounted by two UPAs than that one or two of the Li63 spikes actually contained fewer than 63 UPAs. It is probable that the N110 was not examined in detail by Besant & Leadbeater, who would have assumed that this group, which by then was very familiar to them because it had appeared in many MPAs, contained its usual number of 110 UPAs (this is suggested by the fact that *Occult Chemistry* contains no disintegration diagram for this element). Analysis of the nitrogen MPA reveals that the N110 contains 58 X and 52 Y subquarks. In the manganese MPA it contains two fewer X subquarks. Each of the Li63 spikes is made up of 31 X and 32 Y subquarks, which is the composition found for this group in the analysis of the potassium MPA.

The possibility needs to be considered that the N110 group in this MPA is the mirror state $\widetilde{\text{N110}}$ containing 58 Y and 52 X subquarks, with two subquarks absent. There is also the

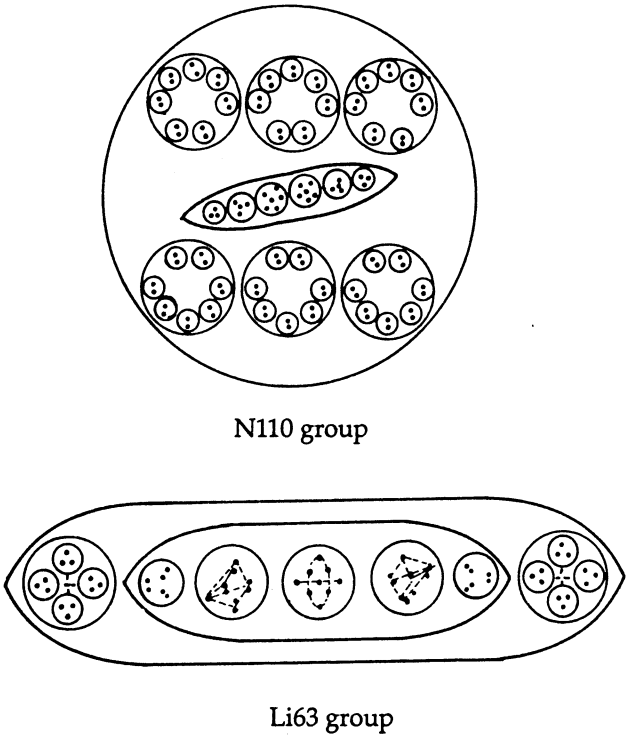


Figure 5.27 : Manganese MPA

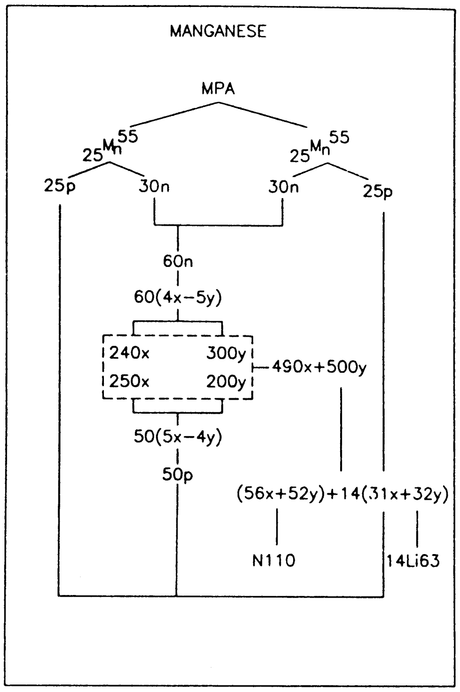


Figure 5.28

possibility that some of the Li63 groups may be the mirror state Li$\widetilde{63}$ containing 31 Y and 32 X subquarks. An MPA including such particles could have three possible compositions:

	actual "N110"	14 spikes
1.	N1$\tilde{1}$0 − 2X	8Li63 + 6Li$\widetilde{63}$;
2.	N1$\tilde{1}$0 − X − Y	9Li63 + 5Li$\widetilde{63}$;
3.	N1$\tilde{1}$0 − 2Y	10Li63 + 4Li$\widetilde{63}$.

In each case the spikes are not all similar. In the absence of any reason why the N110 or some of the Li63 groups need to be mirror states, the possibility that the N1$\tilde{1}$0 is present here is rejected on the basis of Occam's Razor rule because fourteen identical spikes represent a simpler structure than a mixture of two different types of spikes.

The manganese MPA serves as a stringent test of the theory of MPAs proposed in ESPQ because it contains only two types of bodies, both of which were analysed in that work and whose compositions, therefore, are predetermined. In view of this it is remarkable that the

MPA is consistent *precisely* with the earlier analysis of MPAs containing these two bodies. It provides strong evidence supporting both the primary hypothesis proposed in ESPQ that two nuclei of an element form its MPA and the subquark structure:

$$u = X\text{-}X\text{-}Y, \qquad d = X\text{-}Y\text{-}Y$$

of u and d quarks.

Rubidium MPA

The MPA (fig. 5.29) consists of a central globe containing three N110 groups from which sixteen spikes project. Each spike is made up of a Li63 group and a small ovoid (Rb12), which contains two hydrogen triplets and a sextet of UPAs:

$$\text{Rubidium MPA} = 3\text{N110} + 16(\text{Li63} + \text{Rb12}).$$

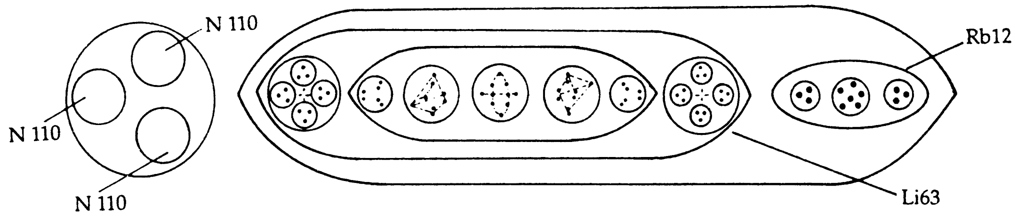


Figure 5.29 : Rubidium MPA

The MPA is formed from two Rb^{75} nuclei (fig. 5.30), which provide 1350 subquarks - the same number as the number of UPAs. Two of the N110 groups are actually the mirror state N$\widetilde{110}$ containing 52 X subquarks and 58 Y subquarks. Each Li63 group contains 31 X subquarks and 32 Y subquarks - the same composition as that found for this group in many MPAs discussed in this chapter The sextet of UPAs in the Rb12 is a bound pair of u and d quarks. This is NOT a u-d diquark (which is the Ad6 group) but the quark counterpart of the deuteron in which two quarks are bound - not by strings (notice that no lines of force link the positive and negative triplets shown in the disintegration diagram (fig. 5.31)) - but by the residual interaction between the subquarks in each quark, just as a proton and neutron are bound in a deuteron by the nuclear force arising from the residual strong interaction between their quarks. The two hydrogen triplets are also u and d quarks. The predicted composition:

$$\text{Rb12} = u + (u+d) + d$$

is confirmed by figure 5.31, which shows that the sextet is made up of a (+) triplet (u quark) and a (-) triplet (d quark) and that the two triplets in the Rb12 consist of a (+) and a (-) one. The MPA *must* contain a central globe because the 754 X subquarks and the 776 Y subquarks provided by the two Rb^{75} nuclei cannot be distributed uniformly among the sixteen spikes, neither number being exactly divisible by 16. As in the case of the manganese MPA, the rubidium MPA is composed solely of particles whose compositions were determined in

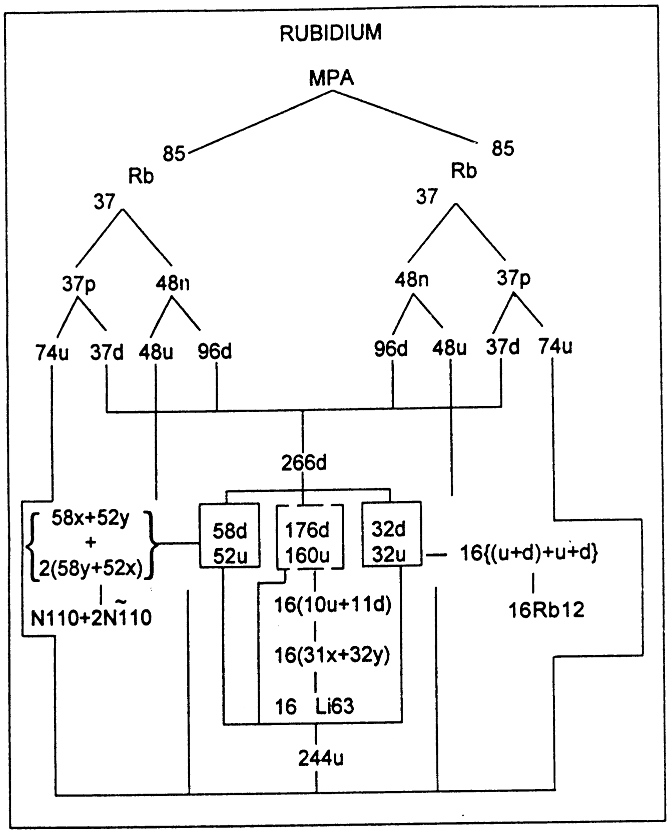


Figure 5.30

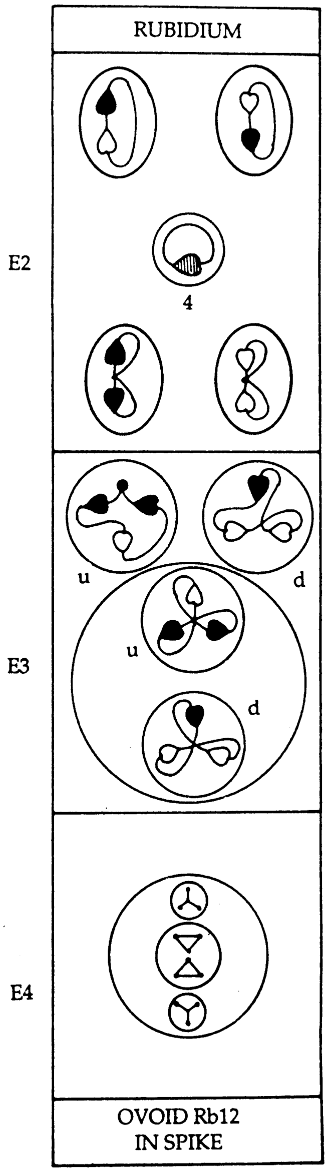


Figure 5.31

ESPQ. It permits therefore no freedom for interpretation of its constituents. That every detail of this MPA is consistent with theoretical analysis of previously studied MPAs is remarkable in view of the severe restraints imposed by nuclear physics, the quark model and the predicted composition of u and d quarks in terms of X and Y subquarks.

5.9 Dumb-bell Group

Sodium MPA

The MPA is shaped like a dumb-bell (fig. 5.32). The connecting rod (Na14) of the dumb-bell contains fourteen UPAs arranged in three spheres of four, six and four UPAs (fig. 5.33). At each end of the rod are two concentric spheres (Na10), the inner one enclosing four UPAs, the outer one containing six UPAs. Twelve funnels radiate symmetrically in the same plane

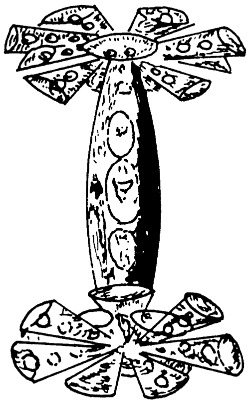


Figure 5.32

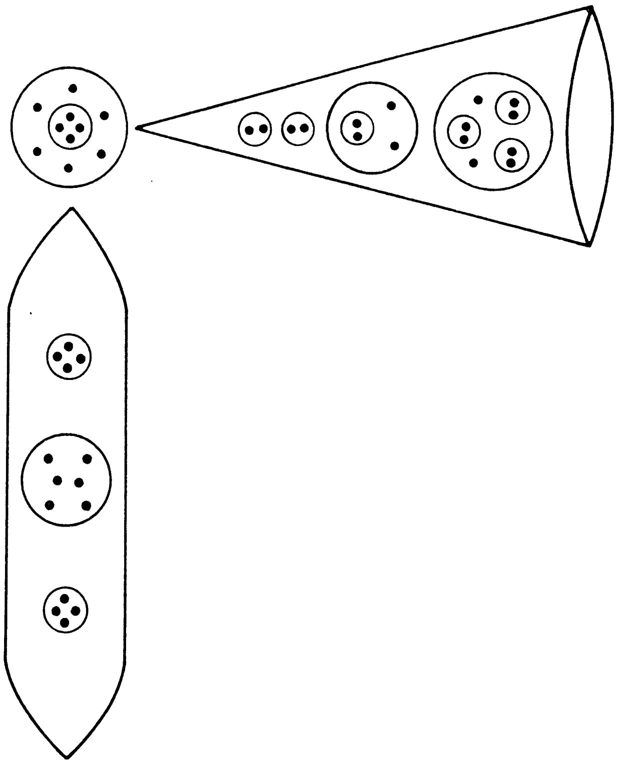


Figure 5.33 : Connecting rod, sphere and funnel

from each pair of spheres. Each funnel (Na16) contains sixteen UPAs arranged in four spheres, two containing pairs of UPAs, one enclosing a pair of UPAs and two free UPAs and the fourth containing three pairs of UPAs and two free UPAs.

Sodium MPA = Na14 + 2Na10 + 24Na16.

The MPA is formed (fig. 5.34) from two Na^{23} nuclei, which provide 414 subquarks - four fewer than the number of UPAs. The 384 subquarks making up sixty-four u quarks and sixty-four d quarks are distributed equally among the twenty-four funnels. Six of the funnels at one end of the dumb-bell each contain twelve X subquarks and four Y subquarks; the other six each contain twelve Y subquarks and four X subquarks, i.e. six funnels are the mirror states Na16 of the other six; similarly for the twelve funnels at the other end of the dumb-bell. Figure 5.35 shows the subquark composition of one of the former types of funnel. The fourteen X subquarks and the sixteen Y subquarks in the remaining four u quarks and six d quarks provided by the two nuclei fill the rod and Na10 globes. The inner sphere in each Na10 should contain a (0) duad (X-Y), not the reported group of four UPAs. The outer sphere encloses a 3X-3Y bound state. This is confirmed by the disintegration diagram (fig. 5.36), which shows that the group of six UPAs in a globe breaks up at the E2 stage into a (+) triplet (u quark) and a (-) triplet (d quark):

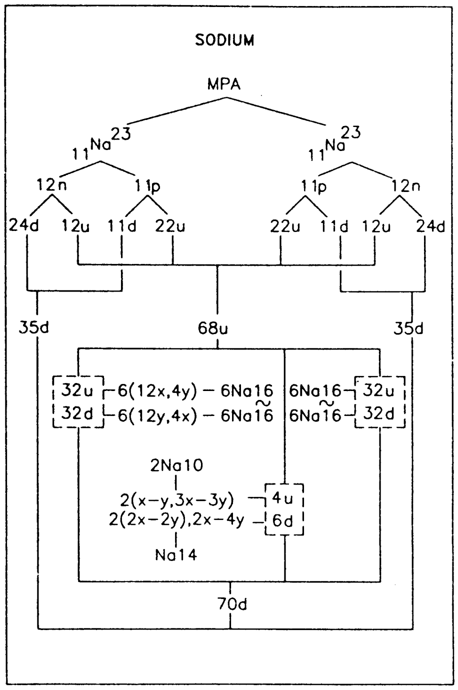


Figure 5.34

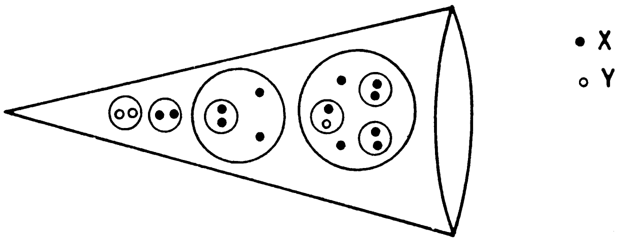


Figure 5.35

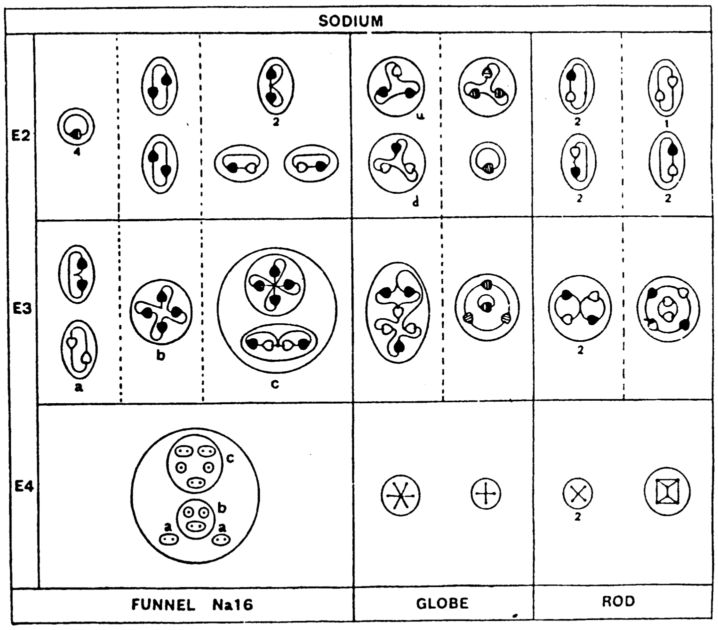


Figure 5.36

$$3X\text{-}3Y \rightarrow u(= 2X\text{-}Y) + d(= X\text{-}2Y).$$

The Na14 contains a 2X-4Y bound state and two 2X-2Y bound states. Figure 5.36 confirms this by indicating that the former breaks up at stage E2 into a (-) duad (Y-Y) and two (0) duads (X-Y):

$$2X\text{-}4Y \rightarrow Y\text{-}Y + 2(X\text{-}Y),$$

and that the latter break up into four (0) duads (X-Y):

$$2(2X\text{-}2Y) \rightarrow 4(X\text{-}Y).$$

The Na16 in twelve funnels comprises a X-X and a Y-Y bound state (as indicated by the (+) and (-) duads a), a bound state of two X subquarks and two free X subquarks (as shown by the (+) quartet b (4X), which splits up at stage E2 into two (+) duads (X-X)), and, lastly, in c another bound state of two X subquarks and two free X subquarks, which recombine into a (+) quartet (4X) that then splits up at stage E2 into two (+) duads (X-X), as well as two X-Y bound states, which link up and then break up again at stage E2 into two (0) duads (X-Y). The discrepancy between the 418 UPAs counted in the MPA and the predicted 414 subquarks is due to a misobservation of the particle in the inner sphere of each Na10 globe: the quartet of UPAs in each globe should have been a (0) duad.

Chlorine MPA

The chlorine MPA is shaped like a dumb-bell (fig. 5.37). The central rod (Cl19) consists (fig. 5.38) of five small spheres containing three, four, five, four and three UPAs. At each end of the rod are Na10 globes from which radiate twelve funnels. A funnel contains a set of three

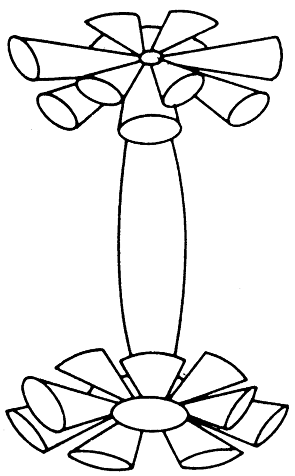


Figure 5.37 : Chlorine MPA

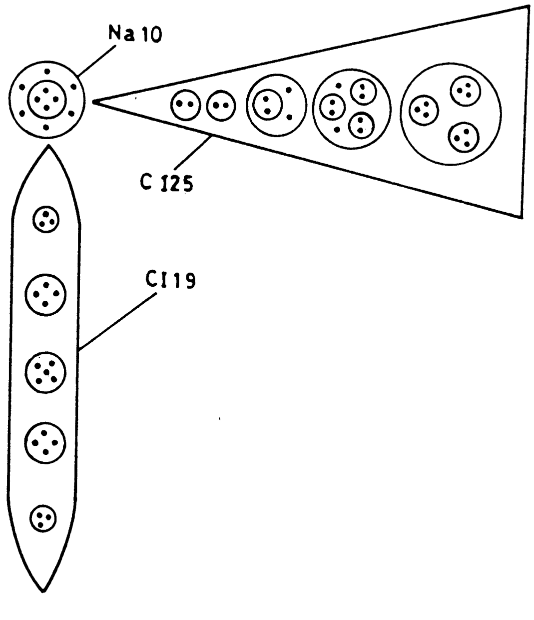


Figure 5.38 : Cl19 rod, Na10 globe and Cl25 funnel

hydrogen triplets (N9) in addition to the contents (Na16) of a funnel of the sodium MPA. There are twenty-five UPAs in a funnel, the set of particles being called a Cl25 group.

Chlorine MPA = Cl19 + 2Na10 + 24Cl25.

The MPA is formed (fig. 5.39) from two Cl^{35} nuclei, which provide 630 subquarks - nine fewer than the number of UPAs. Three hundred subquarks in fifty u quarks and fifty d quarks are equally distributed among a set of twelve funnels, twenty-five to a funnel. The analysis of the sodium MPA revealed that the subquarks in thirty-two u quarks and thirty-two d quarks are distributed amongst a set of twelve Na16 funnels. Each set of twelve Cl25 funnels contains the subquarks making up eighteen more u quarks and eighteen more d quarks. Six funnels each contain an extra two u quarks and a d quark (fig. 5.40). The other six funnels each contain two extra d quarks and an extra u quark. These u-u-d and d-d-u bound states are, respectively, protons and neutrons (analysis of the nitrogen MPA in ESPQ[15] identified an N9 group as a neutron; here the proton, its mirror particle ($\tilde{N}$9), is also present). The disintegration diagram (fig. 5.41) confirms that, for the funnel examined, the N9 breaks up at stage E2 into two (-) triplets (d quarks) and one (+) triplet (u quark).

Two types of Cl25 groups are predicted:

Cl25 (+) = Na16 + u-u-d,

which has an electric charge of +53/9, and

Cl25 (-) = Na16 + d-d-u,

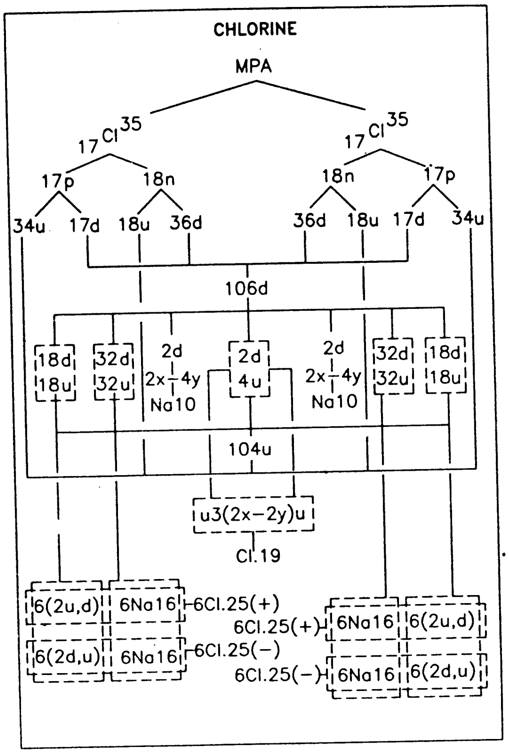


Figure 5.39

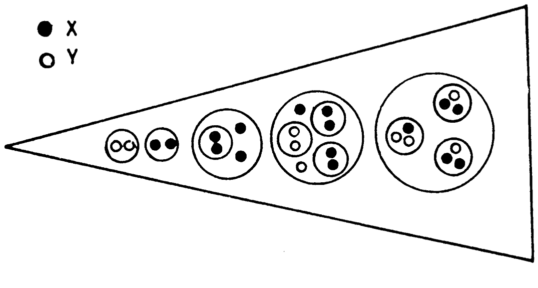


Figure 5.40

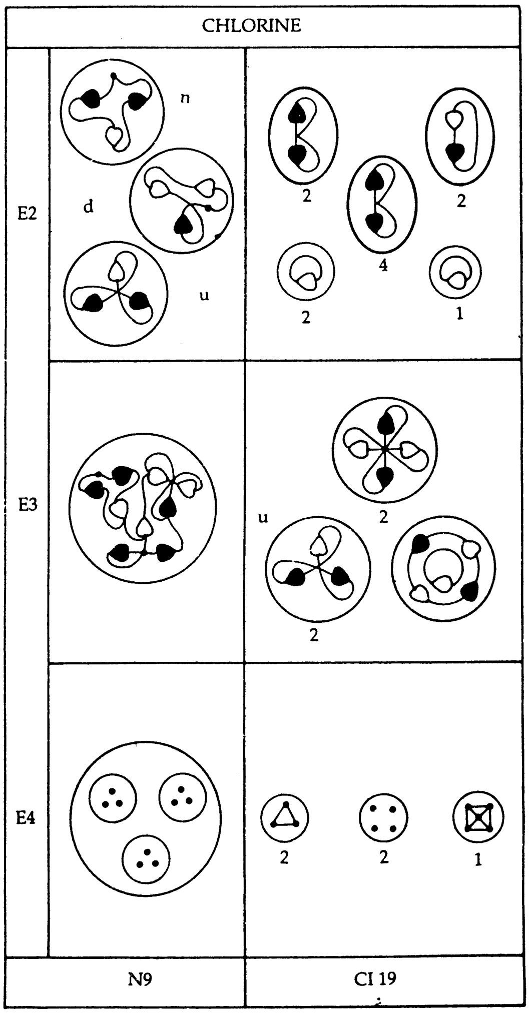


Figure 5.41

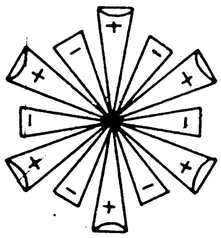


Figure 5.42 : Fan of 12 funnels

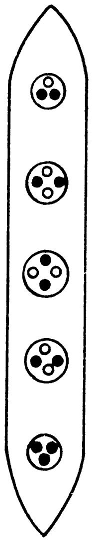


Figure 5.43 : Cl19 rod

which has a charge of -28/9. Six of each type are present in a set of twelve funnels at each end of the Cl19 rod, the two types alternating as shown in figure 5.42. The first edition of *Occult Chemistry* confirms that six of the funnels are distinct from the other six, stating: '... the general form is that of the dumb-bell, the lower and upper parts each consisting of twelve funnels, six sloping upwards and six downwards.'[16]

The Cl19 rod (fig. 5.43) is made up of two u quarks, two 2X-2Y bound states and a central group of two X and two Y subquarks. Figure 5.41 confirms that two (+) triplets (u quarks) are released at stage E3 of the break-up of the Cl19 rod. It also indicates that the two groups of four UPAs break up into four (+) duads. This must be an error of observation, for these groups should have disintegrated into two (+) duads (X-X) and two (-) duads (Y-Y). The reported group of five UPAs at the centre of the rod should be a group of four, that is, the

Cl19 should contain eighteen UPAs. The subquarks in two d quarks make up an Na10 globe, which should contain six, not ten, UPAs (fig. 5.44) (it should be noted that figure 7.105 in ESPQ shows the corrected Cl19 rod, not the Na10, whilst figure 7.104 in ESPQ depicts the corrected Na10, not the Cl19). The discrepancy of 9 between the 630 subquarks predicted to be in the MPA and the counted population of 639 UPAs arises from overcounting by 1 for the Cl19 rod and by 4 for each Na10 globe. Evidence supporting this prediction is as follows: a slightly more complex form of the chlorine MPA was reported by Besant & Leadbeater in which each funnel has an extra UPA and each globe contains two octahedral arrays of UPAs, one inside the other (fig. 5.45):

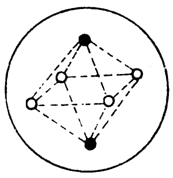


Figure 5.44 : Na10 globe

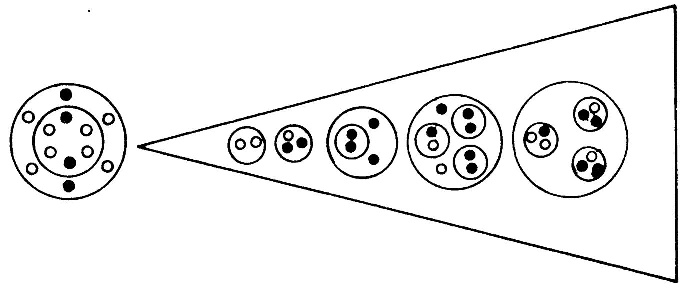


Figure 5.45 : Globe and funnel of MPA of chlorine isotope

$$\text{MPA} = \text{Cl19} + 2(\text{Na10} + 2) + 24\text{Cl26}.$$

The MPA contains 667 UPAs. This is the MPA formed from two Cl^{37} nuclei, which provide 666 subquarks. If the Cl19 rod actually contains eighteen UPAs, the counted and predicted populations would be equal. It was noted that 'The isotope is less common than the normal variety of Chlorine.'[17] This agrees with the MPA being formed from two Cl^{37} nuclei because the Cl^{35} nuclide has a relative abundance of 75.53%, whereas the Cl^{37} nuclide has an abundance of 24.47%.

The difference between the MPAs of the two chlorine isotopes should amount to sixteen X subquarks and twenty Y subquarks contributed by four extra neutrons in the pair of Cl^{37} nuclei. These permit the extra UPA to be an X subquark in each of twelve funnels and a Y subquark in the other twelve funnels, the innermost X-X duad becoming a triplet (u quark) by the addition of a Y subquark and the innermost Y-Y duad becoming a triplet (d quark) by the addition of an X subquark. Two X subquarks and four Y subquarks should therefore be added to each Na10 globe, which already contains two X and four Y subquarks, according to the analysis of the sodium MPA, i.e. each globe should contain four X and eight Y subquarks. In his search for an isotope of chlorine in sea water, Leadbeater said[18] that the twelve UPAs in each globe were arranged in two octahedral clusters, one inside the other (fig. 5.46). Assuming that a bound state of two X subquarks and four Y subquarks is octahedral, the presence of a second octahedral array is consistent with the extra subquarks also consisting of two X and four Y subquarks - in agreement with prediction.

Copper MPA

The MPA is shaped like a dumb-bell (fig. 5.47). Its connecting rod consists of a Cl19 group. The central globe at each end of the dumb-bell is made up of two spheres, each containing a

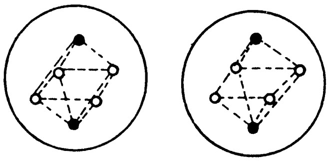


Figure 5.46 : Two octahedra in globe

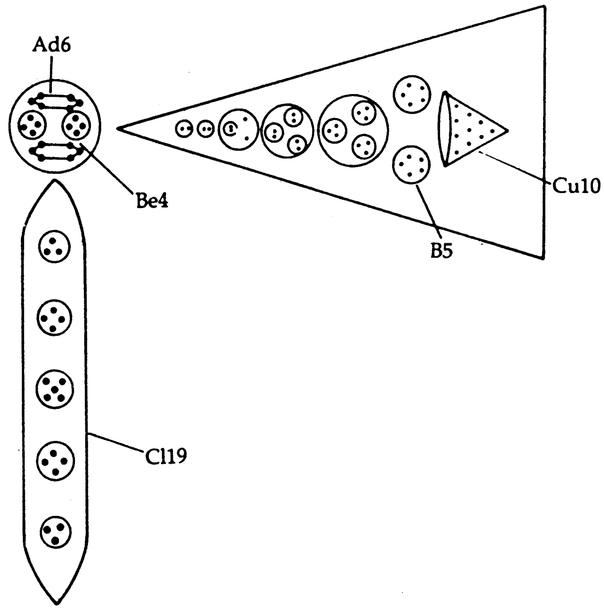


Figure 5.47 : Copper MPA

group of four UPAs (Be4), and two cigar-shaped Ad6 groups. Each of the twenty-four funnels contains a Cl25 group, two B5 quintets and - unique to the copper MPA - a cone containing ten UPAs (Cu10). Twelve funnels project radially from each central globe in a fan-like arrangement.

Copper MPA = Cl19 + 2(2Be4 + 2Ad6) + 24(Cl25 + 2B5 + Cu10).

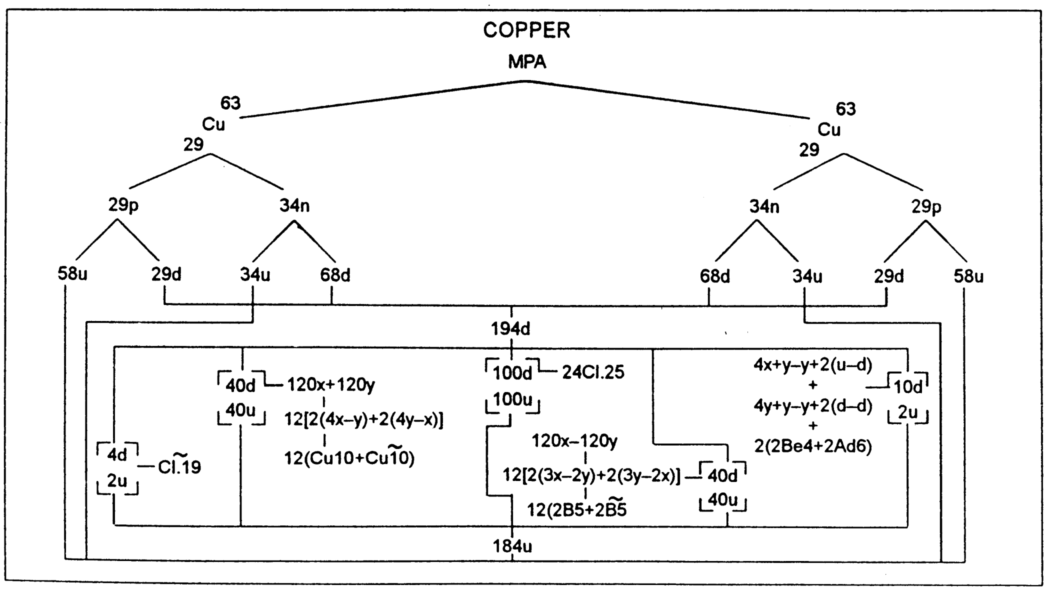


Figure 5.48

The MPA is formed from two Cu^{63} nuclei (fig. 5.48), which provide 1134 subquarks - five fewer than the number of UPAs. The Cl19 rod must be overcounted by 1 (this was similarly inferred for the Cl19 in the chlorine MPA), and one of the Be4 groups in each globe must be overcounted by 2, i.e. it should be a duad, not a quartet, of UPAs. The subquarks in two u quarks and four d quarks constitute the Cl19, which is actually the mirror state $\widetilde{\mathrm{Cl}19}$. As was found for the chlorine MPA, one hundred u quarks and one hundred d quarks form the constituents of the twenty-four Cl25 groups. In six of a set of twelve funnels, the two B5 groups are d-2X bound states; in the other six they are the mirror states $\widetilde{\mathrm{B}5}$ = u-2Y. The disintegration diagram (fig. 5.49) confirms the composition of the former type of funnel because the two joined pyramids (a) shown at stage E4 break up into a (+) duad (X-X) and two rings of UPAs that break up at stage E2 into four (0) duads (X-Y):

$$(2X\text{-}2Y)\text{-}X\text{-}X\text{-}(2X\text{-}2Y) \rightarrow 2(2X\text{-}2Y) + X\text{-}X$$
$$\hookrightarrow 4(X\text{-}Y).$$

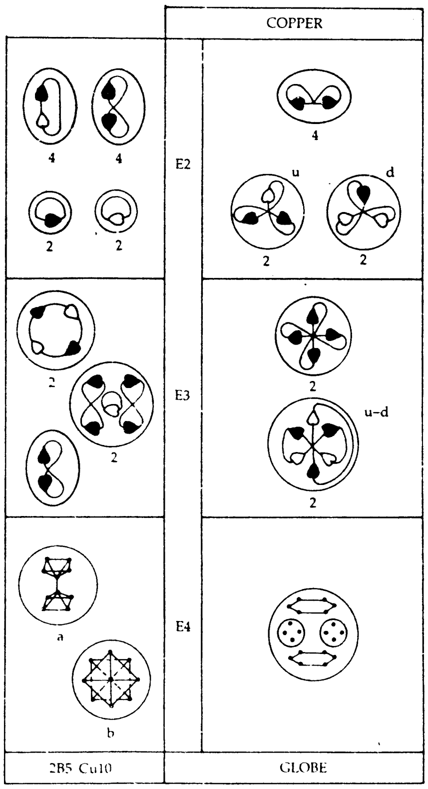


Figure 5.49

The Cu10 group in six of the twelve funnels at each end of the connecting rod is a bipyramidal array of four X subquarks as the base and a Y subquark as its apex (fig. 5.50). It should therefore break up into four (+) duads and two UPAs. Figure 5.48 confirms this prediction. The Cu10 in the other six funnels is the mirror state $\widetilde{\text{Cu}}$10, which consists of four Y subquarks as base and an X subquark as apex.

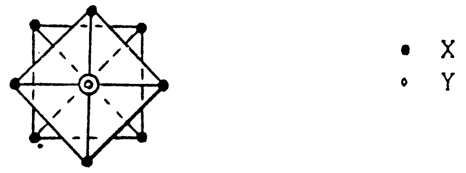


Figure 5.50: Cu10 group.

One globe contains two u-d diquarks (confirmed by the disintegration of the two Ad6 groups into two (+) triplets (u quarks) and two (-) triplets (d quarks), a bound state of four X subquarks (indicated by the break-up of the Be4 group into two (+) duads (X-X)) and a Y-Y bound state, i.e. the other Be4 should actually be a (-) duad. In the other globe the Ad6 groups should be d-d diquarks, one Be4 group should be a bound state of four Y subquarks and the other Be4 should be a Y-Y disubquark. The two globes cannot have the same subquark composition because, if they did, one quartet of UPAs would be a 2X-2Y bound state (which is not the composition of the (+) Be4 group shown in figure 5.49), and the two Ad6 groups would not be identical (as figure 5.49 indicates), one instead being a u-d diquark and the other a d-d diquark, that is, a (-) Ad6 group like that indicated by Besant & Leadbeater in Figure 7.120 of ESPQ, although this latter disagreement is less serious than the former because it could be simply that they did not notice that one Ad6 group was positive and that the other was negative.

Bromine MPA

The dumb-bell-shaped MPA (fig. 5.51) consists of, firstly, a connecting rod (Cl19), secondly, two globes containing a quartet of UPAs (Be4), two triplets (H3) and two duads, and, thirdly, two sets of twelve funnels, each of which contains a Cl25 group and three Ge11 groups. The latter consists of two triplets of UPAs and a mNe5 group also present in the meta-neon MPA.

Bromine MPA = Cl19 + 2(Be4 + 2H3 + 2N2) + 24(Cl25 + 3Ge11).

The MPA is formed from two Br^{79} nuclei (fig. 5.52), which provide 1422 subquarks, that is, seventeen fewer than the number of UPAs. Each globe differs from the Na10 globe of the sodium and chlorine MPAs by the addition of two duads (N2) of UPAs. But, as analysis of the chlorine MPA indicates that the Na10 should contain six, not ten, UPAs because the Be4 group should not be present, each globe must be overcounted by eight UPAs, that is, four due to the non-existent Be4 and four due to the non-existent pair of duads. Together with an overcounting of the Cl19 group by one UPA, as previously predicted for the chlorine and copper MPAs, this accounts satisfactorily for the total error of seventeen too many UPAs. The funnels cannot have been miscounted because both the Cl25 and Ge11 groups are predicted to be accurately counted.

The Cl25 and Cl19 groups have the same compositions as those found for the chlorine MPA. The particles in the globes are the mirror state $\underset{\sim}{\text{Na}}$10, each consisting of two u quarks

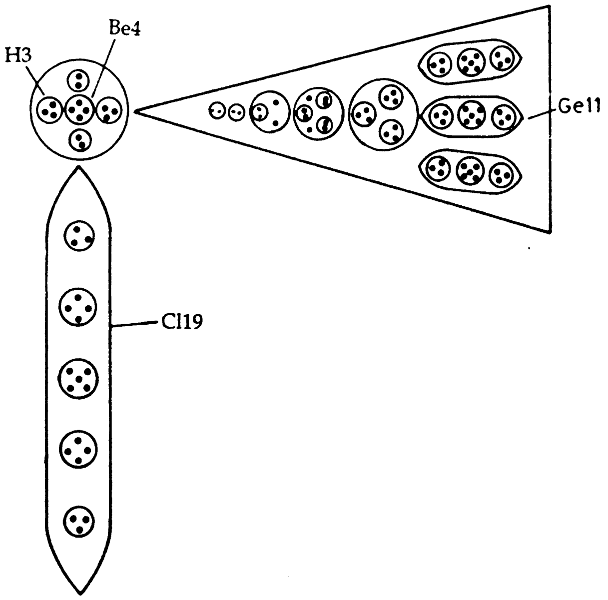


Figure 5.51 : Bromine MPA

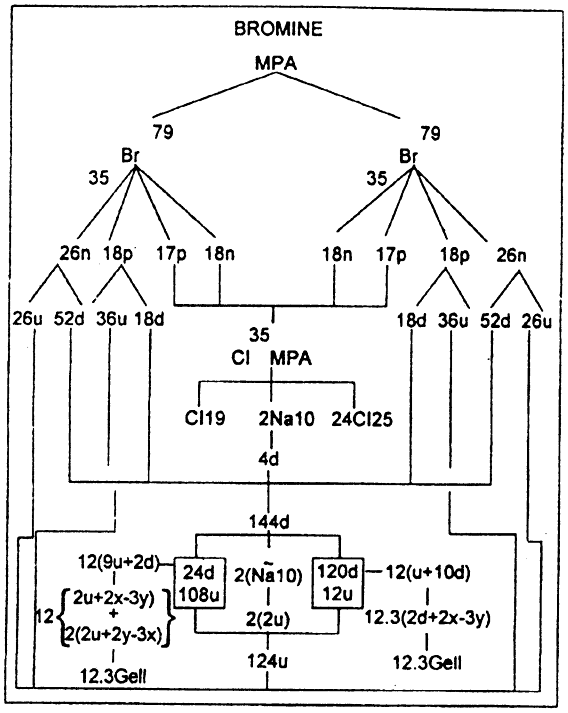


Figure 5.52

instead of the two d quarks forming the Na10. The globes cannot be Na10 because, if they were, neither the remaining number of X subquarks (388) nor the remaining number of Y subquarks (404) is exactly divisible by 12 or 24 and thus neither could be uniformly distributed among the funnels. The disintegration diagram (fig. 5.53) indicates that the globes contain a (+) triplet (u quark) and a (-) triplet (d quark), not the predicted two (+) triplets. But this need not be a serious disagreement because of the likelihood that the Na10 groups were not re-examined during the observation of the bromine MPA - it being assumed that they were identical to what had been seen previously - in which case the discrepancy would be merely due to the error predicted to have been made in the observation of the globes during examination of the chlorine MPA, which was introduced here as well because the globes were assumed to have been the same.

The Ge11 groups have similar compositions to those found for these groups in the germanium MPA. The type with composition:

$$Ge11 = u + 2X\text{-}3Y + u$$

is displayed in figure 5.53, which indicates that it breaks up at the E3 stage into two (+) triplets (u quarks) and a mNe5 group consisting of a UPA (Y subquark) at the centre of a ring of four UPAs (2X-2Y), the latter splitting up at stage E2 into two (0) duads (X-Y disubquarks).

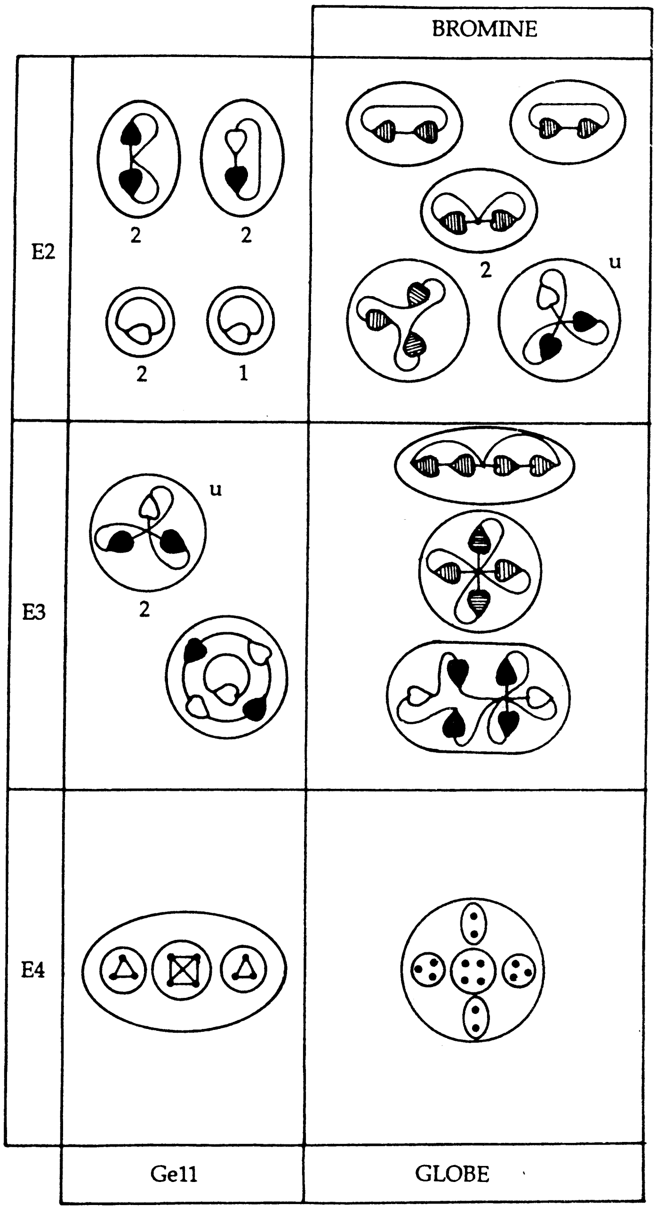


Figure 5.53

Silver MPA

The connecting rod of the dumb-bell-shaped MPA (fig. 5.54) consists of a Cl19 group. Each of the two globes contains a quintet of UPAs (mNe5), two triplets and two duads of UPAs.

Each funnel contains a Cl25 group, three Ge11 groups and a triangular shaped body (Ag21) containing twenty-one UPAs.

$$\text{MPA} = \text{Cl19} + 2(\text{mNe5} + 2\text{H3} + 2\text{N2}) + 24(\text{Cl25} + 3\text{Ge11} + \text{Ag21}).$$

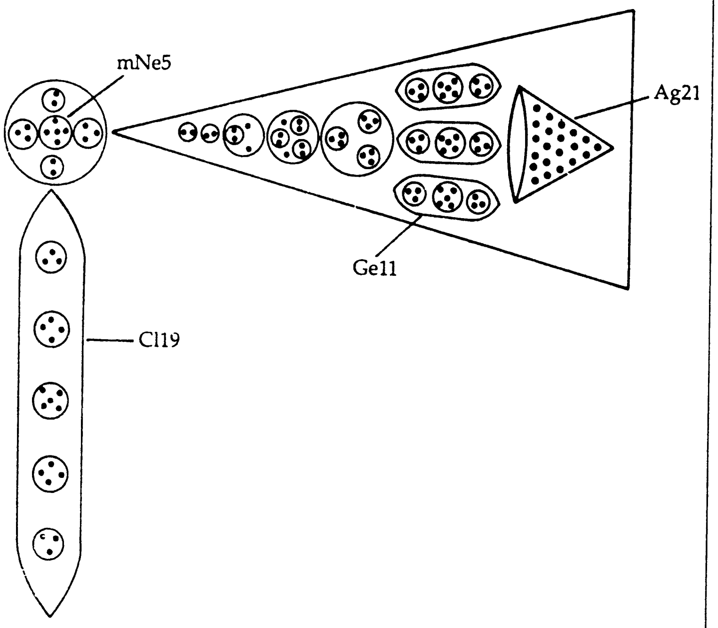


Figure 5.54 : Silver MPA.

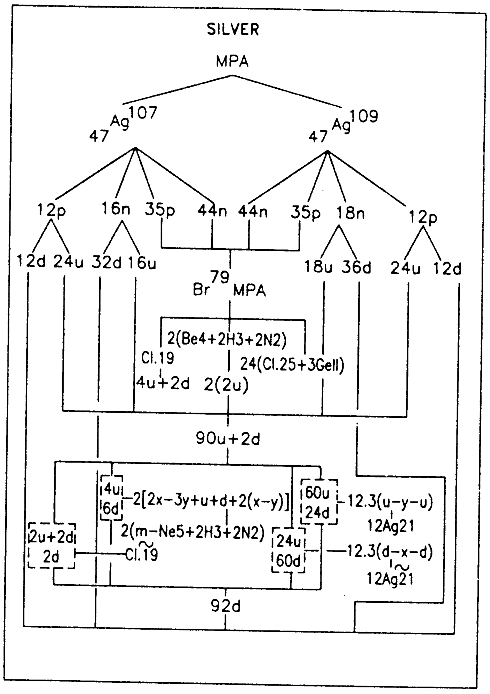


Figure 5.55

The MPA is formed (fig. 5.55) from atomic nuclei of the two stable isotopes Ag107 and Ag109 which, having almost the same terrestrial abundance, are about as likely, statistically speaking, to have been selected for micro-psi observation as two nuclei of the same isotope. These isotopes provide 1944 subquarks - one fewer than the number of UPAs. As found for the MPAs of chlorine, copper and bromine, the Cl19 group is overcounted by one UPA. This simple explanation of the discrepancy between the UPA and subquark populations is the reason why the MPA is considered to have been formed from two *different* atomic nuclei of silver. If two Ag^{107} or two Ag^{109} nuclei had formed the MPA, nine fewer or nine more UPAs, respectively, would have been present in each globe, which seems an implausibly large error of observation, given that a globe contains only fifteen UPAs. The particles in the rod actually constitute the mirror state $\widetilde{\text{Cl19}}$. The Ag21 group in twelve funnels consists of three u-Y-u bound states. This composition is partially confirmed by the disintegration diagram (fig. 5.56), which shows that the Ag21 breaks up into six (+) triplets (u quarks) and three UPAs (Y subquarks). The other twelve funnels contain the mirror state $\text{Ag}\widetilde{21}$ (d-X-d).

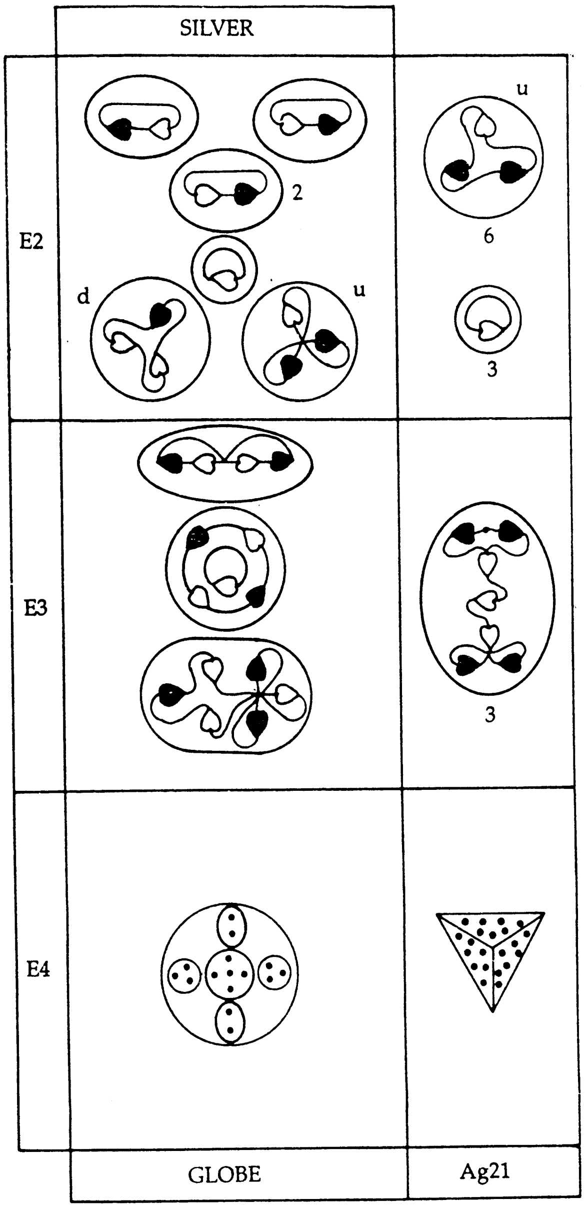


Figure 5.56

The mNe5 group in the globe is the 2X-3Y bound state. This composition agrees with that found for a similar particle in the Ge11 group belonging to the bromine MPA and is consistent with its products of disintegration: two (0) duads (X-Y disubquarks) and a UPA (Y subquark).

The two triplets in the globe are u and d quarks, as is confirmed by the break-up of the globe at the E2 stage into a (+) triplet (u quark) and a (-) triplet (d quark). The two (0) duads are X-Y disubquarks.

Every detail concerning the types of particles present in the silver MPA has been demonstrated to be consistent with both theory and analyses of other MPAs containing these particles.

Iodine MPA

The connecting rod of the dumb-bell-shaped MPA (fig. 5.57) contains a Cl19 group. Each of the two central globes contains three quartets of UPA (Be4) and two triplets (H3). Each of the twenty-four funnels contains a Cl25 group, three Ge11 groups and five I7 groups consisting of two triangular arrays of three UPAs bound to a central UPA.

Iodine MPA = Cl19 + 2(3Be4 + 2H3) + 24(Cl25 + 3Ge11 + 5I7).

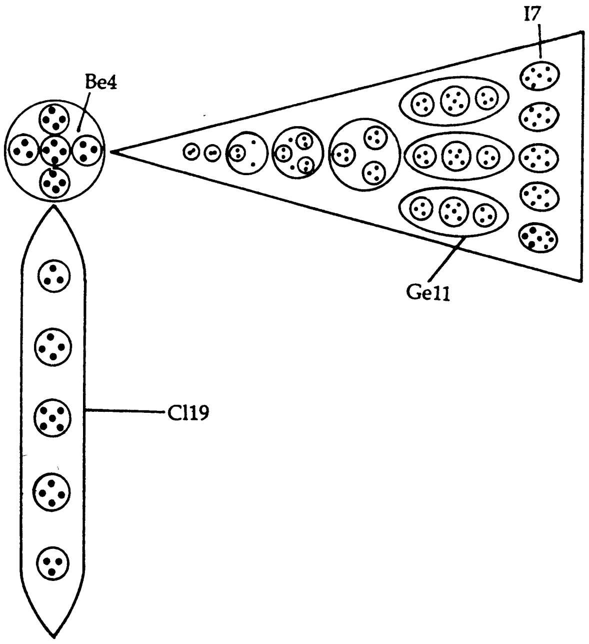


Figure 5.57 : Iodine MPA.

The MPA is formed from two I^{127} nuclei (fig. 5.58), which provide 2286 subquarks - one fewer than the number of UPAs. As found for the MPAs of chlorine, copper, bromine and silver, this discrepancy is due to the UPAs in the Cl19 rod being overcounted by one when it was originally examined - a remarkable exhibition of consistency, especially in view of the fact that I127 is the only stable isotope of iodine and so no other choice of nuclide is possible to fabricate this consistency. The rod is actually the mirror state $\tilde{\text{Cl}}19$, which is predicted to occur also in the MPAs of copper and silver.

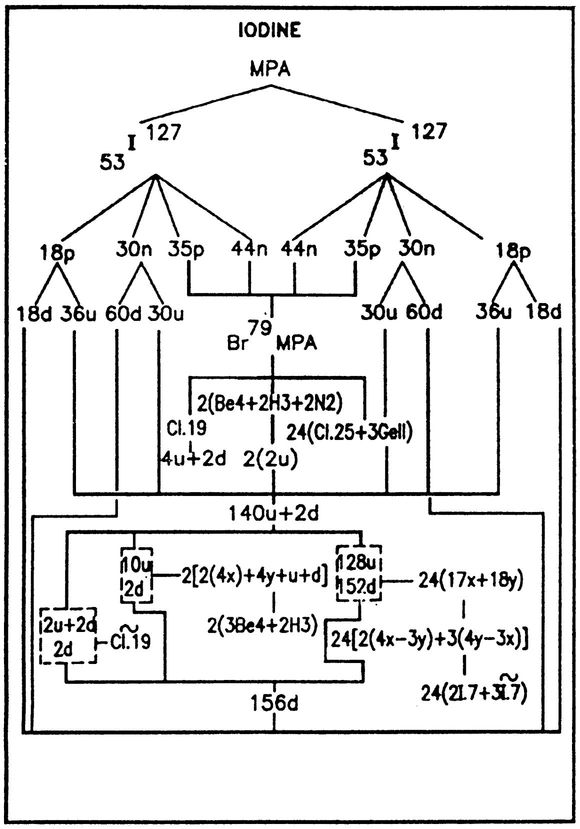


Figure 5.58

Two of the Be4 groups in the globe are bound states of four X subquarks; the other one is their mirror bound state ($\widetilde{Be}4$) of four Y subquarks. According to the disintegration diagram (fig. 5.59), all three are of the (+) variety (4X), for they break up into six (+) duads (X-X). It is simple to prove that a globe may contain either three (+) Be4 groups and two (+) triplets (in which case the latter groups disagree with the observed (+) and (-) triplets) or two (+) Be4 groups and one (-) Be4 group, as well as a (+) and a (-) triplet. The latter composition for the Be4 groups is more plausible because, rather than that a (+) triplet was wrongly described as a (-) triplet, it is more probable that not all three Be4 groups were examined but that only one was studied in detail and the two others assumed to be similar. Besant & Leadbeater were usually very accurate in their assignment of 'positivity' and 'negativity' to groups of UPAs, especially the ubiquitous triplets, although they sometimes erred in assuming that the members of a cluster of similar particles were all positive or all negative because they did not always bother to examine them individually.

The five I7 groups in a funnel consist of two 4X-3Y bound states and three $\tilde{I}7$ mirror states with composition 4Y-3X. The former is shown in the disintegration diagram to break up at stage E2 into two (+) triplets (u quarks) and a UPA (Y subquark), i.e.

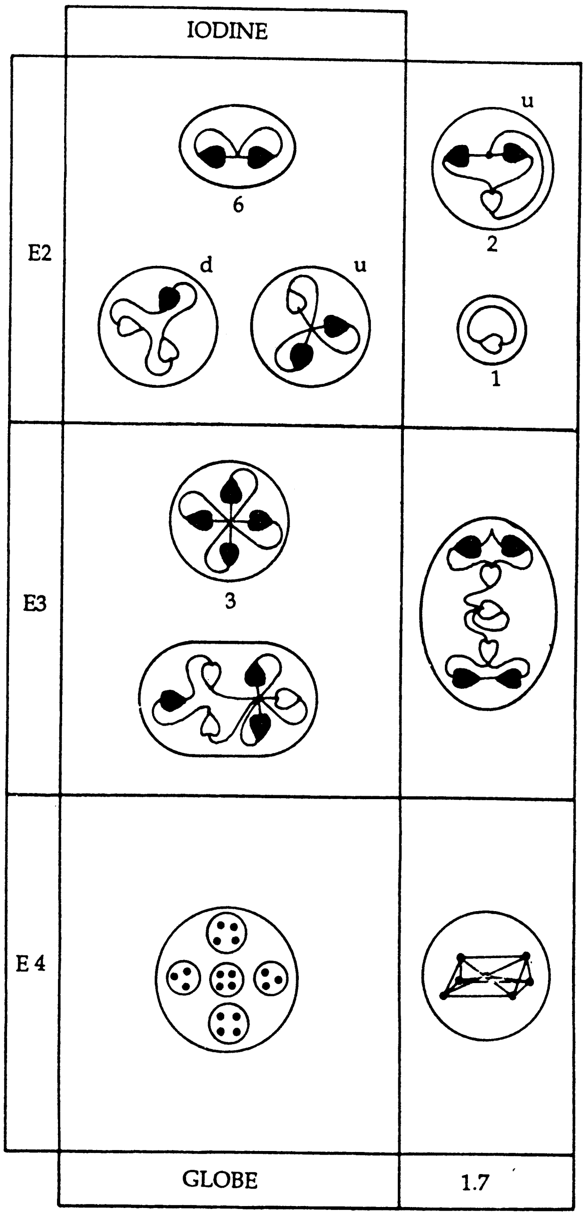


Figure 5.59

$$4X\text{-}3Y \rightarrow 2(2X\text{-}Y = u) + Y,$$

a splitting up that is consistent with its assigned composition. An example of an $\tilde{I}7$ group recorded by Besant and Leadbeater will be given in the discussion of the iron MPA.

Gold MPA

The connecting rod of the dumb-bell-shaped MPA (fig. 5.60) consists of four Sm84 groups around which sixteen Au33 groups revolve in two inclined orbits, eight to each orbit. The Sm84 group consists of two clusters of four triplets of UPAs and four Oc15 rings like that in the occultum MPA. The Au33 group consists of a tetrahedral Ad24 group and a balloon-shaped Oc9 group similar to that in the occultum MPA. Each of the globes at the ends of the connecting rod is made up of an Sm101 group and two Au38 groups. The Sm101 consists of a ring of twelve I7 groups arranged symmetrically about a mNe5 group, which is at the centre of another ring of six duads of UPAs. The Au38 consists of an Ad24 group that intersects a tetrahedral array of two Be4 groups and two hydrogen triplets. Each of the twenty-four funnels contains a Cl25 group, four Ge11 groups and a Fe28 cone containing twenty-eight UPAs.

Gold MPA = (4Sm84 + 16Au33) + 2(Sm101 + 2Au38) + 24(Cl25 + 4Ge11 + Fe28).

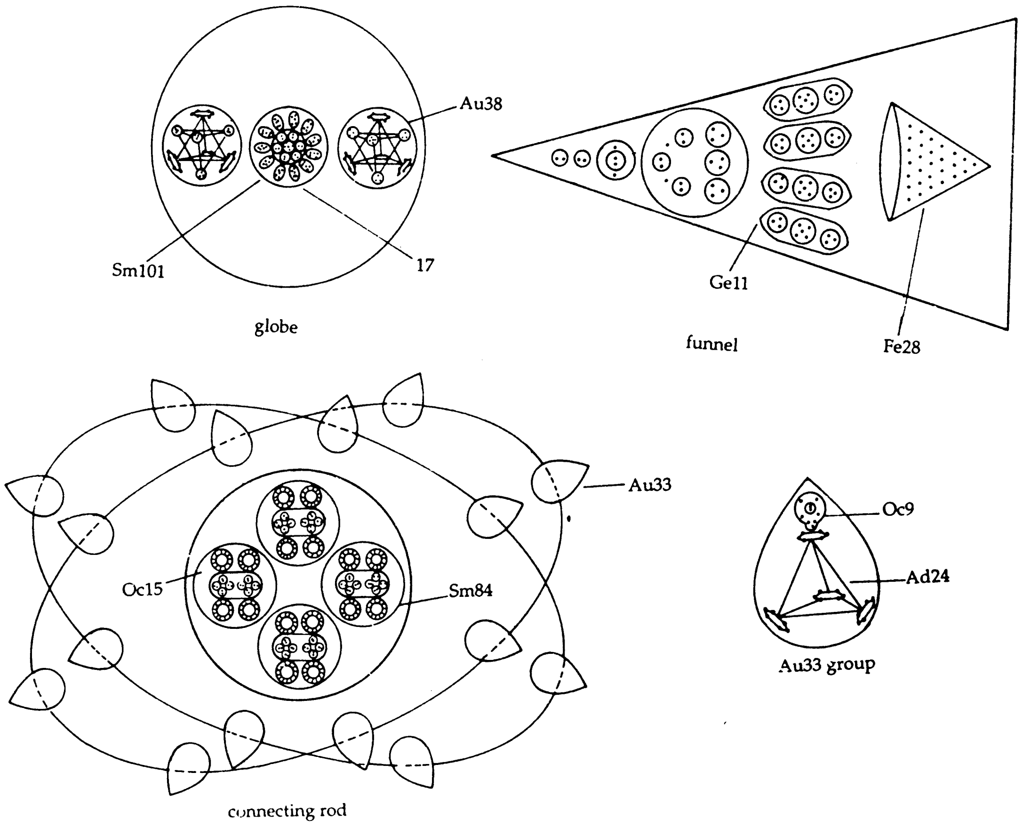


Figure 5.60 : Gold MPA.

The MPA is formed from two Au^{197} nuclei (fig. 5.61), which provide 3546 subquarks - exactly the same as the number of UPAs (Au^{197} is the only stable nuclide of gold). The four

Sm84 groups have the same composition. The cross-shaped clusters of four (+) triplets in each Sm84 (fig. 5.62) are bound states of four u quarks; the clusters of four (-) triplets are bound states of four d quarks. Each Oc15 ring contains six X subquarks and nine Y subquarks, being actually the mirror state Oc̃15 (analysis of the occultum MPA during the discussion of the helium MPA revealed that this ring comprises the nine X subquarks and six Y subquarks making up four u quarks and one d quark). The Oc9 group in ten of the Au33 groups represent the fragments of a neutron (in agreement with analysis of this group in the occultum MPA); in the other six groups it is a similarly broken up proton (the mirror state of a neutron), i.e. the mirror state Oc̃9.

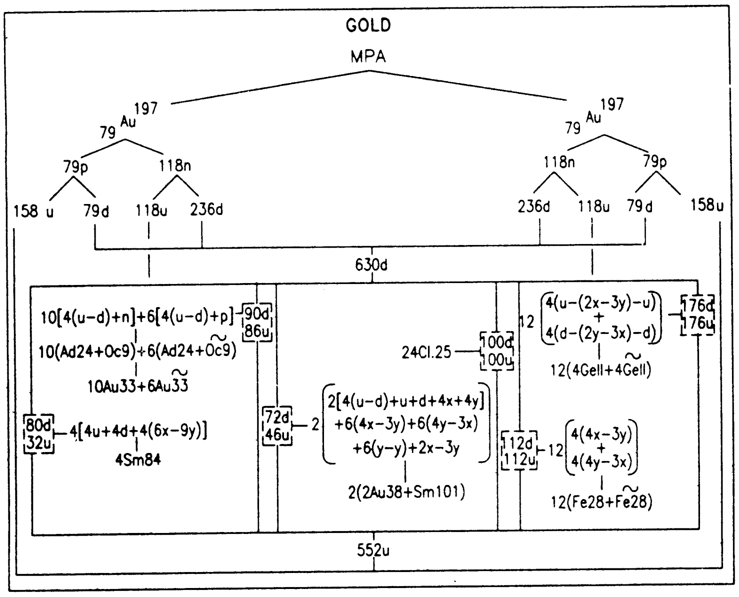


Figure 5.61

The triplets in the Au38 group are a u quark and a d quark; the Be4 groups are bound states of either four X subquarks or four Y subquarks. These identifications are confirmed by one of the disintegration diagrams (fig. 5.63), which shows that the Au38 breaks up into one (+) triplet (u quark), one (-) triplet (d quark), one (+) Be4 group that breaks up further into two (+) duads (X-X), and one (-) Be4 that breaks up into two (-) duads (Y-Y). Six Ĩ7 groups in the Sm101 have the same composition 4X-3Y that was found in the analysis of the iodine MPA; the other six groups are Ĩ7 mirror states. The six (-) duads are Y-Y disubquarks. The mNe5 group is a 2X-3Y bound state, having the same composition as that found for similar particles in the MPAs of bromine and silver.

As deduced for the chlorine MPA, the twenty-four Cl25 groups are formed from one hundred u quarks and one hundred d quarks. The Ge11 group in twelve funnels is the same bound state u-(2X-3Y)-u that was found for this group in the MPAs of germanium, bromine, silver and iodine; in the other twelve funnels the particle is the mirror state Gẽ11 =

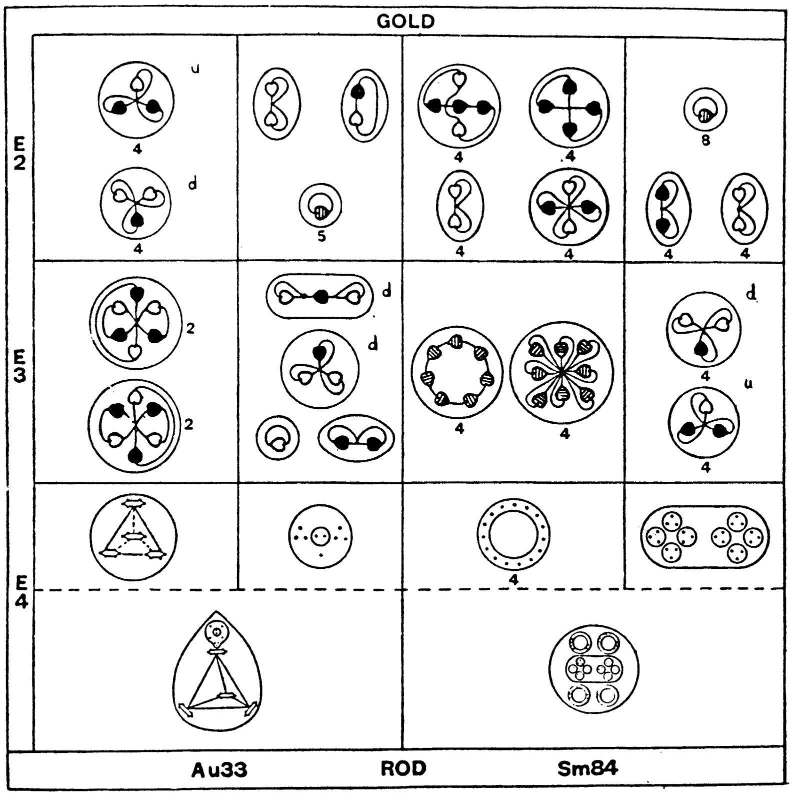


Figure 5.62

d-(2Y-3X)-d. The disintegration diagram (fig. 5.64) portrays the former variety, each Ge11 group breaking up at stage E3 into two (+) triplets (u quarks) and a mNe5 group with the same composition 2X-3Y as that given for the mNe5 at the centre of the Sm101 group.

The Fe28 groups in twelve funnels consist of four u-Y-u bound states. This is confirmed by their disintegration into eight (+) triplets (u quarks) and four free UPAs (Y subquarks). In the other twelve funnels there are Fe28 mirror states consisting of four d-X-d bound states. Notice that there is a difference between the products of disintegration of the Fe28 shown in the disintegration diagrams of the gold and iron MPAs (compare figures 5.64 and 5.178). Instead of four *identical* septets of UPAs, the Fe28 in the MPA of iron consists of two (+) and two (-) septets that break up into four (+) triplets (u quarks), four (-) triplets (d quarks) and four free UPAs. Such a distinction is predicted by the analysis of the iron MPA, which shows that

$$\begin{aligned} Fe28 &= 2(u\text{-}Y\text{-}u) + 2(d\text{-}X\text{-}d) \\ &\rightarrow 4u + 4d + 2Y + 2X \\ &= 4\ (+)\ \text{triplets} + 4\ (-)\ \text{triplets} + 4\ \text{UPAs}. \end{aligned}$$

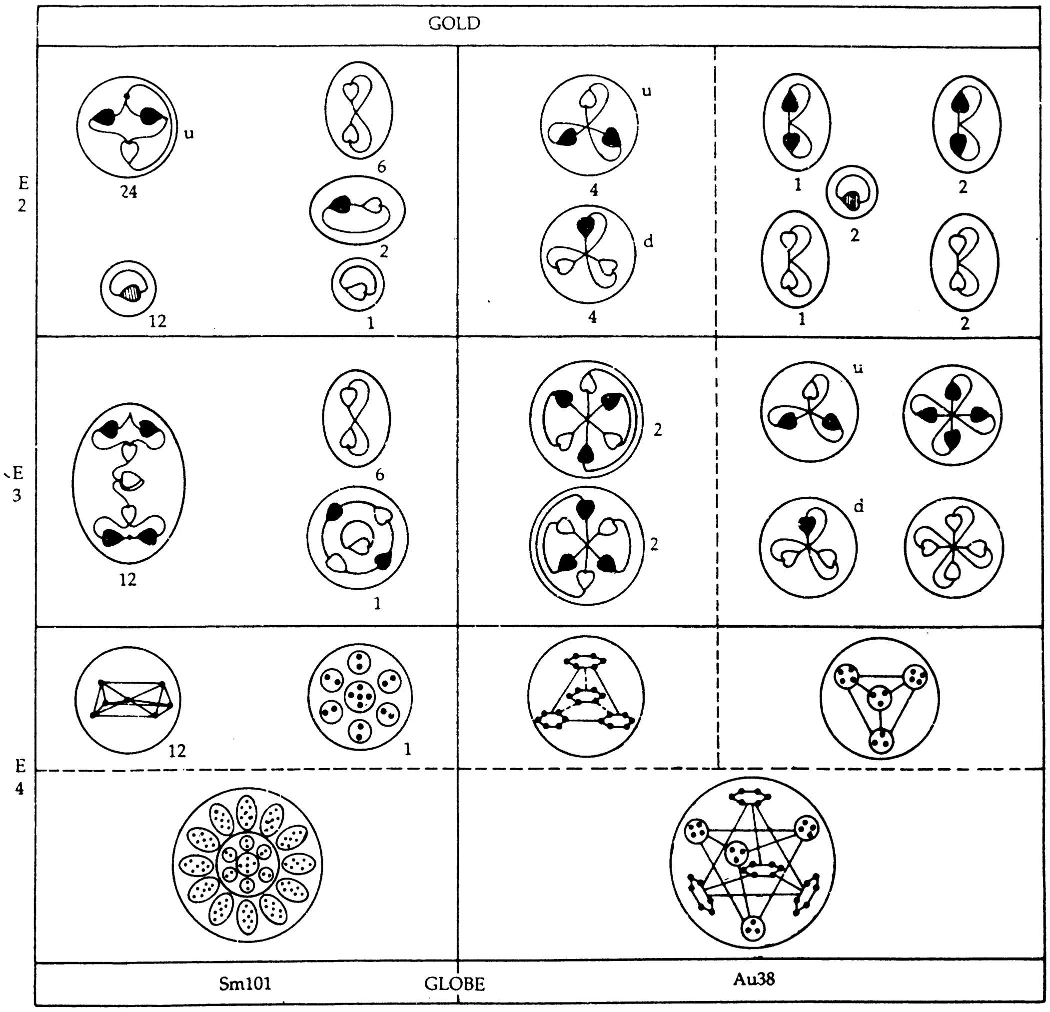


Figure 5.63

5.10 Tetrahedron group A

Beryllium MPA

The beryllium MPA (fig. 5.65) is a tetrahedral array of four funnels radiating from a central globe. A funnel contains four ovoids (Be10), each enclosing two H3 triplets and one quartet of UPAs. The globe contains a whirling cross of four UPAs (Be4).

Beryllium MPA = Be4 + 4(4Be10).

The MPA is formed (fig. 5.66) from two Be^9 nuclei, which provide 162 subquarks - two fewer than the number of UPAs. The Be4 globe is predicted to contain not four but two

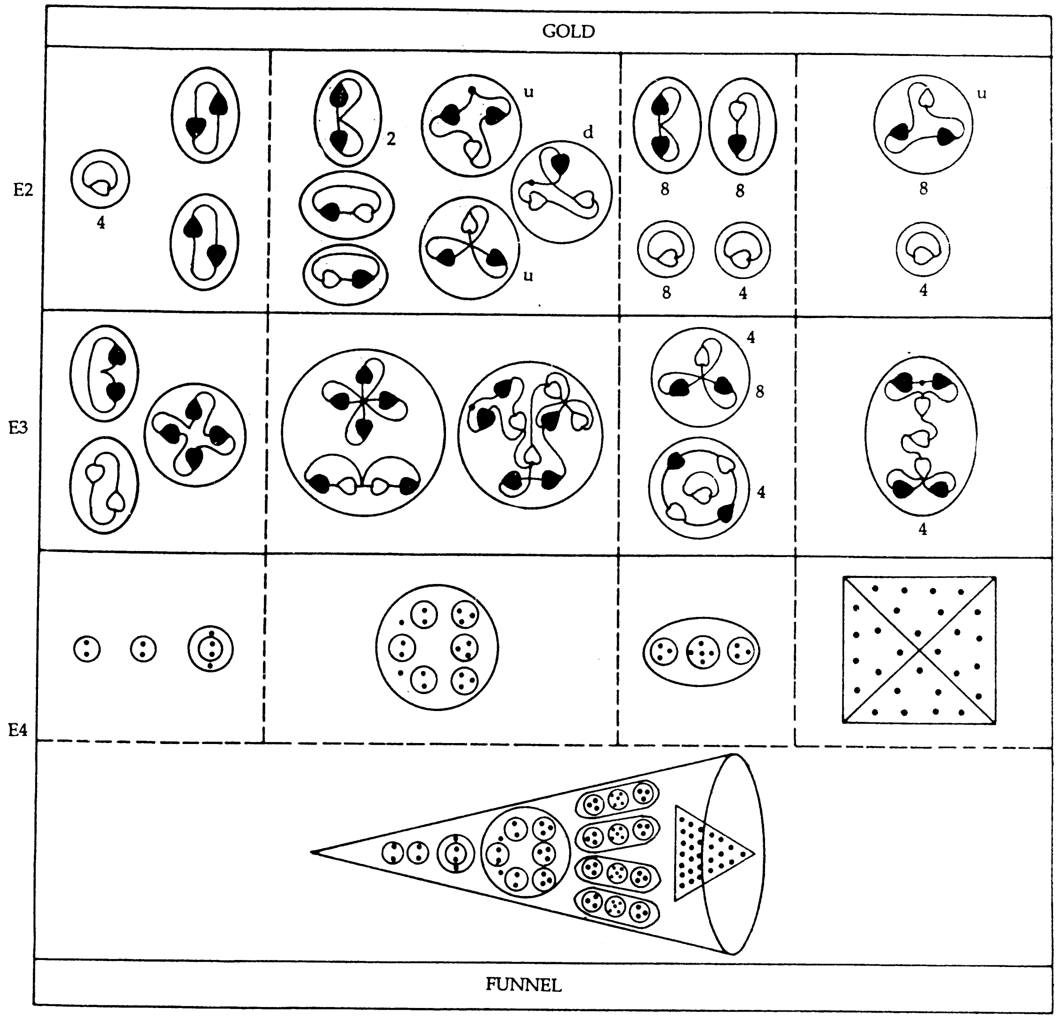


Figure 5.64

UPAs, as a (-) duad (Y-Y). The disintegration diagram (fig. 5.67) indicates that it breaks up into two (0) duads (X-Y), which, too, disagrees with prediction. Remarkably, however, the disintegration diagram (fig. 5.68) of the Be4 globe published in the first edition of *Occult Chemistry* shows that the Be4 breaks up into a (+) duad (X-X) and a (-) duad (Y-Y), the latter agreeing with prediction. Presumably, this particle was wrongly observed on two separate occasions, the later event occurring after 1908, when the first edition was published, although Besant & Leadbeater do not seem to have published a second description of the beryllium MPA, as they did for some other elements. Two types of Be10 groups are predicted, one the mirror state of the other: the Be10 is a bound system of two u quarks and a bound state of

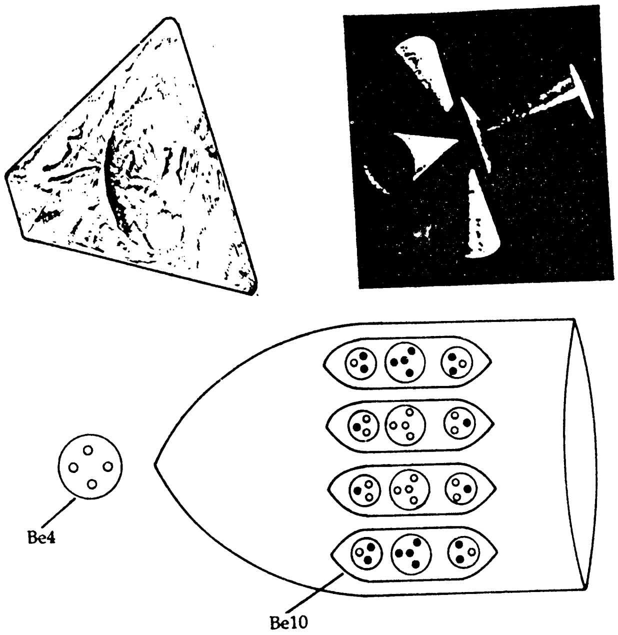


Figure 5.65 : Beryllium MPA.

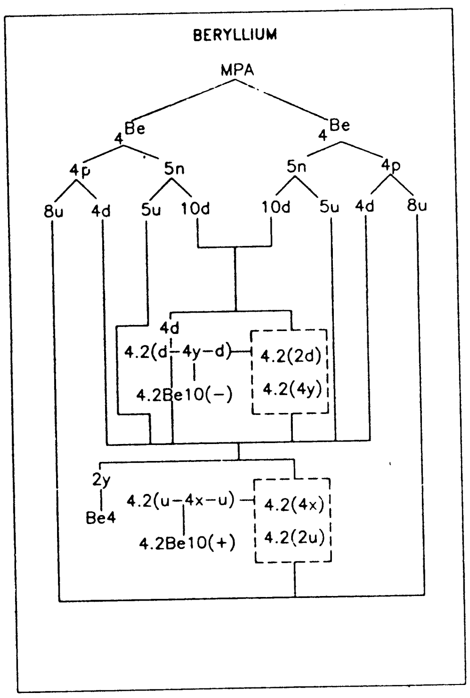


Figure 5.66

four X subquarks, tetrahedrally arranged; the $\widetilde{Be10}$ is a bound system of two d quarks and a bound state of four Y subquarks, similarly arranged:

$$Be10(+) = 8X + 2Y = u + 4X + u$$

and

$$Be10(-) = \widetilde{Be10} = 8Y + 2X = d + 4Y + d.$$

These two mirror states have opposite electric polarity because they comprise counterpart mirror particles whose charges are of opposite sign. Two Be10(+) groups and two Be10(-) groups are in each funnel. Fig. 5.67 confirms this because it shows that a funnel releases at the E3 stage two (+) and two (-) Be10 groups. In the former the UPAs point outwards, in the latter they point inwards, indicative of possessing opposite electric polarity. Furthermore, the Be10(+) contains two (+) triplets (u quarks) and a (+) quartet of UPAs which many disintegration diagrams reveal can be further broken up into two (+) duads (X-X), confirming the composition of the Be10(+) given above, whilst the Be10(-) contains two (-) triplets (d quarks) and a (-) quartet of UPAs which many diagrams indicate can be further broken up into two (-) duads (Y-Y), also in agreement with the composition of the Be10(-) given above. Figure 5.65 shows the subquark composition of the Be10 groups in a funnel.

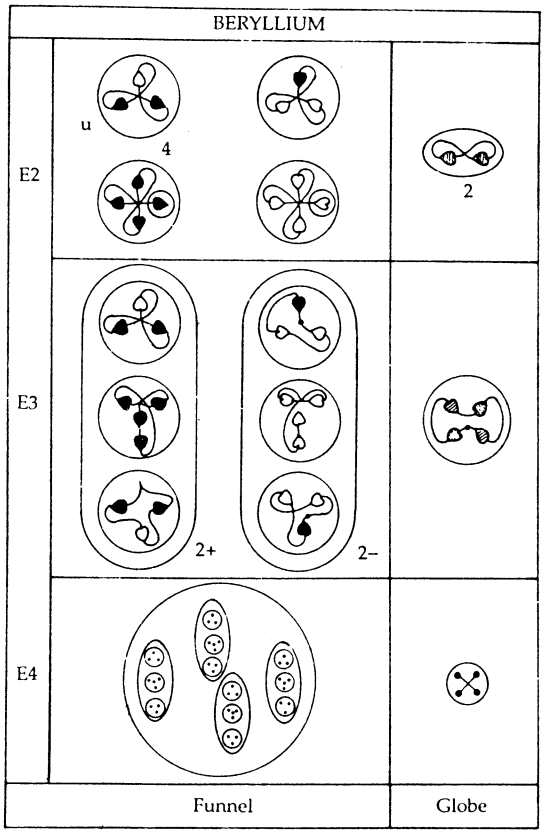


Figure 5.67

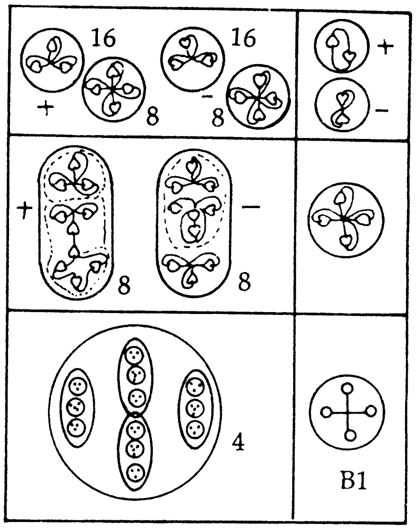
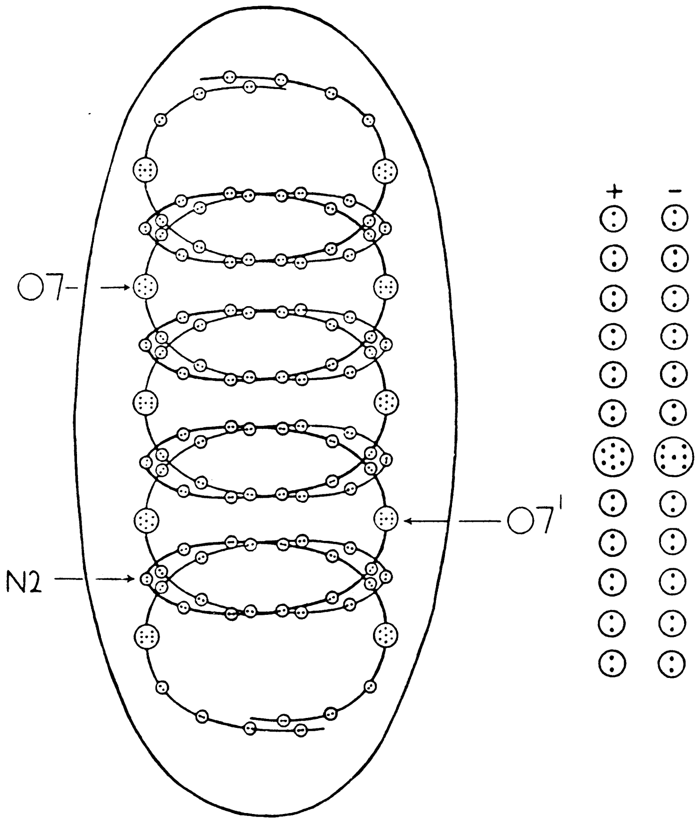


Figure 5.68

Oxygen MPA

The form of the MPA of oxygen is unlike that of any other element. It is ovoid (fig. 5.69) and encloses two spirally-coiled bodies, one 'positive,' the other 'negative,' revolving rapidly in opposite directions about a common axis parallel to their length. Each spiral body is a chain of fifty-five much smaller spheres containing two UPAs (N2), one (+), the other (-). Each body is shaped like a spring with five coils and has a brilliantly lit point shining on each coil. This point is actually a globe (fig. 5.70) containing seven UPAs. The major difference between the two spirals is in their globes. In the positive spiral, denoted (+), the globes (called 'O7') contain a central (+) UPA surrounded by a face-centred cubic array of six UPAs, three (+) and three (-) (fig. 5.71). In the negative spiral, denoted (-), the globes (called 'O_7'') contain a central (-) UPA, about which are arranged three (+) UPAs and three (-) UPAs, two being perpendicular to each other and inclined to the third pair, which lies on a line with the central UPA. The two spirals spin around their shared axis so fast as to present to micro-psi vision a continuous surface, creating the appearance of a solid cylinder.

$$\text{Oxygen MPA} = (55N2 + 5O_7) + (55N2 + 5O_7').$$



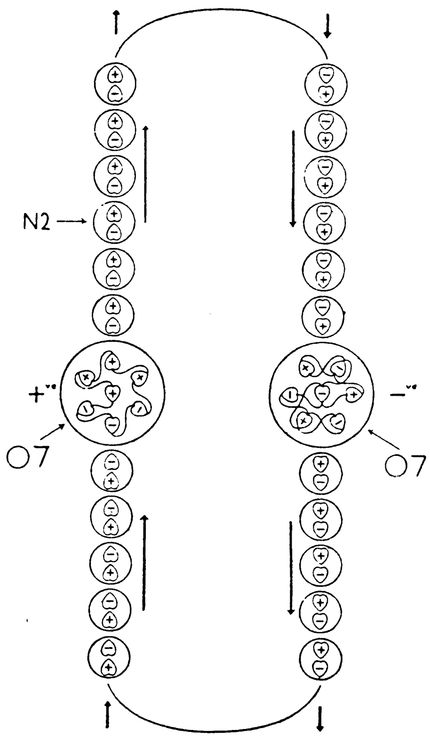


Figure 5.69 : Oxygen MPA

Figure 5.70 : Section of oxygen MPA

The oxygen MPA is formed (fig. 5.72) from two O^{16} nuclei, which contain forty-eight u quarks and forty-eight d quarks. No reason can yet be given for why micro-psi examination

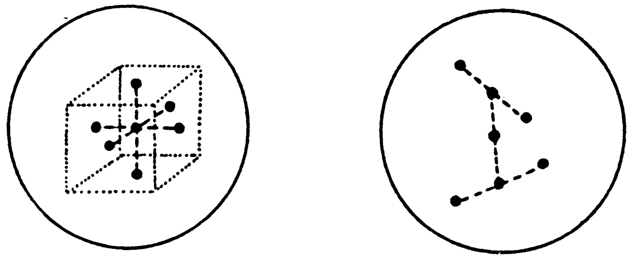
O_7  O_7'

Figure 5.71 : O_7 and O_7' groups

of an oxygen molecule should disintegrate the two O^{16} nuclei into two polymer chain-like strings of bound states of two UPAs behaving like dipoles joined end to end and interdispersed by bound states of seven subquarks linked by strings. The two nuclei provide 288 subquarks, two less than the number of UPAs. Because the MPA consists of two halves of similar form, this symmetry makes it more plausible that one too many UPAs was observed in *both* halves than that one half had two fewer UPAs than the other. It also seems more probable that one too many UPAs was observed in one of the O_7 and in one of the O_7' than that one of the N2 in each spiral body was actually a single UPA that went unnoticed. Furthermore, it is likely that these were a (+) and a (-) UPA because the MPA would then actually contain 144 (+) and 144 (-) UPAs, which would be consistent with it having being formed from two oxygen nuclei with thirty-two nucleons, a pair of nucleons having, according to the intepretation of the hydrogen MPA, nine (+) and nine (-) UPAs:

$$\text{MPA} = 144\,(+) + 144\,(-) = 16[9(+) + 9(-)].$$

The O_7 and O_7' groups predicted to have one fewer UPAs will be called, respectively, O_6 and O_6'.

Each of the fifty-five N2 groups in the (+) spiral is an X-X bound state; each N2 in the (-) spiral is a Y-Y bound state. This is confirmed by the disintegration diagram (fig. 5.73), which shows that the MPA releases at the E2 stage fifty-five (+) duads (X-X) and fifty-five (-) duads (Y-Y) Thirty-four X subquarks and thirty-four Y subquarks make up the two sets of five globes. The subquark composition of each globe cannot be deduced from figure 5.73 because they were not broken up into their constituents. Two facts, however, allow it to be deduced:

1) The O_7 was called positive and the O_7' was called negative. In keeping with the general result that the positivity and negativity of groups of UPAs refer to the sign of their electric charge, if a positively charged O_7 has n X subquarks, each of charge +5/9, and (7-n) Y subquarks, each of charge -4/9, then its total charge is

$$(1/9)[5n - 4(7-n)] > 0,$$

i.e.

$$9n > 28.$$

Therefore, $n>4$. The facts that the same numbers of X and Y subquarks make up all the globes and that each spiral contains the same number of globes mean that each negatively

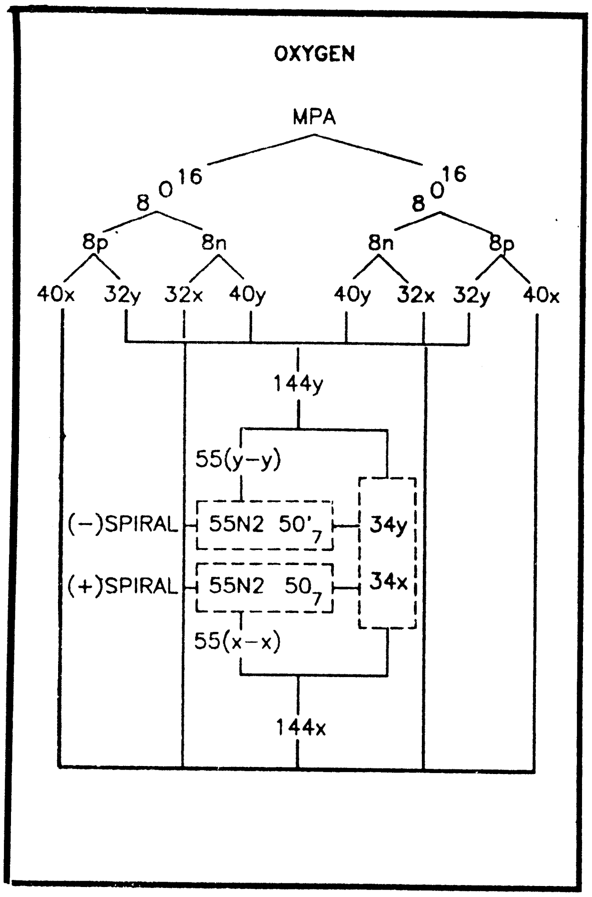


Figure 5.72

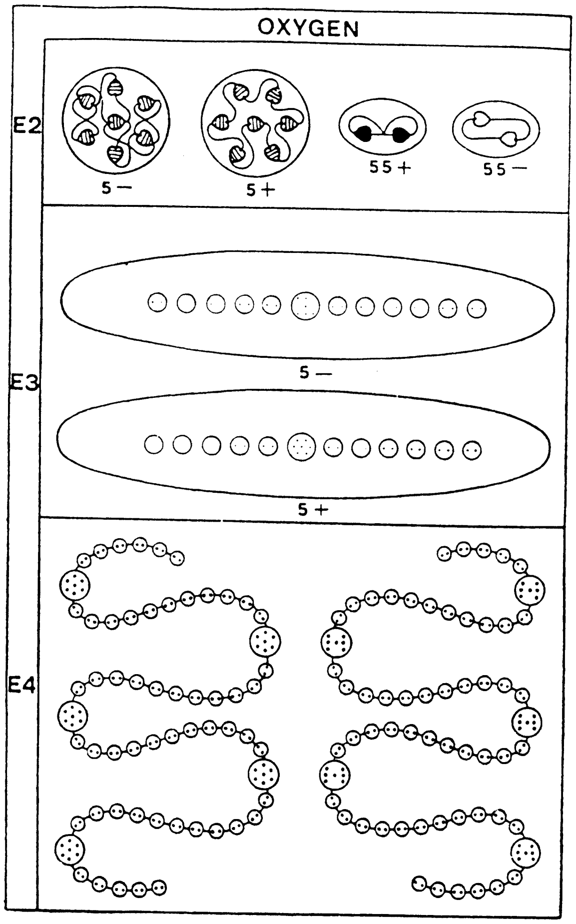


Figure 5.73

charged O_7' is the mirror state $\tilde{O}_7$ of O_7, containing n Y subquarks and (7-n) X subquarks. Its total charge is

$$(1/9)[(7-n)5 - 4n] < 0,$$

i.e.

$$9n>35.$$

Therefore, n>4. An O_7 (O_7') with five, six or seven X (Y) subquarks and, respectively, two, one or no Y (X) subquarks is positively (negatively) charged;

2) The disintegration diagram (fig. 5.74) of the oxygen MPA published in the first edition of *Occult Chemistry* differs from figure 5.73 published in the third edition by indicating that

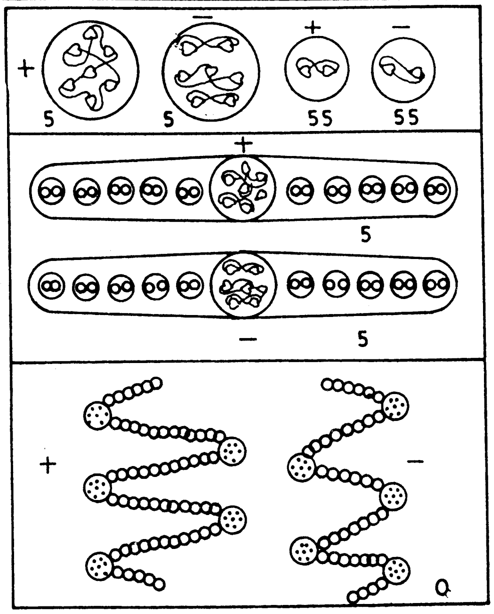


Figure 5.74

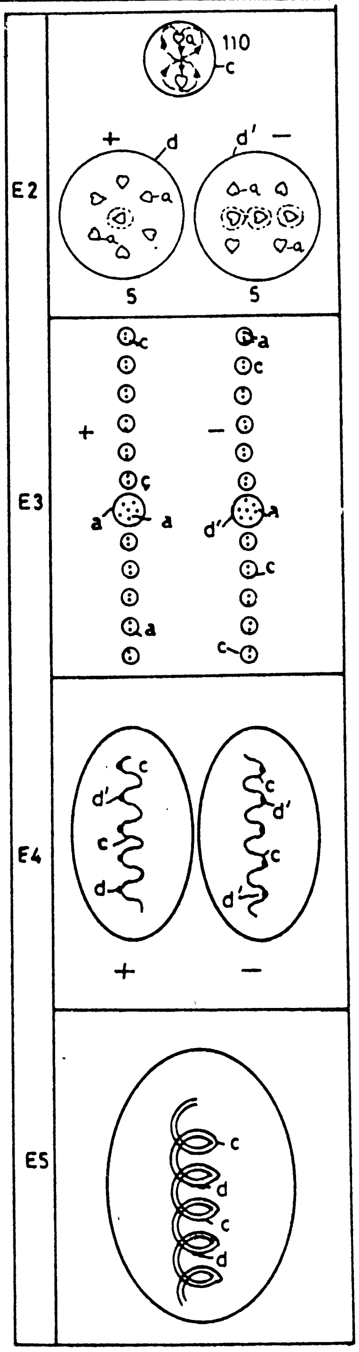


Figure 5.75

the (-) O_7' group released at the E2 stage consists (looking from top to bottom) of a (-) duad (Y-Y), a (-) linear hydrogen triplet H3′ (d quark = X-2Y) and a second (-) duad (Y-Y), i.e. the O_7' is made up of one X subquark and six Y subquarks, so that n = 6. This agrees with the second of its three possible compositions deduced above to have a net negative charge.

In order to be consistent with both figure 5.74 and their polarities assigned by Besant & Leadbeater, the O_7 must be therefore a 6X-Y bound state and its mirror state - the O_7' - must be a X-6Y bound state. The O_6 should consist of either six X subquarks or five X subquarks and one Y subquark, whilst the O_6' must consist, respectively, of either six Y subquarks or five Y subquarks and one X subquark (either one X is absent from an O_7 and one Y from an O_7' or one Y is absent from an O_7 and one X from an O_7'). Remarkably, the total subquark composition of these groups implied by their observed polarities and by figure 5.74 agrees *exactly* with the thirty-four X and thirty-four Y subquarks required by theory because:

$$4O_7 + 4O_7' + O_6 + O_6' = 4(6X - Y) + 4(X - 6Y) + (6X \text{ or } 5X - Y) + (6Y \text{ or } X - 5Y) = 34X + 34Y.$$

This is convincing evidence of the correctness of the theory that MPAs are formed from pairs of atomic nuclei.

The oxygen MPA is an example of small differences to be found occasionally between the disintegration diagrams of MPAs published in the first and third editions of *Occult Chemistry*. These 'edition variants' are relatively few but are highly important as tests of any theory of MPAs because, having arisen from some elements being re-examined, only their later observations appearing in the last edition, *both* compositions of the MPA implied by their two disintegration diagrams have to be compatible with theory. In 1895 Besant published in the Theosophical magazine *Lucifer* descriptions of the MPAs of hydrogen, nitrogen and oxygen. According to the disintegration diagram (fig. 5.75) she gave there for oxygen, the two spirals broke up at the E2 stage into 110 duads of UPAs pointing in the same direction, that is, (0) duads (compare figures 5.73 and 5.75). Making the plausible assumption that the O_7 and O_7' groups have the same compositions in the earlier and later versions of the oxygen MPA, the subquark composition of the 110 (0) duads must be the same as that of 55 (+) duads and 55 (-) duads. This means that the subquarks in two (0) duads consist of those in one (+) duad and one (-) duad. A priori, the u and d quarks making up protons and neutrons in atomic nuclei could comprise up to six differently charged subquark species q_r ($r = 1,2,3,4,5,6$). Labelling the three recorded types of duads:

$$(+) = q_i - q_j$$
$$(-) = q_k - q_l \qquad (i, j, k, l, m, n, = 1,2,3,4,5,6)$$
$$(0) = q_m - q_n,$$

then

$$q_i - q_j + q_k - q_l = 2(q_m - q_n).$$

Either:
CASE A

$$q_i = q_j = q_m \text{ (or } q_n) \equiv X$$

and

$$q_k = q_l = q_n \text{ (or } q_m) \equiv Y,$$

or:
CASE B

$$q_i = q_k \text{ (or } q_l) = q_m \text{ (or } q_n)$$

and

$$q_j = q_l \text{ (or } q_k) = q_n \text{ (or } q_m).$$

But the trivial case B must be wrong because it implies - contrary to observation - that the (+), (-) and (0) duads must have electric charges of the same sign as they consist of the same types of subquarks. Hence only case A is allowed and the two edition variants of the oxygen MPA imply that

(+) = X-X,
(-) = Y-Y,
(0) = X-Y.

Since the (+) duad is positively charged and the (-) duad is negatively charged, it may be inferred that X has a positive charge and that Y has a negative charge. The fundamental interpretation of these types of duads used for the analysis of MPAs - far from being arbitrary - can actually be *inferred* logically from the two edition variants of oxygen and the natural interpretation of Besant's and Leadbeater's terms 'positive' and 'negative' as referring to electric polarity.

The (+) spiral of the oxygen MPA, which consists of fifty-five (+) duads and five other particles, must contain at least 110 X subquarks because it was shown above that this type of duad contains two X subquarks. Similarly, its (-) spiral, which consists of fifty-five (-) duads and five other particles, must contain at least 110 Y subquarks because it was shown above that this duad contains two Y subquarks. Forty-eight u quarks and forty-eight d quarks thus contain at least 110 X subquarks and 110 Y subquarks. This means that one u and one d quark must have three X subquarks and three Y subquarks, for, if they had fewer of either (or both) type of subquark, there would be insufficient X or Y subquarks (or both) in two O^{16} nuclei to make up the fifty-five (+) duads and the fifty-five (-) duads. This restricts the compositions of u and d quarks to the following possibilities:

	CASE 1	CASE 2	CASE 3
u =	X-Y-Y	X-X-Y	X-X-X
d =	X-X-Y	X-Y-Y	Y-Y-Y

(clearly, the positively u quark cannot consist of three negatively charged Y subquarks and the negatively charged d quarks cannot consist of three positively charged X subquarks). In terms of their electric charges Q:

	CASE 1	CASE 2	CASE 3
$Q_u - Q_d = 2/3 - (-1/3) = 1 =$	$Q_Y - Q_X$	$Q_X - Q_Y$	$3(Q_X - Q_Y)$

Case 1 is forbidden because $Q_Y<0<Q_X$, in accordance with what was deduced above for the charges of the X and Y subquarks. This conclusion is confirmed by the fact that (+) and (-) hydrogen triplets, which have to be, respectively, u and d quarks in order for the hydrogen MPA to correlate with the quark model of the proton, are always shown in disintegration diagrams to break up into, respectively, (+) and (-) duads plus free UPAs, i.e. the u quark must consist of at least two X subquarks and the d quark must consist of at least two Y subquarks; this is consistent only with cases 2 and 3. Features of the oxygen MPA cannot be further used to distinguish between cases 2 and 3.

It was argued above that the oxygen MPA should contain 144 (+) UPAs and 144 (-) UPAs. But two O^{16} nuclei contain forty-eight u quarks and forty-eight d quarks, and if u and d quarks have the subquark composition:

u = (2X-Y), d = (X-2Y),

proven in this chapter by self-consistent analysis of the MPAs of forty-eight elements, the oxygen MPA is predicted to contain 144 X subquarks and 144 Y subquarks. Does this mean that a (+) UPA is either an X or Y subquark and that a (-) UPA is either a Y or X subquark? Analysis of the hydrogen MPA concluded that this is not so because one (+) hydrogen triplet (u quark) in its lower hydrogen triangle is made up of two (+) UPAs and one (-) UPA, whereas the other (+) triplet is made up of two (-) and one (+) UPA - the same as the (-) triplet (d quark) in the lower hydrogen triangle; this, clearly, is impossible if each type of UPA has only one electric charge. The oxygen MPA furnishes further evidence in support of this conclusion that the internal chirality of UPAs is not correlated with their electrical polarities: figure 5.70 shows that *both* the (+) duads and the (-) duads making up the spirals of the MPA consist of a (+) UPA and a (-) UPA (other than the hydrogen MPA, this is the only MPA where the composition of particles in terms of (+) and (-) UPAs was explicitly described). Furthermore, it was deduced earlier that the O_7 group comprises six X subquarks and one Y subquark and that the O'_7 group is made up of one X subquark and six Y subquarks, whereas the former consists of four (+) UPAs and three (-) UPAs and the latter consists of three (+) UPAs and four (-) UPAs. So (+) UPAs cannot be either X or Y subquarks and (-) UPAs cannot, respectively, be either Y or X subquarks. As explained in ESPQ,[19] the internal chirality of UPAs denotes the polarity not of their electric charge but of their *'magnetic charge'* - the source of the hypercolour gauge fields confining subquarks in quarks.

Calcium MPA

The MPA (fig. 5.76) consists of a central globe (Ca80), from which projects a tetrahedral array of four funnels. The Ca80 globe is a pair of concentric spheres, both of which are divided into

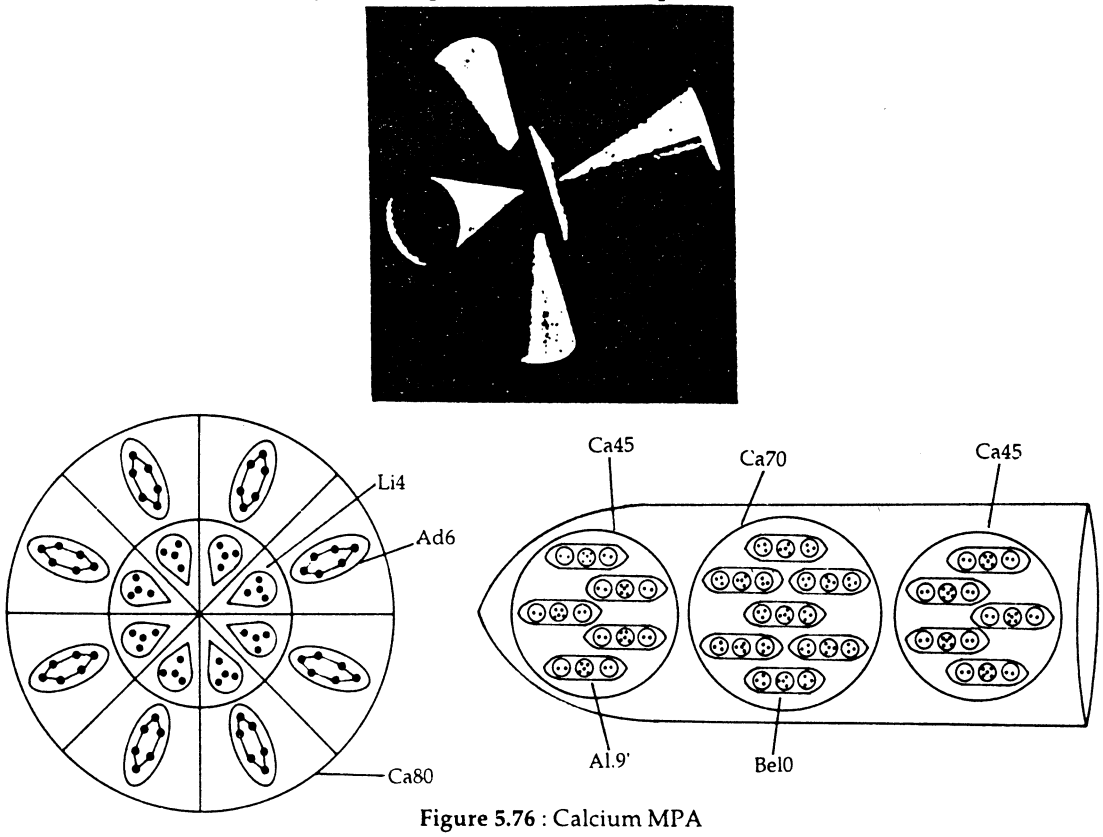


Figure 5.76 : Calcium MPA

eight equal segments. Each segment in the inner sphere contains a tetrahedral Li4 group; each outer sphere encloses a cigar-shaped Ad6 group. Each funnel contains 160 UPAs in three spheres (Ca160), the central one (Ca70) enclosing seven Be10 ovoids and the two spheres (Ca45) on either side each containing five Al9′ ovoids.

Calcium MPA = (8Li4 + 8Ad6) + 4(5Al9′ + 7Be10 + 5Al9′)
= Ca80 + 4(Ca45 + Ca70 + Ca45)
= Ca80 + 4(Ca160).

The MPA is formed (fig. 5.77) from two Ca^{40} nuclei, which provide 720 subquarks, the same number as the number of UPAs. The eight Ca^{45} groups are made up of subquarks belonging to the twenty protons in one Ca^{40} nucleus and to the twenty neutrons in the other Ca^{40} nucleus. In one Ca^{45} group each Al9′ group comprises the subquarks in a proton that, having been set free, recombined as X-X and Y-Y disubquarks and a square pyramidal array of three X subquarks and two Y subquarks (fig. 5.78):

proton (= 5X-4Y) → X-X + Y-Y + 3X-2Y.

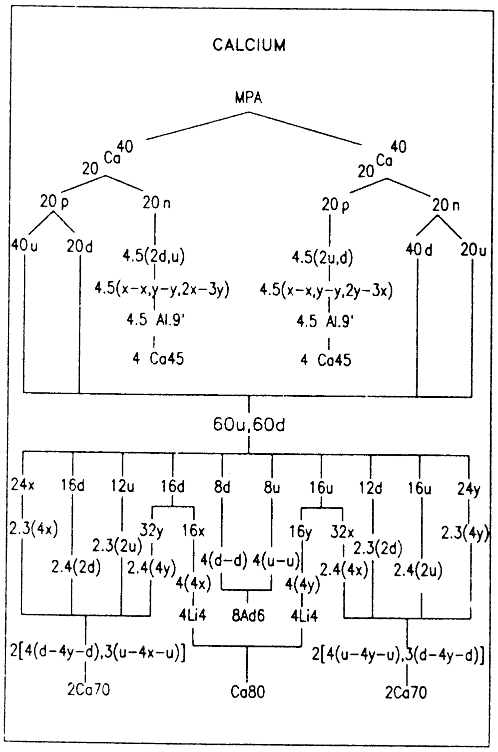


Figure 5.77

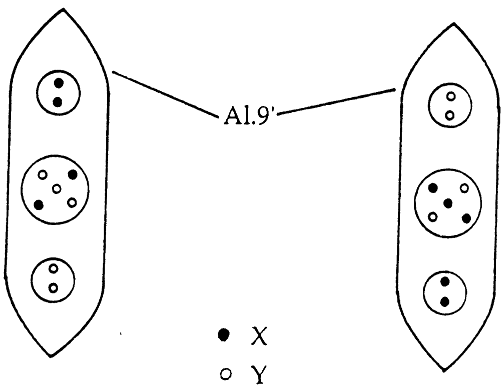


Figure 5.78 : Al9′ group

In the other Ca^{45} each Al9′ group is made up of the subquarks released from a neutron that have recombined into Y-Y and X-X disubquarks and a square pyramidal array of three Y subquarks and two X subquarks:

neutron (= 5Y-4X) → Y-Y + X-X + 3Y-2X.

The two Ca45 groups are thus mirror states of each other. The disintegration diagram (fig. 5.79) confirms the prediction that the pair of Ca45 groups contain ten (+) duads (X-X) and ten (-) duads (Y-Y) because, among the products of disintegration of these two groups at stage E3 there are ten (+) duads and ten (-) duads. Four of the Ad6 groups in the Ca80 (fig. 5.80) are four u-u diquarks; the other four are d-d diquarks, i.e. their mirror particles. Four of the Li4 groups in its central sphere are bound states of four X subquarks; the other four are bound states of four Y subquarks - the mirror state L͠i4 of the former. Four segments of the larger sphere enclose a u-u diquark and a tetrahedral cluster of four X subquarks; four segments contain a d-d diquark and a cluster of four Y subquarks. The disintegration diagram confirms this composition because it shows that the globe breaks up at stage E3 into four (+) Ad6 groups (each of which splits up at stage E2 into two (+) triplets, or u quarks), four (-) Ad6 groups (each of which breaks up into two (-) triplets, or d quarks), four (+) Li4 groups (which split up at stage E2 into eight (+) duads, or X-X) and four (-) Li4 groups (which break up into eight (-) duads, or Y-Y).

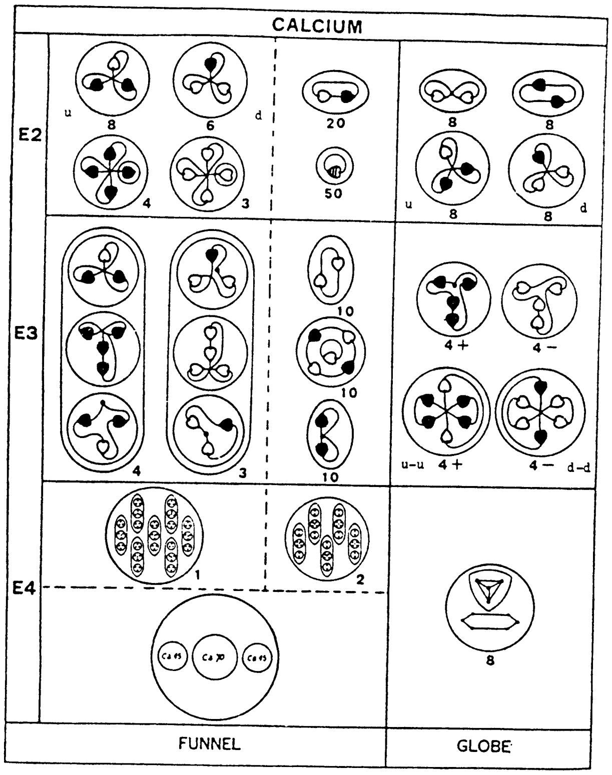


Figure 5.79

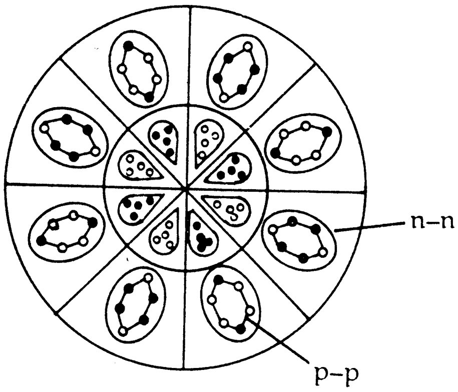


Figure 5.80 : Ca80 group

The composition of the Ca70 group is shown below:

2 funnels: Be10 (×4): u-4X-u;
Be10 (×3): d-4Y-d;
2 funnels: $\widetilde{Be10}$ (×4): d-4Y-d;
$\widetilde{Be10}$ (×3): u-4X-u.

Figure 5.79 confirms this because it shows that there are four Be10 groups made up of two (+) triplets (u quarks) and one (+) Be4 group (4X) and three Be10 groups with two (-) triplets (d quarks) and one (-) Be4 group (4Y). The composition of these two types of Be10 groups agrees with that found for the (+) and (-) Be10 groups in the analysis of the beryllium MPA. Every detail in the calcium MPA both agrees with theoretical prediction and is consistent with results of analyses of other MPAs.

Chromium MPA

The MPA (fig. 5.81) consists of a central globe, which is divided into eight segments containing an N6 group and an Ad6 group, and a tetrahedral array of four funnels, which project outwards from the centre of the globe. Each funnel contains the three spheres that constitute the Ca160 group and a pair of Cr25 groups, each of which consists of five quintets of UPAs (one mNe5 group and four B5 groups).

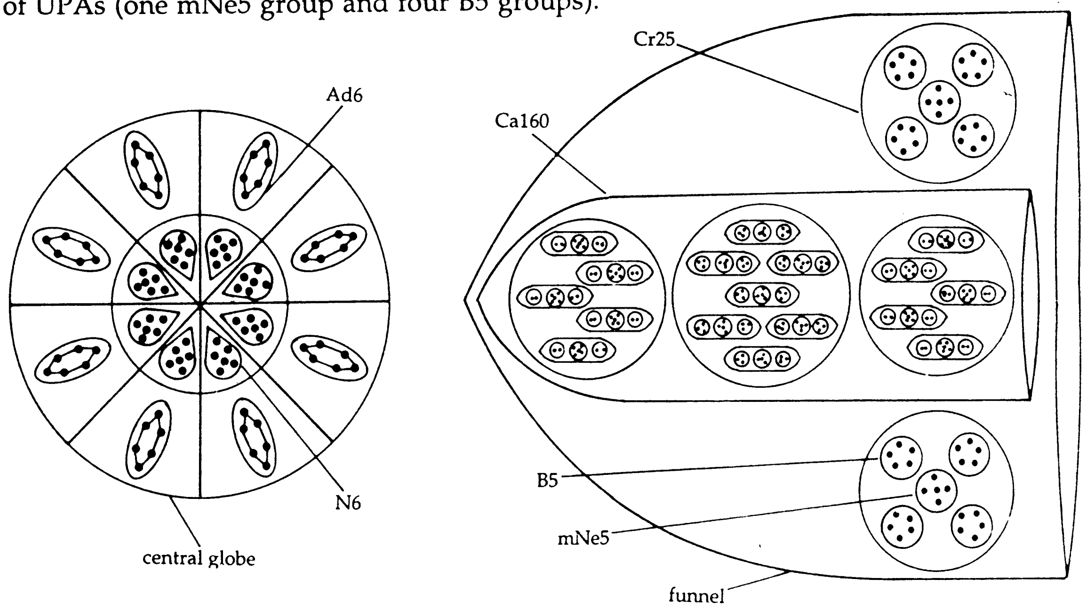


Figure 5.81 : Central globe and funnel of the chromium MPA.

Chromium MPA = (8N6 + 8Ad6) + 4(Ca160 + 2Cr25).

The MPA is formed from two Cr^{52} nuclei (fig. 5.82), which provide 936 subquarks - the same number as the number of UPAs. The Ad6 groups are u-d diquarks. This is confirmed by figure 5.83, which shows that the eight groups break up at stage E2 into eight (+) triplets (u quarks) and eight (-) triplets (d quarks). The N6 group is a u quark and a d quark bound not by strings but by the residual interaction between their subquarks - the counterpart at the quark level of the nuclear force binding a proton and neutron in a deuteron. The u and d quarks are the (+) and (-) triplets shown at stage E3, which break up into, respectively, a (+) duad (X-X) and a (-) duad (Y-Y), as well as two free UPAs (an X and a Y subquark).

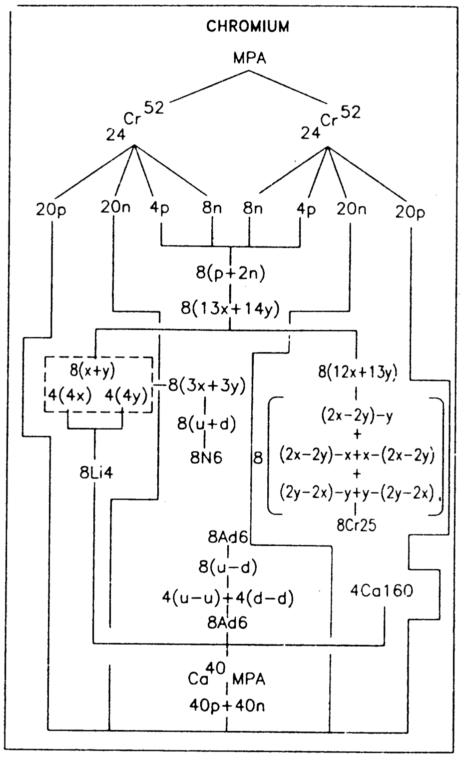


Figure 5.82

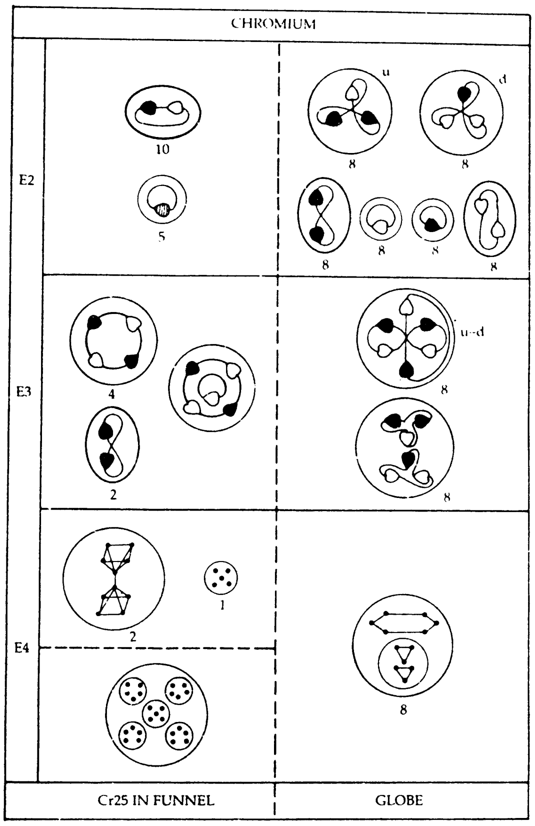


Figure 5.83

The mNe5 group is a 2X-3Y bound state, as found earlier for this particle in the MPAs of bromine, silver and gold. The B5 groups consist of two d-2X bound states and two u-2Y bound states - their mirror state, $\bar{B}5$. The pairs are the 'two pairs of quintets which are *mirror images* of one another.'[20] The term italicized by the author is very apt for distinguishing between particles whose differences are analogous to mirror nuclei. The compositions of the quintets are confirmed by figure 5.83: the five UPAs released at the E2 stage originate in the two (+) duads (X-X) and in the central UPA (Y subquark) of the mNe5 group observed at stage E3, whilst the ten (0) duads (X-Y) are released from the four rings of four UPAs (2X-2Y) and from the base of the mNe5, which consists of two X and two Y subquarks. The two UPAs at the apices of a pair of pyramidal bound states of five UPAs are X subquarks. This is indicated by the (+) duad of UPAs (X-X) released at the E3 stage of the break-up of the joined pyramids. In the other pair of pyramids (the mirror state of the first pair) the two apex UPAs are Y subquarks. A (+) duad and a (-) duad of UPAs should have been released, not two (+) duads. It is possible that Besant & Leadbeater, as analysis suggests they did for many other sets of superficially similar particles, examined only one pair of pyramids in detail, assuming that the other was identical in terms of the positivity and negativity of its constituents. The pair of pyramids cannot consist of a d-2X bound state and a u-2Y bound state because these would release a (0) duad (X-Y) instead of the observed (+) duad. Figure 5.84 shows the X and Y subquarks present in the two pyramid-shaped, bound states predicted to be mirror states of each other.

The Ca160 group has the composition deduced in the analysis of the calcium MPA.

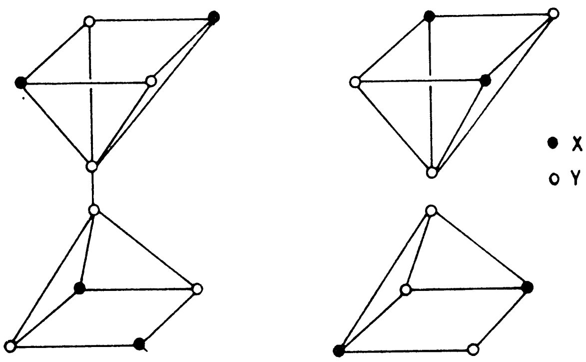


Figure 5.84

Strontium MPA

The MPA (fig. 5.85) consists of a central globe (Sr96), which contains eight I7 groups and eight B5 groups, and four funnels pointing from the centre of the globe towards the centres of the faces of a tetrahedron, each of which contains two Ca160 groups and two Sr24 groups. The latter is made up of two B5 groups and two I7 groups.

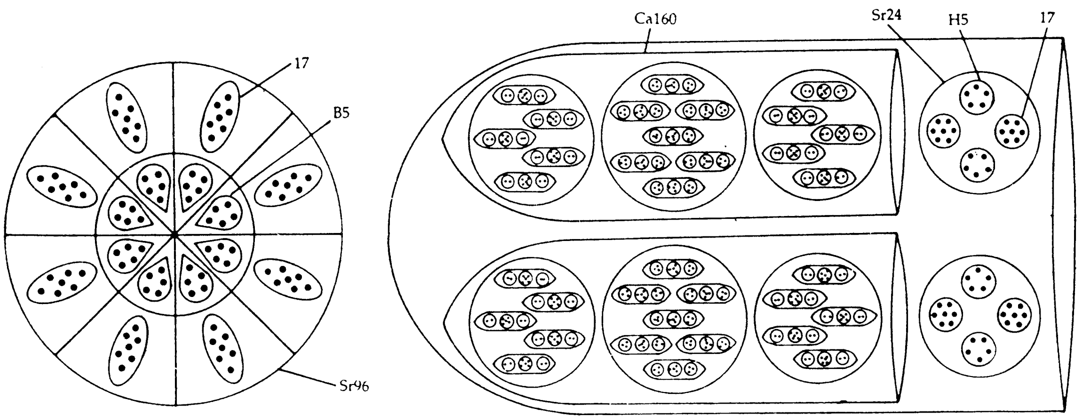


Figure 5.85 : Central globe and funnel of the strontium MPA.

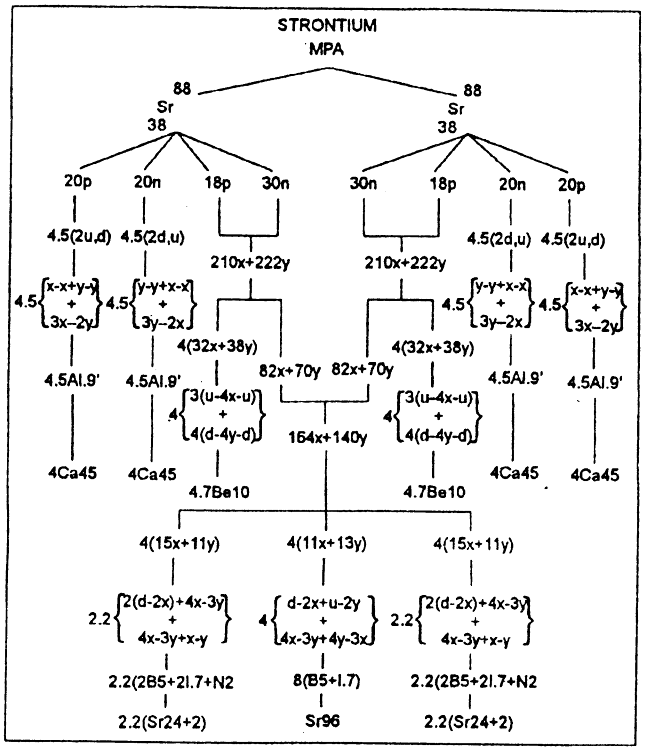


Figure 5.86

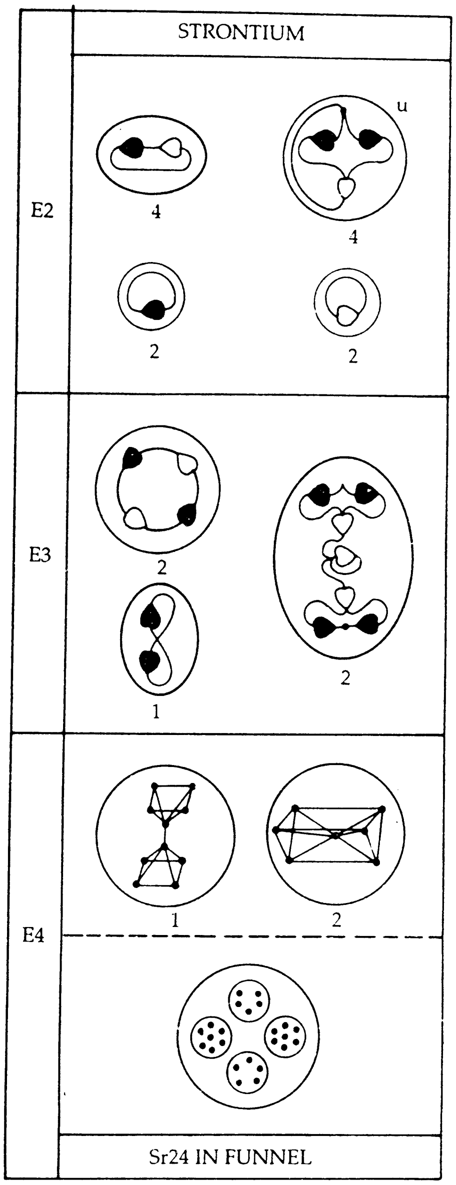


Figure 5.87

Strontium MPA = Sr96 + 4(2Ca160 + 2Sr24).

The MPA is formed from two Sr^{88} nuclei (fig. 5.86), which provide 1584 subquarks - sixteen more than the number of UPAs. It is probable that the Sr24 group is undercounted by two UPAs, the predicted, unobserved group of UPAs being a (0) duad (X-Y) at the centre of the Sr24. The two B5 groups are d-2X bound states made up of three X subquarks and two Y subquarks. The disintegration diagram (fig. 5.87) confirms this composition, the groups breaking up at the E3 stage into one (+) duad (X-X) and two quartets of UPAs that break up at the next stage into four (0) duads (X-Y):

$$2(3X\text{-}2Y) \rightarrow X\text{-}X + 2(2X\text{-}2Y)$$
$$\quad \hookrightarrow 4(X\text{-}Y).$$

The two I7 groups are u-Y-u bound states. This composition is consistent with their disintegration products shown at the E2 stage, namely, four (+) triplets (u quarks) and two UPAs (Y subquarks). The B5 and I7 groups in the Sr96 are not shown in figure 5.87. But their assigned compositions are identical to those given above. Indeed, apart from the predicted missing duad in the Sr24 group, every detail about the MPA of strontium is consistent with theory.

Molybdenum MPA

The MPA (fig. 5.88) differs from that of strontium in the substitution of the Mo46 group for the Sr24 group in each of the four funnels and in the addition of a small sphere containing two UPAs to the centre of the Sr96 group. The Mo46 consists of four ovoids, two of them each containing an Li4 group and an I7 group and the two others each containing a B5 group and an I7.

Molybdenum MPA = (Sr96 + N2) + 4(2Ca160 + 2Mo46).

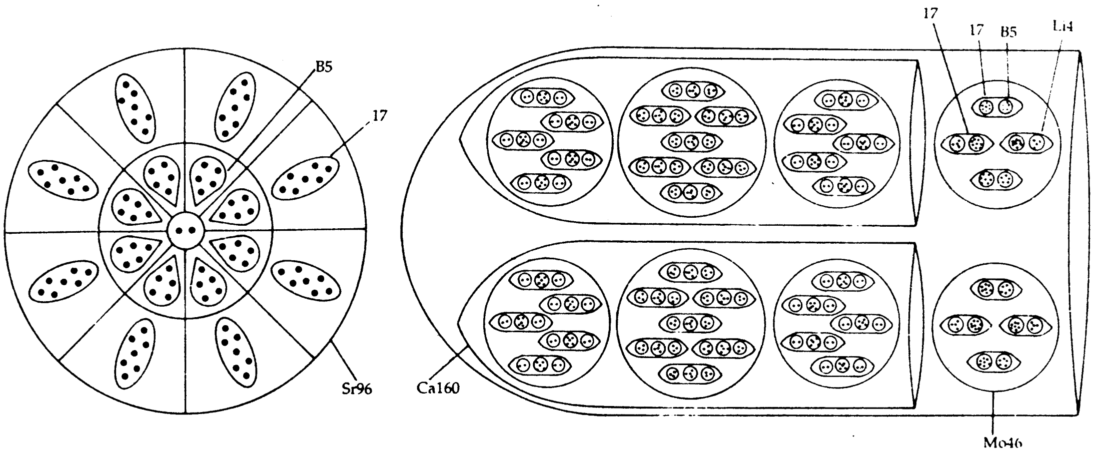


Figure 5.88 : Central globe and funnel of the molybdenum MPA.

The MPA is formed from two Mo^{97} nuclei (fig. 5.89), which provide 1746 subquarks - the same number as the number of UPAs. The duad of UPAs in the central globe should be a bound state of two Y subquarks, i.e. a (-) duad. It is unfortunate that this prediction cannot be tested because Besant & Leadbeater said nothing about its positivity or negativity and did not discuss the disintegration of the central globe because it contained a group of UPAs whose break-up they had described when they examined the strontium MPA. The Sr96 group has the same composition as that found for the strontium MPA.

The two Li4 groups in the Mo46 are bound states of four X subquarks and four Y subquarks. This is confirmed in figure 5.90 by the observed products of their disintegration at the E2 stage, namely, two (+) duads (X-X) and two (-) duads (Y-Y). Predictions for the remainder of the Mo46 cannot be checked because figure 5.90 gives no details. But the predicted compositions of the B5 and I7 groups agree with the results of analyses of other MPAs containing these groups, one of the B5 groups being the mirror state $\overline{\text{B5}}$ of the other one.

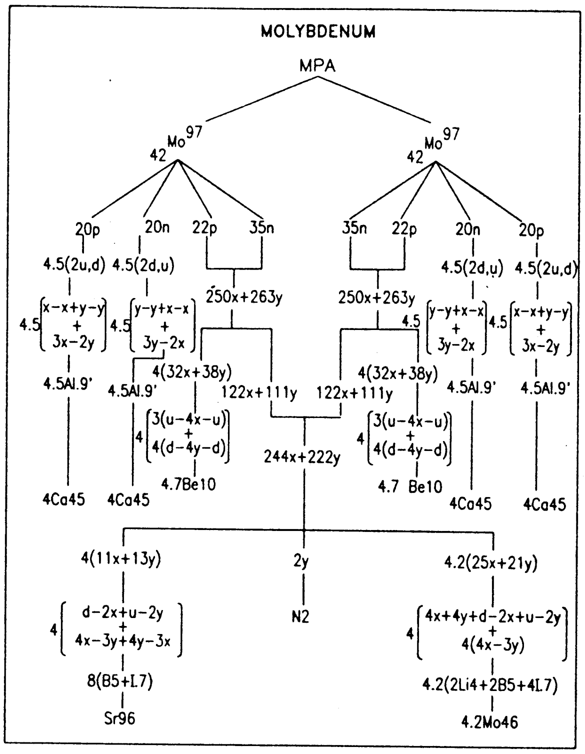


Figure 5.89

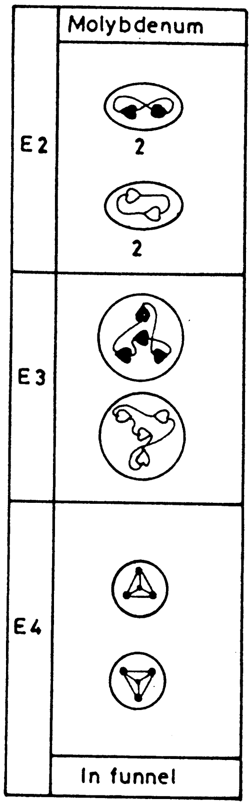


Figure 5.90

5.11 Tetrahedron group B

Magnesium MPA

The MPA (fig. 5.91) is a tetrahedral array of four similar funnels. Each funnel contains three identical segments, each having three similar ovoids (Mg12) enclosing twelve UPAs. A Mg12 is made up of three spheres enclosing two UPAs (N2), seven UPAs (I7) and three UPAs (H3).

$$\text{Magnesium MPA} = 4[3(3\text{Mg12})].$$

The MPA is formed (fig. 5.92) from two Mg^{12} nuclei, which provided 432 subquarks - the same number as the number of UPAs. The 108 subquarks in eighteen u and eighteen d quarks are present in each funnel, each Mg12 containing the twelve subquarks in two u and two d quarks. The N2 is an X-Y bound state, the I7 is a bound state of three X and four Y subquarks (actually the mirror state $\tilde{I}7$ of the I7) and the H3 is a u quark:

$$\begin{aligned}\text{Mg12} &= \text{N2} + \text{I7} + \text{H3} \\ &= \text{X-Y} + \text{3X-4Y} + \text{u}.\end{aligned}$$

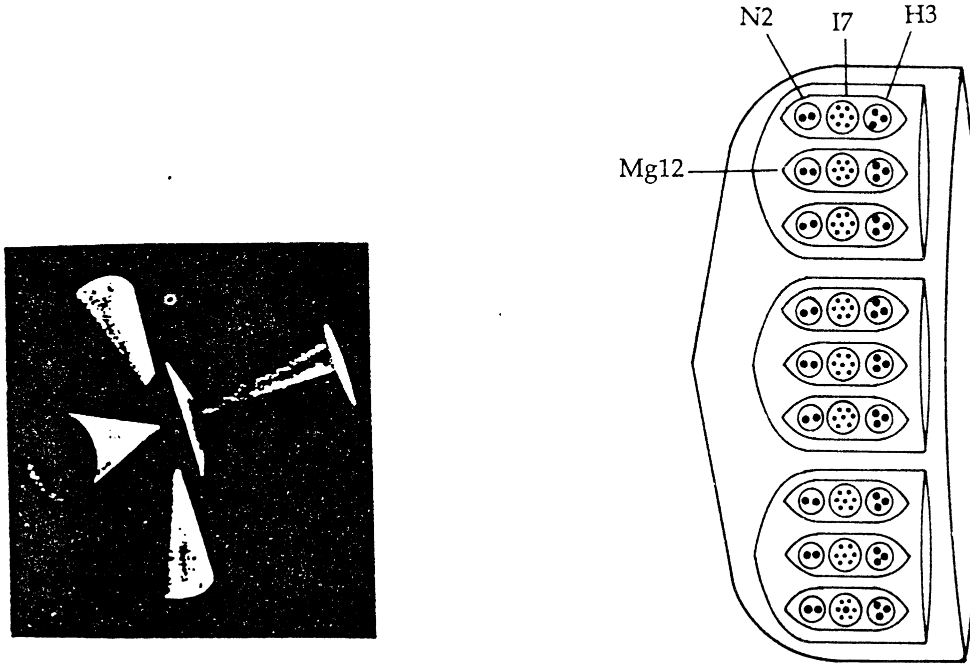


Figure 5.91 : Magnesium MPA

(see figure 5.93). The disintegration diagram (fig. 5.94) confirms that the H3 in the Mg12 group is a (+) triplet, i.e. a u quark, and that the N2 is a (0) duad, i.e. an X-Y bound state. The 'I7' group dissociates at stage E_2 into a quartet of UPAs and a (-) triplet. The former is a bound state of two X and two Y subquarks and the latter is a d quark.

The disintegration diagram (fig. 5.95) published in the first edition of *Occult Chemistry* differs from figure 5.94 in indicating that the Mg12 groups are not all the same. Instead, eighteen of them contain (+) triplets, (+) duads and (+) I7 groups and eighteen contain (-) triplets, (-) duads and (-) I7 groups. The reason for this is as follows: a segment S contains two Mg12 groups and its mirror state Mg$\widetilde{12}$. The three segments consist of two S and its mirror state $\tilde{S}$, i.e. five Mg12 groups and four Mg$\widetilde{12}$ groups. This is the composition of each of two funnels. Each of the two other funnels contain the mirror states of the former, i.e. two $\tilde{S}$ and one S, or five Mg$\widetilde{12}$ groups and four Mg12 groups. The composition of the MPA is

$$2(5\text{Mg}12 + 4\text{Mg}\widetilde{12}) + 2(5\text{Mg}\widetilde{12} + 4\text{Mg}12) = 18\text{Mg}12 + 18\text{Mg}\widetilde{12},$$

where

$$\text{Mg}12 = \text{X-X} + 6\text{X-Y} + \text{u}$$

and

$$\text{Mg}\widetilde{12} = \text{Y-Y} + 6\text{Y-X} + \text{d}.$$

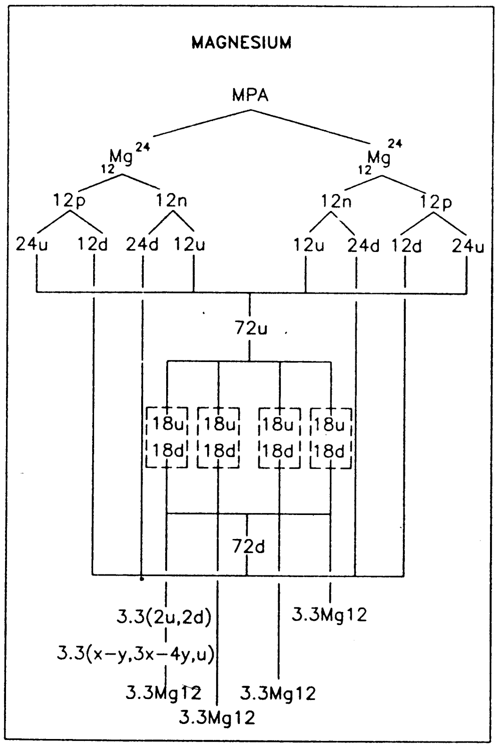


Figure 5.92

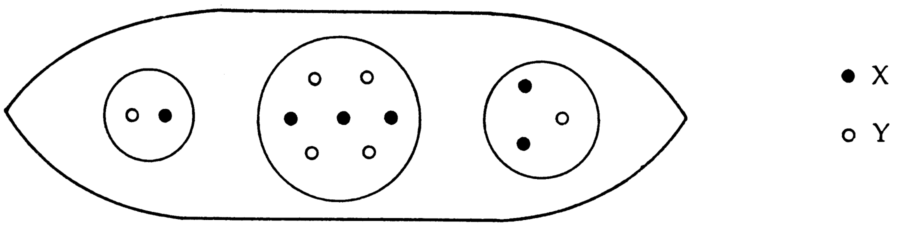


Figure 5.93 : Mg12 group

The (+) I7 shown in fig. 5.95 is a 6X-Y bound state and the (-) I7 (its mirror state $\tilde{I7}$) is a 6Y-X bound state. This composition is confirmed by the fact that the (+) I7 group releases a (+) quartet of UPAs (4X) and a (+) triplet (u quark), whilst the (-) I7 releases a (-) quartet (4Y) and a (-) triplet (d quark) consistent with their predicted subquark composition:

$$6X\text{-}Y \rightarrow 4X + u(= 2X\text{-}Y)$$

and

$$6Y\text{-}X \rightarrow 4Y + d(= 2Y\text{-}X).$$

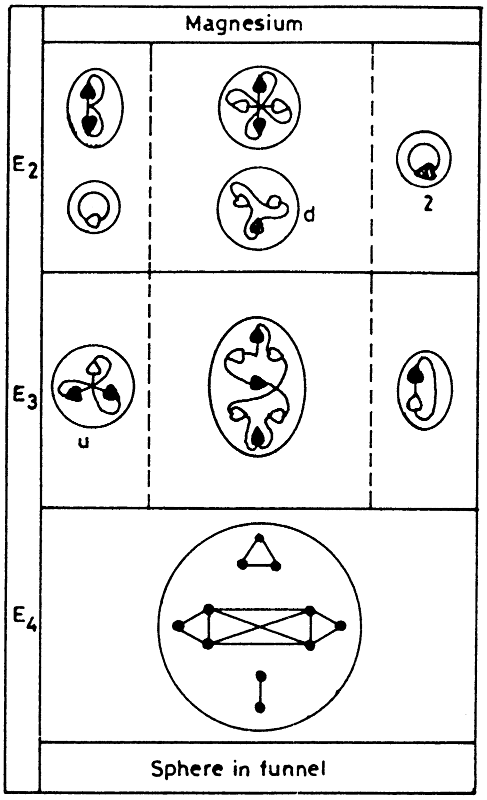


Figure 5.94

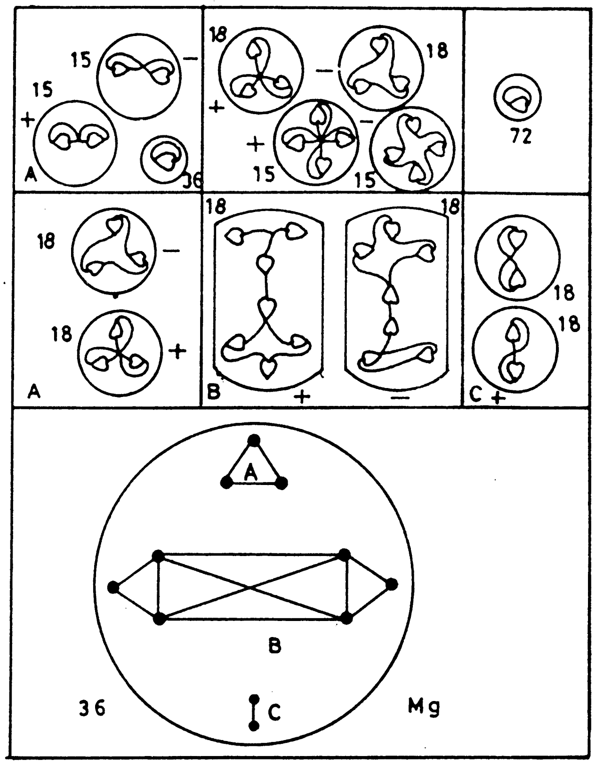


Figure 5.95

The prediction that the I7 groups described for the magnesium MPA in the first edition of *Occult Chemistry* do, indeed, differ in composition from those depicted in the third edition is supported by the fact that the configurations of the strings binding together their UPAs are quite dissimilar. The particles in two funnels are mirror states of their counterparts in the two other funnels. What makes this possible is the fact that the Mg^{12} nucleus is made up of an equal number of protons and their mirror states - neutrons, i.e. the same number of X subquarks and Y subquarks. The magnesium MPA is another example of 'edition variants' previously encountered in the analysis of the oxygen MPA. The third edition variant was presumably recorded in a second examination of the magnesium MPA years after it was first described in the first edition of *Occult Chemistry*. The importance of such variants is that — given that they were formed from two nuclei of the *same* isotope because they were said to contain the *same* number of UPAs — the total numbers of X and Y subquarks in their particles implied by their slightly different disintegration diagrams should still be the same, even though they broke up into either dissimilar particles or different numbers of the same particle, which means that they pose an additional test of consistency with theory. Figure 5.92 provides a remarkable example of a perfect consistency between theoretical demands and the types of particles reported to make up MPAs.

Sulphur MPA

The MPA is a tetrahedral array of four funnels (fig. 5.96). Each funnel has three segments, each of which contains three similar ovoids (S16). An ovoid encloses three small spheres, one containing a duad of UPAs (N2) and the other two containing groups of seven UPAs (I7).

Sulphur MPA = 4[3(3S16)].

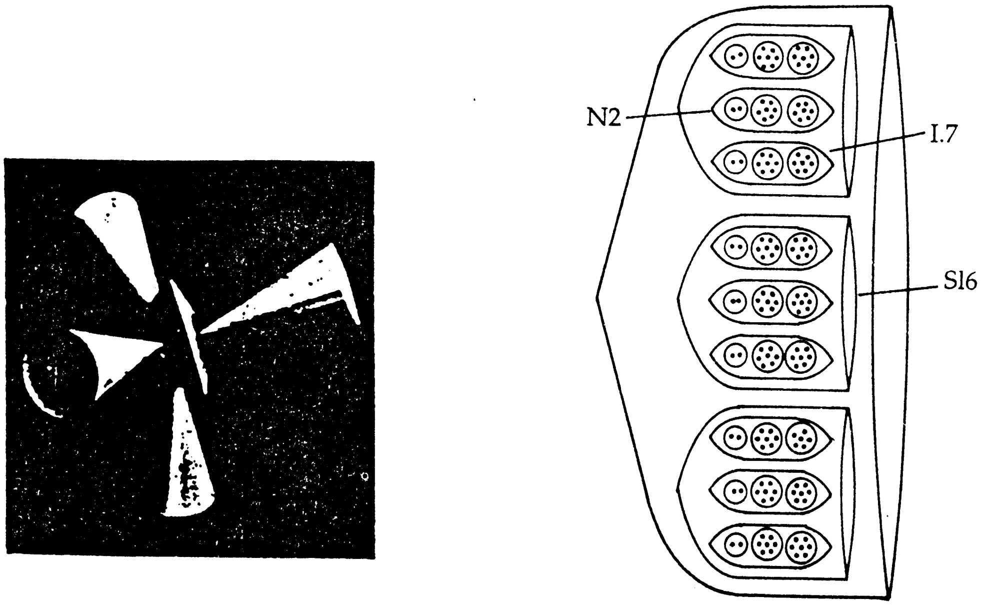


Figure 5.96 : Sulphur MPA

The MPA is formed from two S^{32} nuclei (fig. 5.97), which provide 576 subquarks - the same as the number of UPAs. The ninety-six u quarks and ninety-six d quarks present in these nuclei are equally distributed among the four funnels. Each segment therefore contains the subquarks making up eight u quarks and eight d quarks. An S16 group consists of a $\underset{\sim}{X}$-Y disubquark (N2), a 4X-3Y bound state (I7) and a 4Y-3X bound state - the mirror state $\tilde{I}7$ of the former (fig. 5.98). The MPA of sulphur differs from that of magnesium in the replacement of an H3 triplet in the Mg12 group by an I7 group. An S^{32} nucleus contains four more protons and four more neutrons than a magnesium nucleus, that is, thirty-six more X subquarks and thirty-six more Y subquarks. The MPA of sulphur therefore has seventy-two more X subquarks and thirty-two more Y subquarks than the magnesium MPA, that is, two more X and two more Y subquarks per ovoid. These additional four subquarks combine with the three subquarks in the u quark present in an ovoid of the magnesium MPA to form another I7:

$$Mg12 = N2 + \tilde{I}7 + H3$$
$$= X - Y + 3X - 4Y + u;$$
$$Mg12 + 2X + 2Y = X - Y + 3X - 4Y + u\ (= 2X - Y) + 2X + 2Y$$

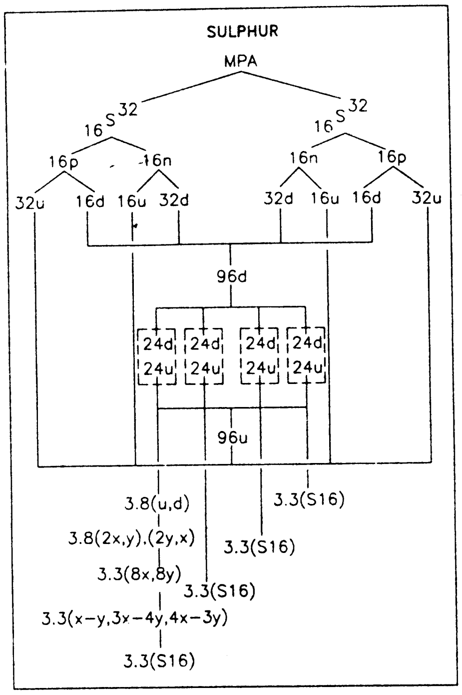


Figure 5.97

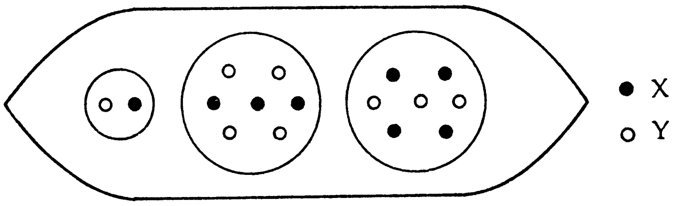


Figure 5.98 : S16 group

$$= X - Y + 3X - 4Y + 4X - 3Y$$
$$= N2 + \tilde{I}7 + I7$$
$$= S16.$$

The disintegration diagram (fig. 5.99) shows that the N2 is a (0) duad, i.e. X-Y. The bound state of seven UPAs depicted here is the mirror state Ĩ7 (3X-4Y) because it breaks up into a quartet of UPAs and a (-) triplet (d quark):

3X-4Y → 2X-2Y + d quark (= X-2Y).

However, the other bound state of seven UPAs is an I7 (4X-3Y), which breaks up into a quartet of UPAs and a u quark:

4X-3Y → 2Y-2X + u quark (= 2X-Y).

These two bound states, therefore, should break up into a (+) and (-) triplet, not two (-) triplets, as figure 5.99 indicates. As we have already seen and as we will discover for many groups of UPAs analysed in this chapter, Besant & Leadbeater presumably did not examine *both* I7 groups to determine their positivity or negativity but, instead, induced the break up of only one group, assuming wrongly that, as both seemed similar particles, their products of disintegration would be similar as well. That the difference in the predicted subquark contents of the nuclei of magnesium and sulphur should be precisely that needed to form an extra I7 group in each ovoid of the sulphur MPA is remarkable confirmation of the interpretation of MPAs as objects formed from two atomic nuclei of elements.

Zinc MPA

The MPA (fig. 5.100) consists, firstly, of a central globe (Zn18), which contains a duad of UPAs and four Li4 groups, secondly, a tetrahedral array of four funnels, each of which contains three sets of three S16 groups found also in the sulphur MPA, and, thirdly, four spikes, which point towards the corners of the tetrahedron upon whose faces the mouths of the funnels open. Each spike contains the cone-shaped Cu10 group found in the copper MPA, four spheres (Zn20) containing a duad, two triplets and two pairs of triplets, and lastly, three

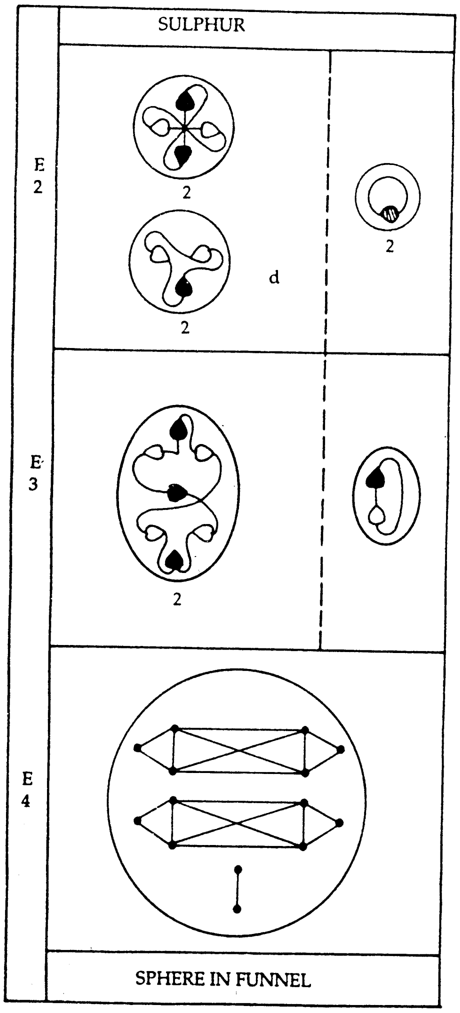


Figure 5.99

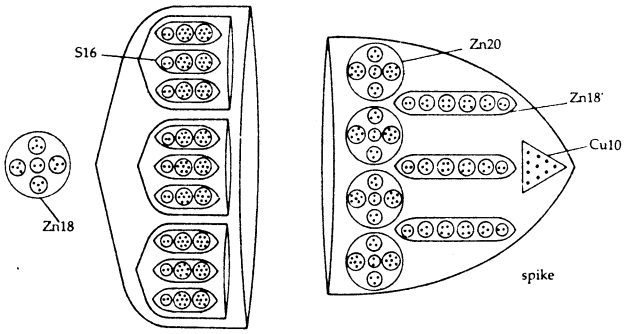


Figure 5.100 : Zinc MPA

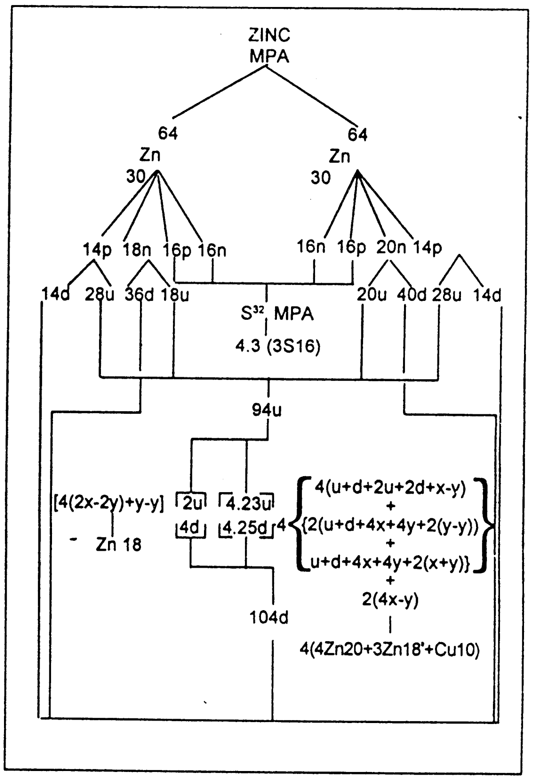


Figure 5.101

pillar-shaped groups (Zn18'), each of which contains a pair of duads, a pair of triplets and a pair of Be4 groups.

Zinc MPA = Zn18 + 4(3[3S16]) + 4(4Zn20 + 3Zn18' + Cu10).

The MPA is formed (fig. 5.101) from a Zn^{64} nucleus and a Zn^{66} nucleus, which provide 1170 subquarks - the same number as the number of UPAs. The disintegration diagram (fig. 5.102) confirms that the Li4 group in the Zn18 group is a bound state of two X subquarks and two Y subquarks because it indicates that the particle breaks up at the E2 stage into two (0) duads (X-Y). But the central duad in the Zn18 group should be a (-) duad (Y-Y), not the (0) duad (X-Y) shown in figure 5.102. The latter would allow the remaining 283 X subquarks and 293 Y subquarks to be distributed among the spikes neither uniformly nor as a combination of particles and their mirror states. It must be pointed out that the products of disintegration of the Zn18 differ in the first and third editions of *Occult Chemistry*. In the former (fig. 5.103) the Zn18 breaks up into two (+) Li4 groups (3X-Y), two (-) Li4 groups (X-3Y) and one (+) duad (X-X), making a total of ten X subquarks and eight Y subquarks, whereas in the latter it breaks up at the E2 stage into nine (0) duads (X-Y), implying that it consists of nine X subquarks and nine Y subquarks. Theory predicts that the Zn18 consists of eight X subquarks and ten Y subquarks, which disagrees with both editions. The two (+) Li4 and the two (-) Li4 (X-3Y) have the same number (eight) of X and Y subquarks as the four Li4 shown in figure 5.102 because the latter break up into eight (0) duads (X-Y), so their only theoretical difference lies with their central duad, which is (+) in the first edition and (0) in the third edition. This difference is explainable only if the duad was wrongly observed, theory requiring it to be a (-) duad. Figure 5.103 shows that the Zn18′ contains a (+) duad (X-X) and a (-) duad (Y-Y), whereas figure 5.102 indicates that both duads are (0) duads (X-Y), a difference which is theoretically consistent because

$$(X\text{-}X) + (Y\text{-}Y) = 2(X\text{-}Y).$$

According to figure 5.103, of the sixteen Zn20 groups, eight contain (+) duads at their centres and eight have (-) duads, whilst figure 5.102 indicates that there is a (0) duad in each Zn20 globe - a difference which once again is theoretically consistent. The other difference between the two edition variants is in the Cu10 group, which breaks up into two identical groups of five UPAs, according to figure 5.102, but into two groups of five depicted as mirror images of each other in the disintegration diagram of the Cu10 on page 48 of the first edition of *Occult Chemistry*. The pairs of duads making up each group of five UPAs are too badly drawn there for their polarities to be obvious. But the depiction of the two groups of five UPAs as mirror images indicates that they are mirror states of each other, implying that the Cu10 contains the same number of X and Y subquarks, whereas figure 5.102 implies that this group contains at least eight X subquarks because it shows the Cu10 breaking up into four (+) duads (X-X) and two free UPAs. The differences between the Cu10 and Zn18 groups in the two disintegration diagrams are not theoretically reconcilable and must arise from observational error.

The composition of the S16 group (fig. 5.104) is that derived in the analysis of the sulphur MPA. In the Zn20 group the (+) and (-) triplets are, respectively, u and d quarks, the pair of (+) triplets are bound states of u quarks, and the pair of (-) triplets are bound pairs of d quarks. The (0) duad is a X-Y disubquark. In two of the three Zn18′ groups a u quark, a d quark and two Y-Y disubquarks orbit about bound states of four X subquarks and four Y subquarks; in the third Zn18′ group the two duads are X-Y disubquarks. The latter composition is shown in figure 5.102, the particles at the E3 stage consisting of a (+) triplet (u quark), a (-) triplet (d quark), two (0) duads (X-Y), a (+) Be4 group that splits up at stage E2 into two (+) duads (X-X), and a (-) Be4 group that splits up into two (-) duads (Y-Y).

The Cu10 group has the same composition as that found during the analysis of the copper MPA.

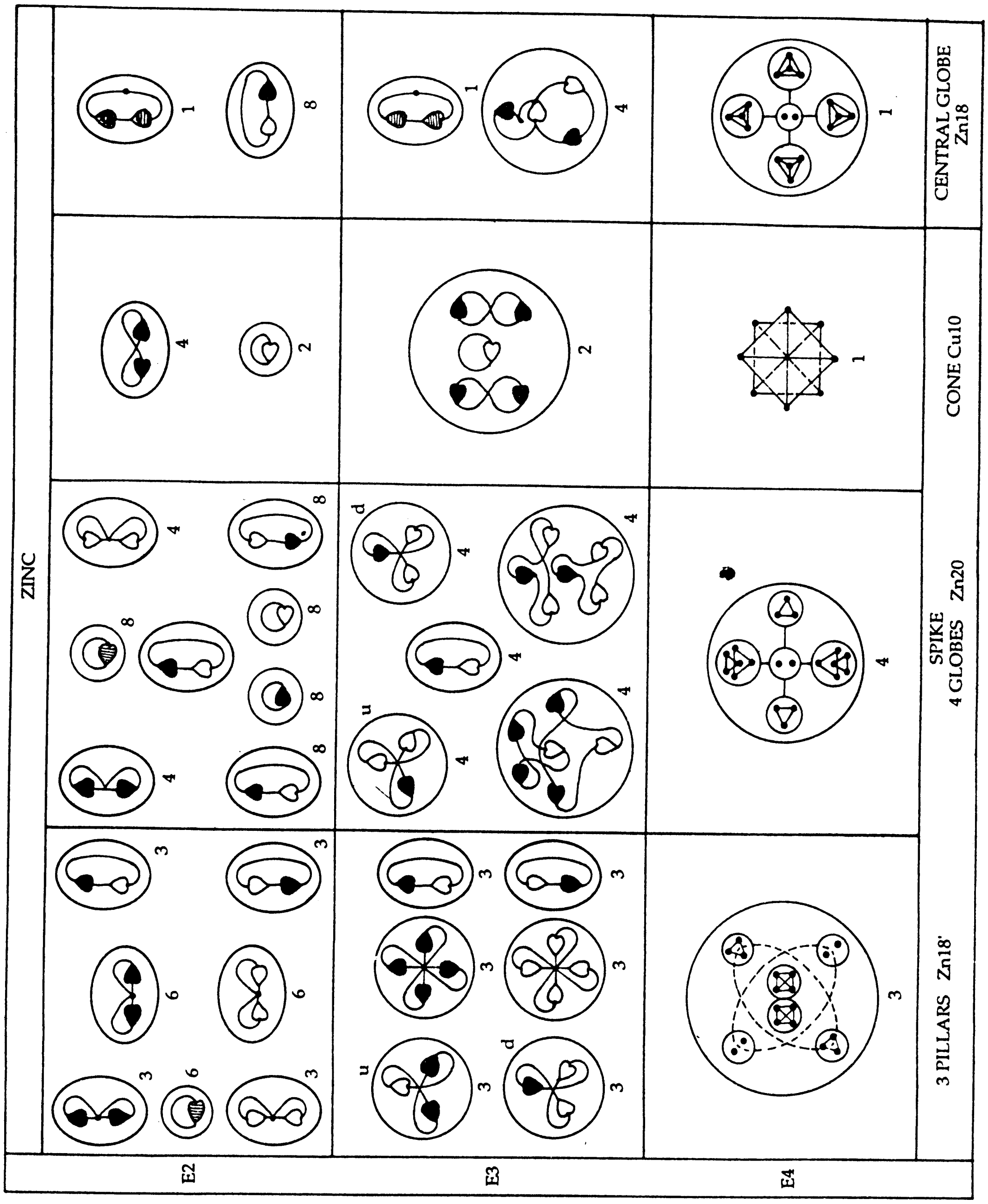

ZINC
E2
E3
E4
3 PILLARS Zn18'
SPIKE
4 GLOBES Zn20
CONE Cu10
CENTRAL GLOBE
Zn18

Figure 5.102

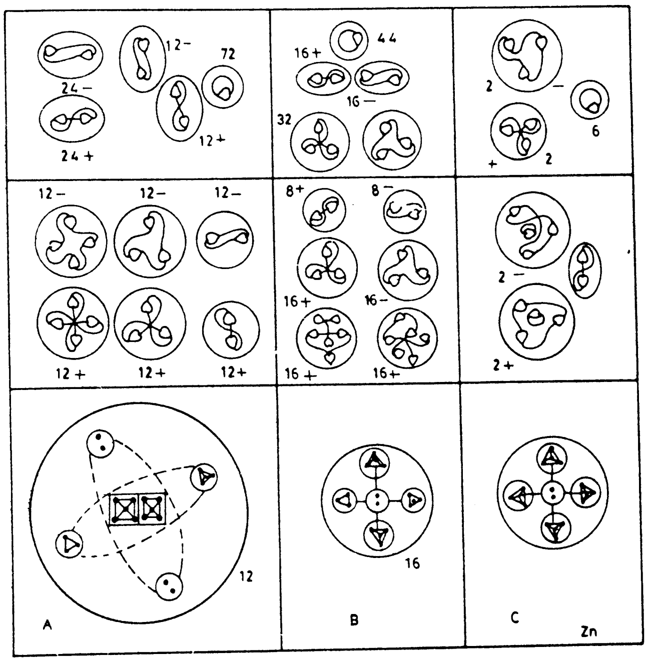


Figure 5.103

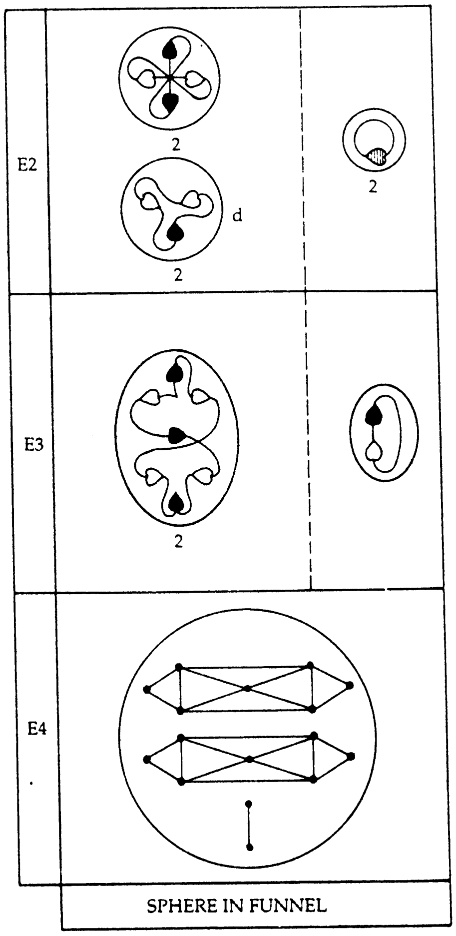


Figure 5.104

Selenium MPA

The MPA (fig. 5.105) consists of a central globe (Zn18), four funnels that are arranged tetrahedrally and divided into three segments enclosing three duads of UPAs and six Se10 groups, and four star-shaped bodies (Se153), each of which hovers over the mouth of a funnel. The star has six points projecting radially from a central sphere. Each point contains two mNe5 groups revolving around cones of six and seven UPAs. The centre of the star consists of a triangular array of three triplets of UPAs that crosses over a triangular array of three duads in a Star of David formation.

Selenium MPA = Zn18 + 4[3(3Se10 + 3Se10 + 3N2) + Se153].

The MPA is formed from nuclei of Se^{78} and Se^{80} (fig. 5.106), which provide 1422 subquarks - the same as the number of UPAs. As deduced for the zinc MPA, the central duad in the Zn18 group is a Y-Y disubquark, i.e. a (-) duad, not the (0) duad (X-Y) shown for the Zn18 in the disintegration diagram of the selenium MPA (fig. 5.107).

The three segments have the following composition:

$$\begin{bmatrix} Se10 & \widetilde{Se10} & X-Y \\ Se10 & \underset{\sim}{Se10} & X-X \\ Se10 & \widetilde{Se10} & X-Y \end{bmatrix} + 2\begin{bmatrix} \widetilde{Se10} & \underset{\sim}{Se10} & Y-X \\ \underset{\sim}{Se10} & \widetilde{Se10} & Y-Y \\ \widetilde{Se10} & Se10 & Y-X \end{bmatrix},$$

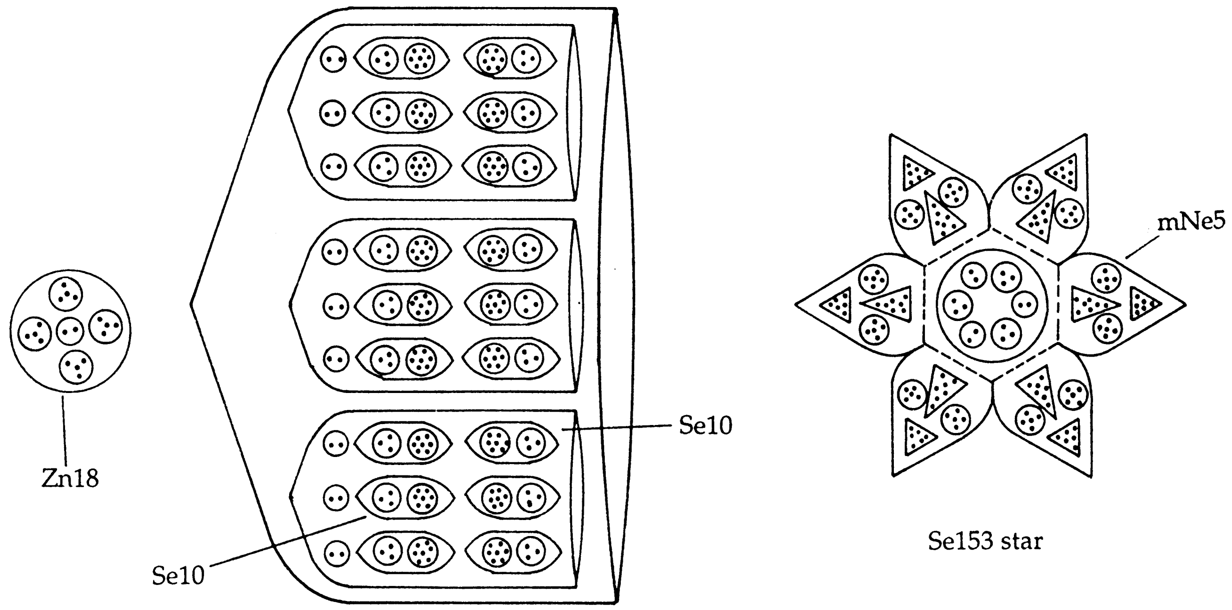


Figure 5.105 : Selenium MPA

where Se10 = u + d-4X and $\widetilde{\text{Se10}}$ = d + 4Y, i.e. two segments are the mirror state of the third. Figure 5.107 confirms the composition of the Se10, for it shows that the group breaks up into a (+) triplet (u quark), a (-) triplet (d quark) and a (+) Be4 group (bound state of four X subquarks). The observed segment contains two (0) duads (X-Y) and a (+) duad (X-X), in agreement with the composition of the first segment shown above. But there should be four Se10 groups and two $\widetilde{\text{Se10}}$ mirror states in this segment, not six identical Se10 groups as indicated. Presumably not all the groups in a segment were examined in detail by Besant & Leadbeater.

The Se153 star contains the subquarks in twenty-eight u quarks and twenty-three d quarks. Its centre consists of two u quarks, one d quark, one X-X bound state and two Y-Y bound states. Figure 5.107 confirms this by indicating that the central group of particles breaks up at the E3 stage into two (+) triplets (u quarks), one (-) triplet (d quark), one (+)

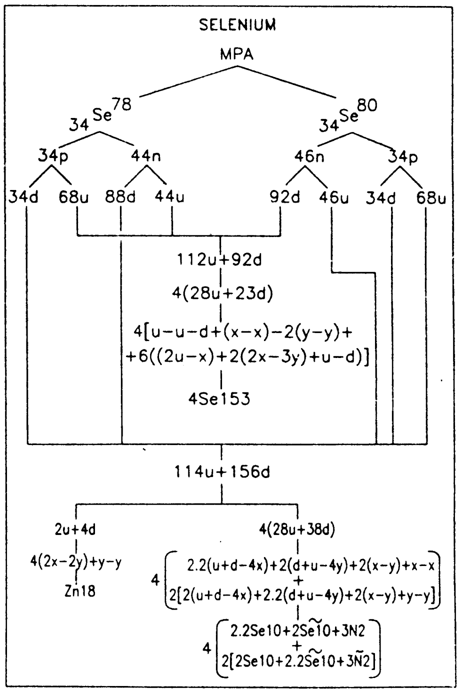


Figure 5.106

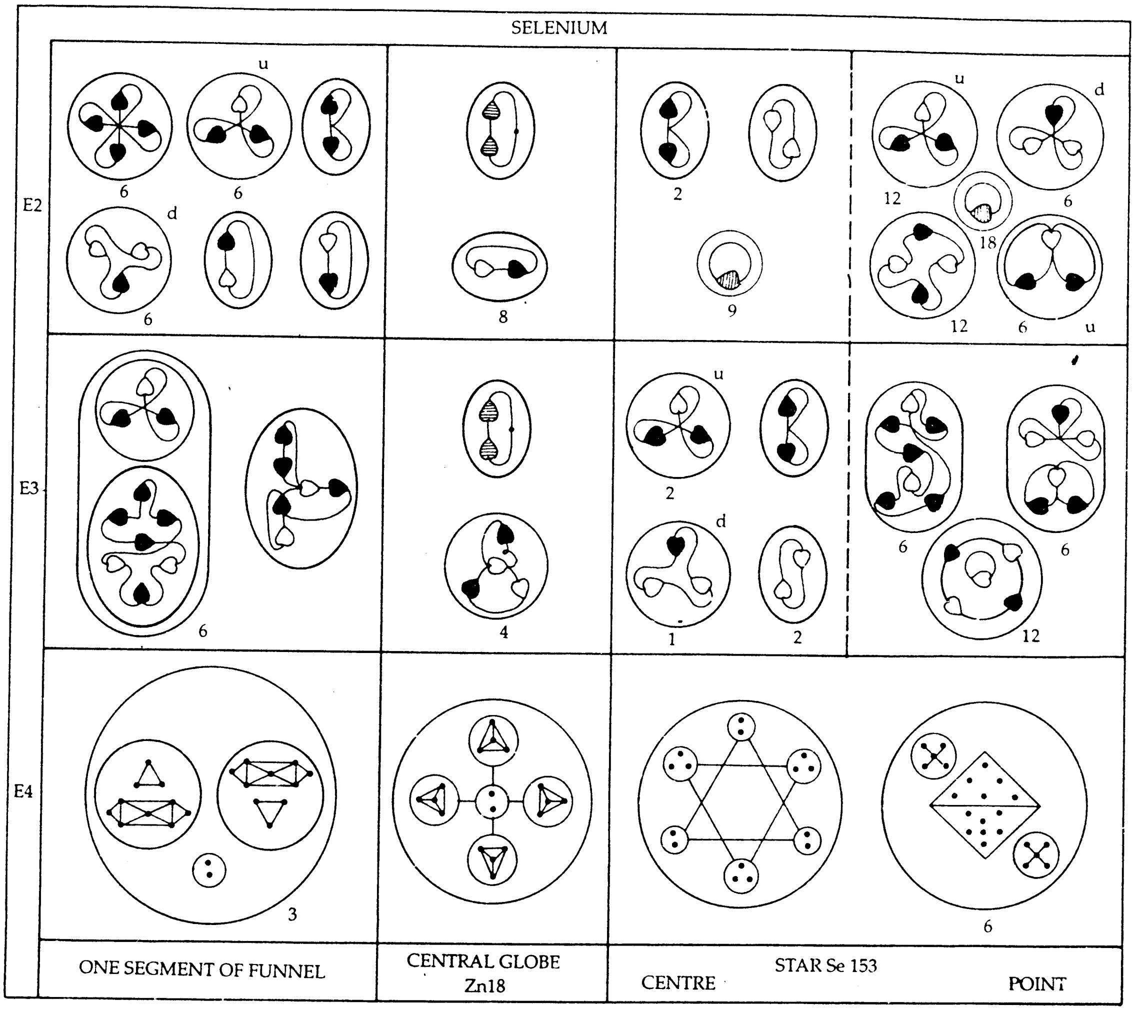


Figure 5.107

duad (X-X) and two (-) duads (Y-Y). As found for many MPAs already discussed, the two mNe5 groups in the point of the star are 2X-3Y bound states. The cone enclosing six UPAs is a bound state of one u quark and one d quark, as is indicated by its breaking up into a (+) triplet (u quark) and a (-) triplet (d quark). The cone of seven UPAs is a u-X-u bound state, which is consistent with its observed break-up into two (+) triplets (u quarks) and a UPA (X subquark).

Cadmium MPA

The MPA (fig. 5.108) consists of a central globe (Cd48) and four funnels, which are arranged tetrahedrally and contain three segments. The Cd48 group consists of a central cross of four

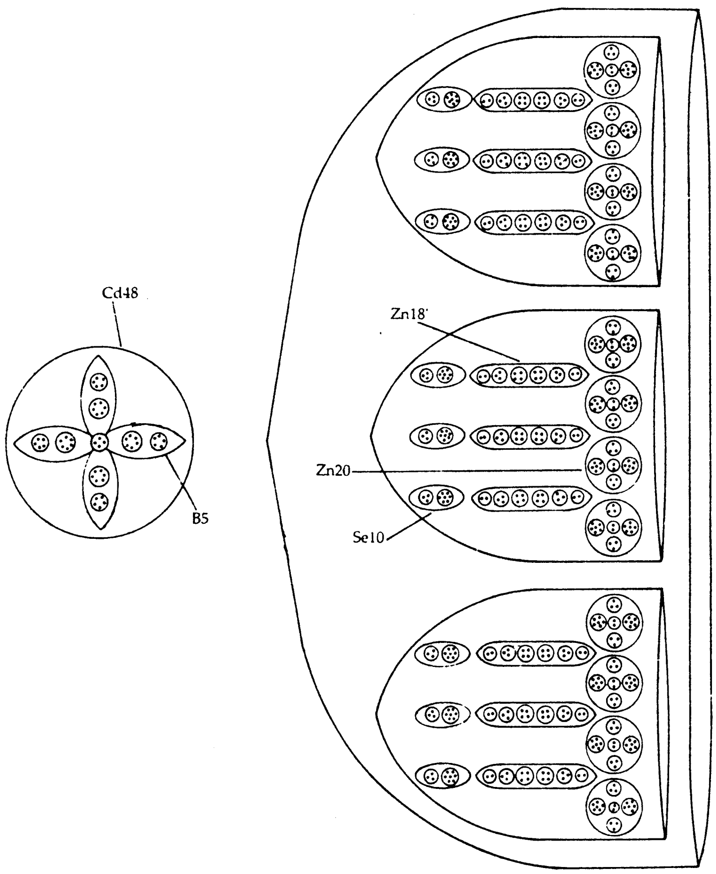


Figure 5.108 : Cadmium MPA

UPAs and four pairs of groups, one group consisting of two triplets of UPAs and the other being a B5 group. Each segment contains four Zn20 spheres and three Zn18' pillars. Below each pillar is an Se10 ovoid.

Cadmium MPA = Cd48 + 4[3(3Se10 + 3Zn18' + 4Zn20].

The MPA is formed (fig. 5.109) from two Cd^{112} nuclei, which provide 2016 subquarks - the same number as the number of UPAs in the MPA. The Cd48 is made up of the subquarks in eight u quarks and eight d quarks. The cross of four UPAs is a 2X-2Y bound state, as is indicated by the disintegration diagram of the cadmium MPA (fig. 5.110), which shows that it breaks up into two (0) duads (X-Y). The pair of (+) triplets in the Cd48 consists of two u quarks; the pair of (-) triplets consists of two d quarks. Instead of four similar B5 groups, two of the four are predicted to be B5 groups and two $\tilde{B5}$ mirror states.

The Zn20 group has the same subquark composition as that found for the zinc MPA. The Se10 group has the same composition as that deduced for the selenium MPA. One of the types of Zn18' groups present, namely:

$$Zn18' = X\text{-}X + u + 4X + 4Y + d + X\text{-}X,$$

is the mirror state of one of the Zn18′ groups identified in the analysis of the zinc MPA. Presumably, the different types of Zn18′ groups were not detected by Besant & Leadbeater because, as previous analysis has suggested many times, they did not examine in detail *all* those present in the funnel they selected for examination.

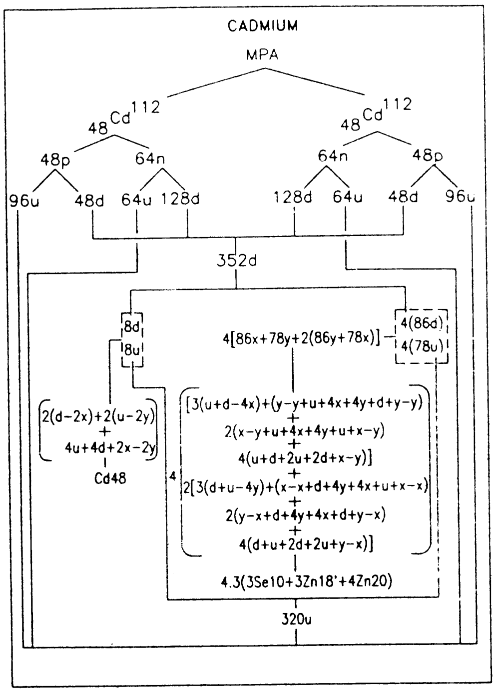


Figure 5.109

Tellurium MPA

The MPA (fig. 5.111) consists of four funnels, which are arranged tetrahedrally in space and project from a central globe (Te 51), at whose centre is located a septet of UPAs surrounded by a cross-shaped array of four B5 groups and four pairs of hydrogen triplets. The Te51 differs from the central globe Cd48 of the cadmium MPA in having a group of seven UPAs at the centre instead of a group of four. Each funnel contains three similar cylindrical segments consisting of three Se10 groups, three Te21 groups and four Te22 groups. The pillar-shaped Te21 comprises a quintet, two quartets, two triplets and a duad of UPAs. The Te22 sphere contains one quartet, two sextets and two triplets of UPAs.

$$\text{Tellurium MPA} = Te51 + 4[3(3Se10 + 3Te21 + 4Te22)].$$

Tellurium has many isotopes, a fact which may make a specific choice of nuclides that form its observed MPA seem rather arbitrary. But careful consideration of both the magnitude of the errors of counting implied by various choices in relation to the symmetry of the MPA and the statistical likelihood (based upon relative abundance) of these nuclides being selected randomly by a micro-psi observer leads to the conclusion that the tellurium MPA observed by Besant & Leadbeater was most probably formed from nuclei of Te^{125} and Te^{130} (fig. 5.112). These nuclei provide 2295 subquarks - seventy-two more than the number of UPAs determined by Besant & Leadbeater in the MPA. Being a particle that was recorded to be only in the MPA of tellurium and containing more UPAs, the Te21 is more likely to have been described wrongly than the Se10 group, which appears in many other MPAs. This means that each Te21 group must be undercounted by two UPAs. No doubt Besant & Leadbeater did not examine all thirty-six such groups in the MPA but, instead, studied only one, thus accounting for the large discrepancy between the UPA and predicted subquark populations. The distribution of the particles in the Te21 group would become symmetric with respect to its centre if a duad of UPAs were added at the end of the pillar nearer to the mouth of the funnel (see figure 5.111). It will therefore be assumed that the predicted,

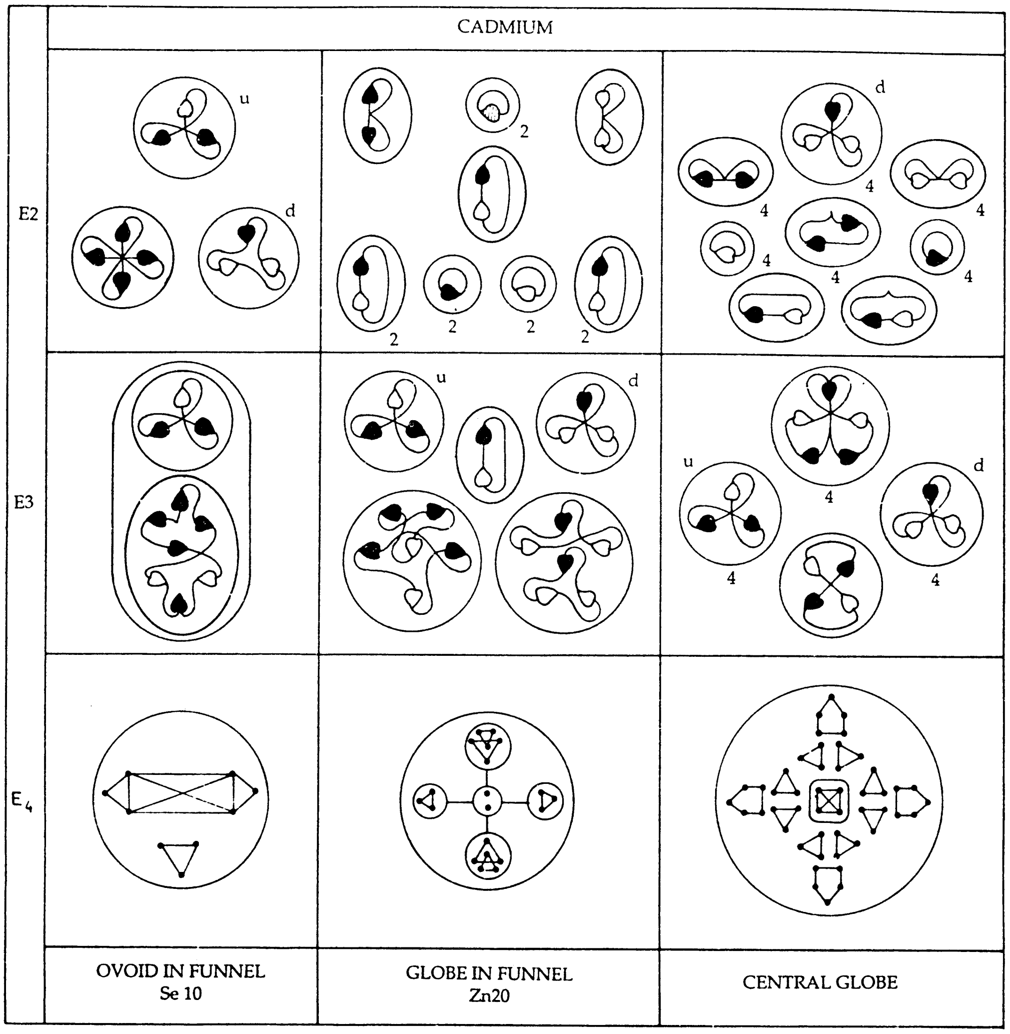


Figure 5.110

observational error in the Te21 consists of this missing duad, whose presence would make symmetric the 'true' Te21 (let us call it the 'Te(21+2)'). This duad should be a X-Y disubquark (fig. 5.113).

The Te22 group (fig. 5.114) is the Zn20 group with a cross-shaped array of two X subquarks and two Y subquarks replacing the central duad of UPAs. This is consistent with the statement in *Occult Chemistry* that: 'in the globes in the funnels a group of four is substituted for the group of two in Zinc,'[21] i.e. the composition of the particles surrounding the central group of four UPAs is the same as in the Zn20 group. Instead of providing a disintegration diagram for the Te21 group, Besant & Leadbeater said that this group was

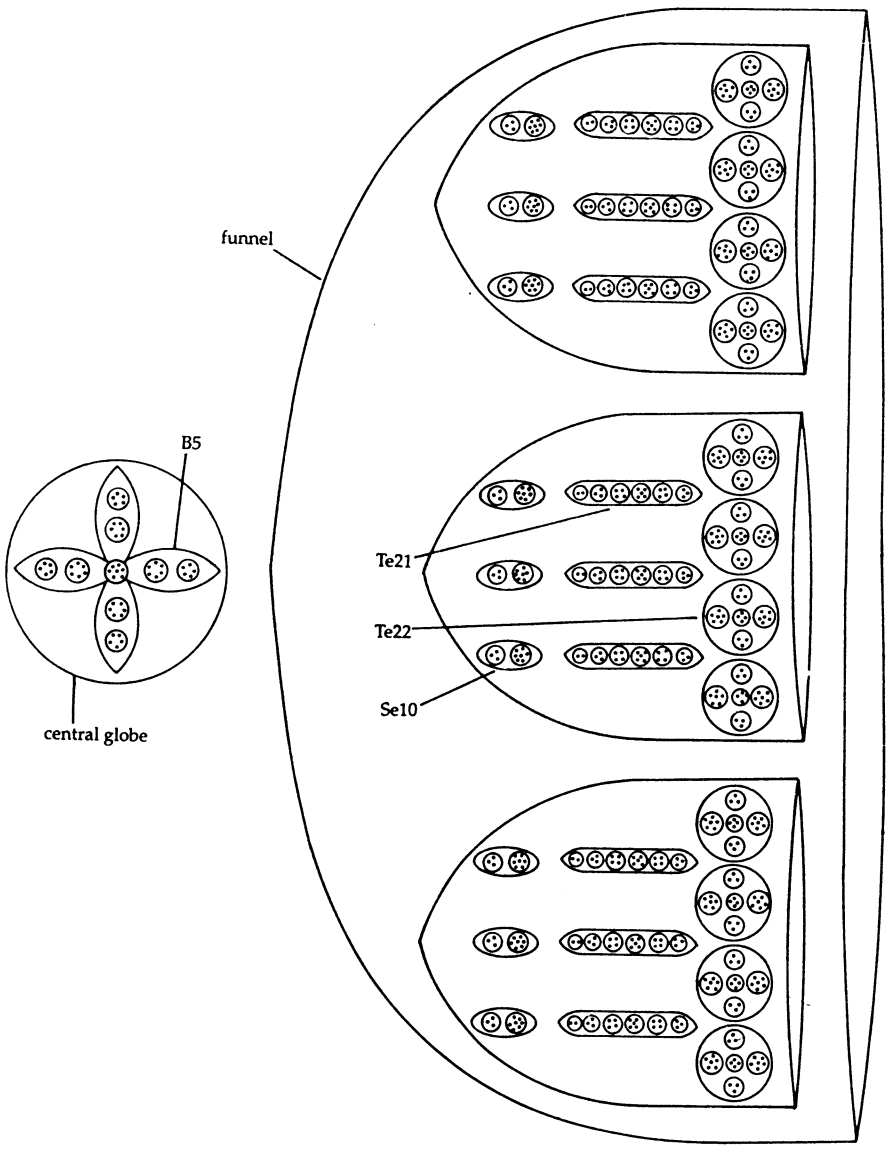


Figure 5.111 : Tellurium MPA

identical to the Cl19 rod with a pair of UPAs added at its base. But the Cl19 group is predicted to contain eighteen UPAs in the following particles:

u + 2X-2Y + 2X-2Y + 2Y-2X + u.

The Te(21+2) group is predicted to have an extra Y subquark in the central quartet and a duad of UPAs at each end of the rod:

Te(21+2) = X-X + u + 2X-2Y + 2X-3Y + 2Y-2X + u + Y-Y.

One segment contains two Te(21+2) groups and its mirror state and the two other segments contain two Te($\widetilde{21}$+2) mirror states and one Te(21+2) group. The composition of the Se10 group is that found in the selenium MPA. Since the Te22 group:

Te22 = u + d + 2u + 2d + 2X-2Y

is its own mirror state, two of the three segments in each funnel are made up of particles which are the mirror states of those in the third segment (see figure 5.112).

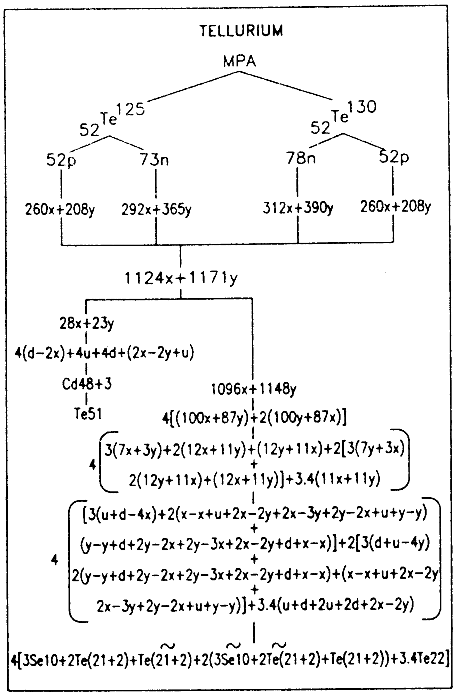


Figure 5.112

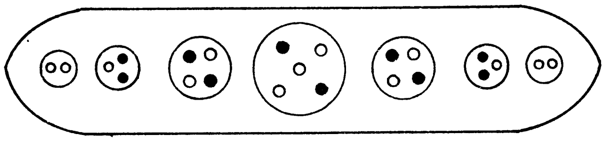


Figure 5.113 : Te(21+2) group

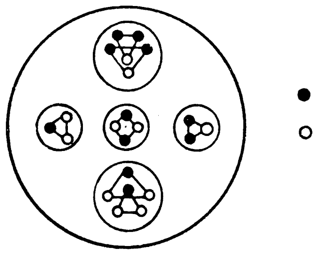


Figure 5.114 : Te22 group

The central septet of UPAs is predicted to be a bound state of one u quark and two X-Y disubquarks. The disintegration diagram (fig. 5.115) confirms this by indicating that the septet breaks up at the E2 stage into two (0) duads (X-Y) and a (+) triplet (u quark). It also confirms that the four B5 groups are d-2X bound states because it shows that they break up at the E2 stage into four (-) triplets (d quarks) and four (+) duads (X-X). Finally, figure 5.115 indicates that the central sphere contains four (+) triplets (u quarks) and four (-) triplets (d quarks), confirming the composition of the Te51 predicted in figure 5.112.

5.12 Cube group A

Boron MPA

The boron MPA (fig. 5.116) is a face-centred cubic array of six funnels projecting from a central globe. A funnel contains an Ad6 group and four ovoids, each of which contains two hydrogen triplets (H3). The globe has four spheres, each enclosing groups of five UPAs (B5).

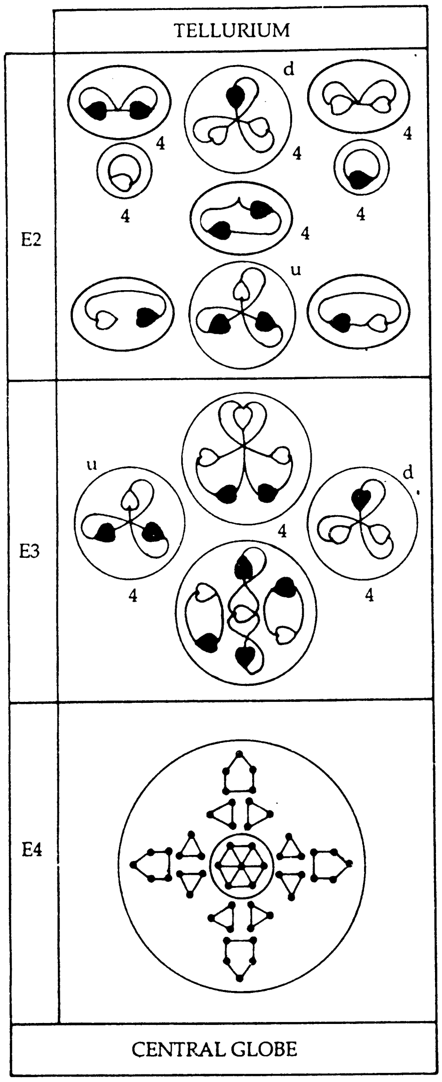


Figure 5.115

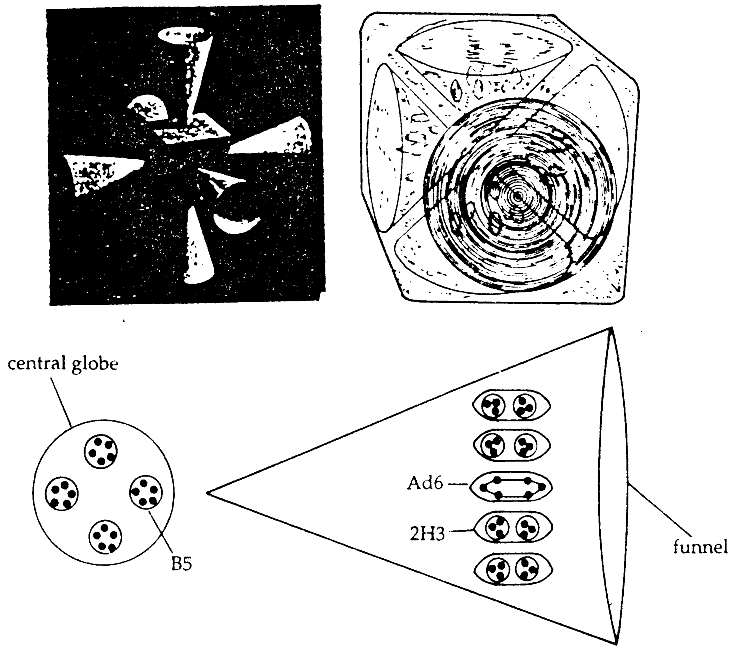


Figure 5.116 : Boron MPA

Boron MPA = 4B5 + 6[4(2H3) + Ad6].

The MPA is formed (fig. 5.117) from two B^{11} nuclei, which provide 198 subquarks, two fewer than the number of UPAs. The twenty-four d quarks present in the twelve neutrons of both nuclei are the pairs of triplets in two ovoids within each funnel, the two other ovoids containing pairs of u quarks. These quark pairs are not diquarks because the quarks are bound not by strings but by the residual interaction between the strings binding their subquarks - the quark counterpart of the deuteron. That u and d quarks make up the ovoids is confirmed by the disintegration diagram (fig. 5.118), which shows that twenty-four (+) triplets (u quarks) and twenty-four (-) triplets (d quarks) are released from the funnels at the E3 stage of disintegration. Figure 5.118 does not indicate whether the triplets in an ovoid are either both (+) or both (-) (as assumed above) or whether they consist of one of each type (the first edition of *Occult Chemistry* sheds no light on this matter). There is no stronger theoretical reason to make the former choice than that the pairs of d quarks supplied by the twelve neutrons in the two B^{11} nuclei remained together during the formation of the MPA.

The six Ad6 groups consist of three u-u diquarks and three d-d diquarks. Figure 5.118 confirms that there are three (+) Ad6 groups, which break up at the E2 stage into six (+) triplets (u quarks) and three (-) Ad6 groups, which dissociate into six (-) triplets (d quarks).

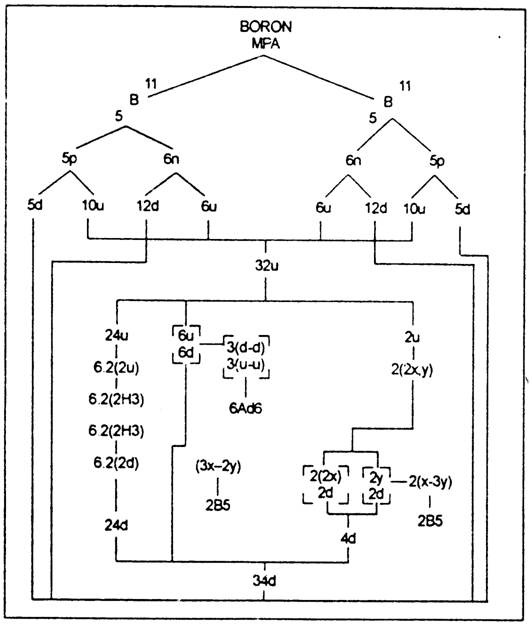


Figure 5.117

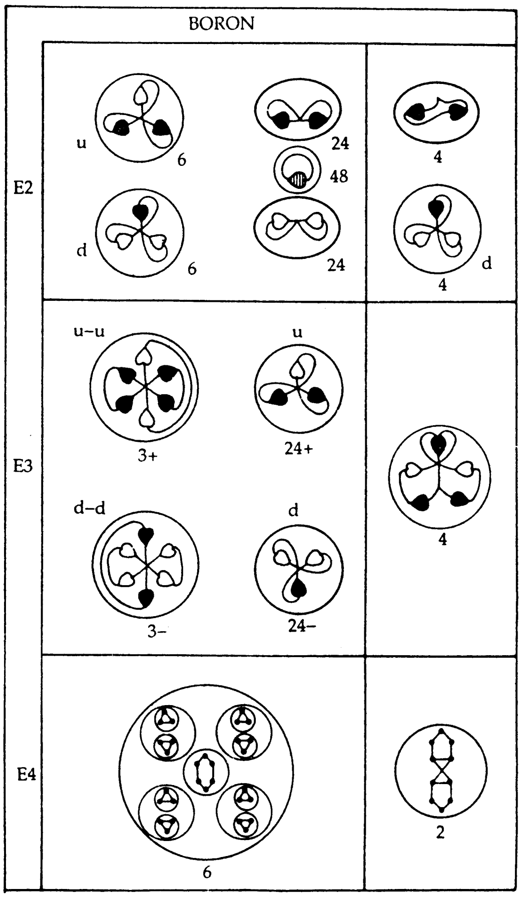


Figure 5.118

The central globe is predicted to contain two B5 groups and two quartets of UPAs, not four B5 groups. They consist of the eight X subquarks and ten Y subquarks making up the two u quarks and four d quarks remaining in the two nuclei after their thirty u quarks and thirty d quarks were released as pairs of H3 triplets or Ad6 groups. These subquarks regroup to form two B5 groups (3X-2Y) and two X-3Y bound states (Li4):

$$2u(= 2x\text{-}Y) + 4d(= X\text{-}2Y) = 8X + 10Y \rightarrow 2(3X\text{-}2Y) + 2(X\text{-}3Y).$$

Alternatively, one B5 group could be the mirror state $\tilde{B}5$ (2X-3Y), in which case the two quartets cannot be the same but, instead, consist of an X-3Y bound state (Li4) and a 2X-2Y bound state (Be4). The disintegration diagram confirms that one B5 group is a 3X-2Y bound state because it shows that it breaks up into a (-) triplet (d quark) and a (+) duad (X-X):

$$3X\text{-}2Y \rightarrow d\ (= X\text{-}2Y) + X\text{-}X.$$

Nitrogen MPA

The sphere-shaped MPA (fig. 5.119) contains six bodies made up of 261 UPAs. A balloon-shaped object (N110) floats in the middle of the sphere. It contains six smaller spheres arranged in two horizontal rows of three spheres, each one enclosing seven duads of UPAs (N14). It also contains a long ovoid enclosing two triplets, two quartets and two sextets (N6) of UPAs. Below the N110 group is a cluster of seven spheres (N63), each containing three hydrogen triplets (N9). Around the N110 are two 'negative' spheres (N20). An N20 contains five spheres, each of which encloses two spheres containing single N2 duads. There are also two 'positive' spheres (N24), each enclosing four globes. A globe contains three spheres, each enclosing an N2 duad.

Nitrogen MPA = N110 + N63 + 2N24 + 2N20.

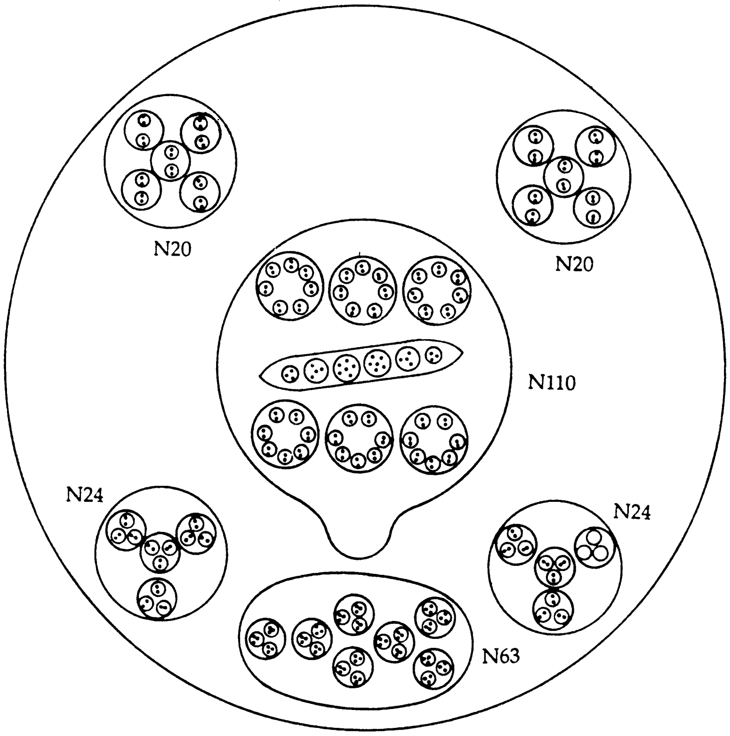


Figure 5.119 : Nitrogen MPA

Nitrogen was one of the first elements in the atmosphere to be examined by Besant & Leadbeater in 1895. If its MPA were formed from two N^{14} nuclei, which contain 252 subquarks, it would contain nine more UPAs than theory predicts. Nitrogen is one of three elements whose MPAs have UPA populations consistent with their formation from two stable nuclei of the element that differ in mass number by one unit, i.e. a neutron made up of nine subquarks. The relative abundance of the N^{15} isotope is only 0.365%, compared with

99.635% for N^{14}, making the formation of the nitrogen MPA from the latter far more likely, statistically speaking. The description of MPAs, however, may not have been based solely upon a *single* examination during one investigative session. Indeed, this seems highly unlikely, given the complexity of many of the MPAs. Nor may Besant & Leadbeater have looked at only one MPA of each element. They may have needed to examine several similar MPAs in succession in order to complete their investigation because their observation of the many types of particles in the MPA may have disturbed it as a whole, necessitating on such occasions a fresh MPA. The detailed picture of an MPA is, therefore, really a pastiche that was probably built up from a series of examinations of a number of sample MPAs, not all of which may have been formed from the *same* pair of nuclides. This consideration makes it more plausible that a nucleus of a relatively rare isotope like the N^{15} may have occasionally participated in the formation of an MPA. If the compounded description of the MPA of nitrogen included a contribution exclusively due to the relatively rare nuclide N^{15}, this would account *precisely* for its UPA population. Although this possibility may sound like special pleading, its justification lies in two arguments: firstly, an observational error of nine *too many* UPAs is difficult to explain in terms of smaller errors made during the observation of the groups making up the MPA. It is highly unlikely that either the N20, N24 or N63 was wrongly observed because this would destroy the agreement between observation and theory found for many other MPAs containing these groups. The similarity of the seven N14 spheres making up the N110 also makes it improbable that they had nine too many UPAs; this being an odd number, at least one sphere would, implausibly, have had to contain a single UPA instead of a duad of UPAs. It would be plausible if the long ovoid in the N110 had been undercounted through UPAs or groups of UPAs being missed. But it is difficult to see how it could have been *overcounted* by as many as nine UPAs. Secondly, the assumption that both an N^{14} and an N^{15} nucleus formed the observed nitrogen MPA accounts for every reported detail, as will be now shown.

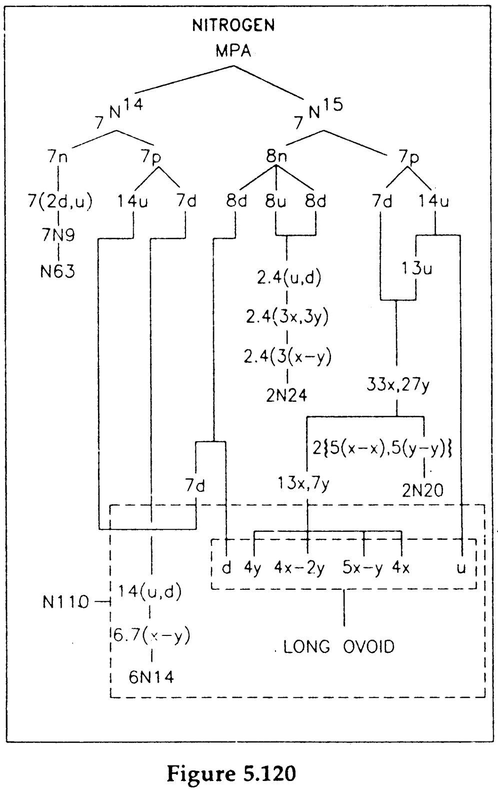


Figure 5.120

The nitrogen MPA is formed from an N^{14} nucleus and an N^{15} nucleus (fig. 5.120). Seven neutrons from the former make up the N63 group, an N9 group being a neutron made up of two d quarks and one u quark. This is confirmed by the disintegration diagram (fig. 5.121), which shows that each N9 in the N63 breaks up at stage E2 into two (-) triplets (d quarks) and one (+) triplet (u quark). The subquarks in eight u quarks and eight d quarks from the eight neutrons in the N^{15} nucleus regroup to form two clusters of four bound states of three X-Y disubquarks:

$$2N24 = 8u + 8d = 2(4u + 4d)$$
$$= 2[4(2X\text{-}Y) + 4(X\text{-}2Y)]$$
$$\rightarrow 2[4 \times 3(X\text{-}Y)].$$

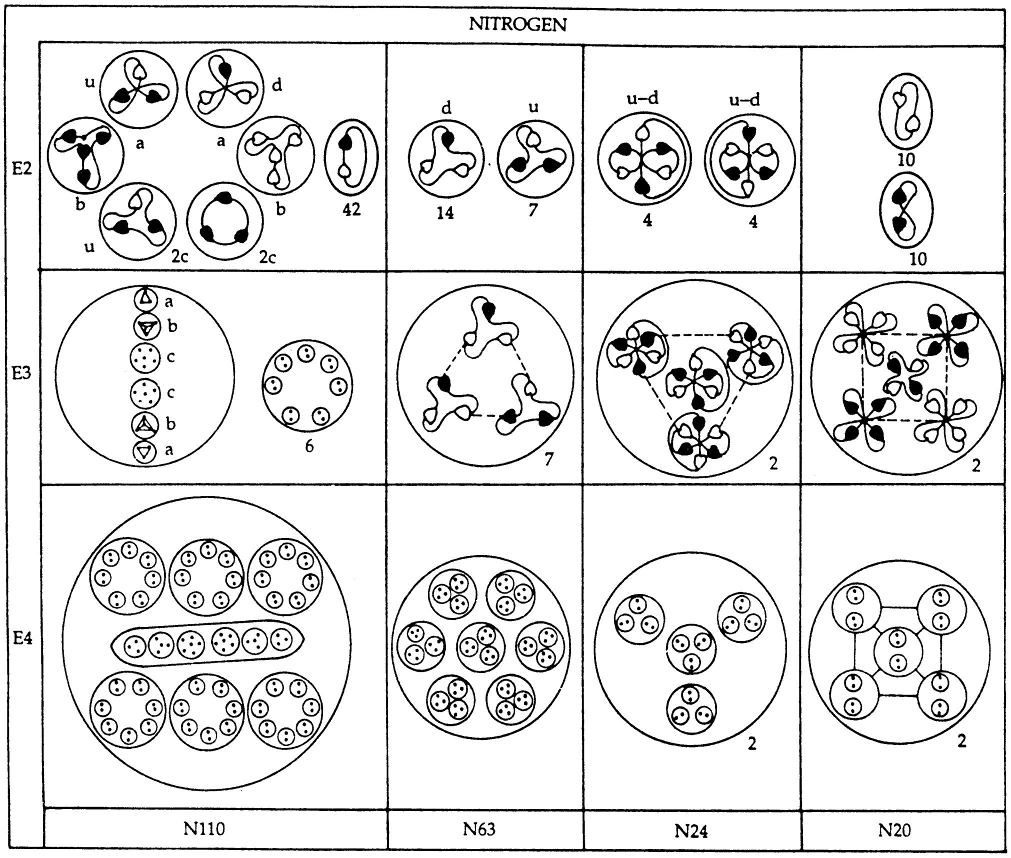


Figure 5.121

Mutual Coulombic repulsion between their similar charges of +⅓ causes these bound states to have a tetrahedral arrangement in space, as is confirmed by the observation (referring to each N24 group): 'On the E3 level, each assumes a tetrahedral form, with six Anu at each point.'[22] Figure 5.121 shows that the group of six UPAs rearranges itself into an Ad6 group when the N24 group is broken up. This is possible because the six UPAs are the subquarks making up a u and a d quark and because, according to the analysis of many MPAs, an Ad6 group is, usually, an u-d diquark.

An N20 consists of a square pyramidal array of five X-X bound states and five Y-Y bound states. That two types of bound states are present is confirmed by figure 5.121, which shows that the two N20 break up at stage E2 into ten (+) duads (X-X) and ten (-) duads (Y-Y).

The N110 is made up of the following particles:

$$N110 = 6 \times 7(X\text{-}Y) + u + 4X + 4X\text{-}2Y + 5X\text{-}Y + 4Y + d.$$

The first particle is the six N14 globes containing groups of seven duads that surround the long ovoid in the centre of the MPA (fig. 5.122). The disintegration diagram confirms this identification because it indicates that the N110 releases forty-two (0) duads (X-Y) at stage E2. The other particles make up the long ovoid. The two triplets are a u and a d quark, the two quartets b are a bound state of four X subquarks and a bound state of four Y subquarks, and the two sextets c are a bound state of four X subquarks and two Y subquarks and a bound state of five X subquarks and one Y subquark. Figure 5.121 confirms that the two triplets a are a (+) triplet (u quark) and a (-) triplet (d quark). It also indicates that one of the two sextets c breaks up at the E2 stage into two (+) triplets 2c (u quarks), which is consistent with its containing four X subquarks and two Y subquarks:

$$4X\text{-}2Y \rightarrow 2u(= 2X\text{-}Y).$$

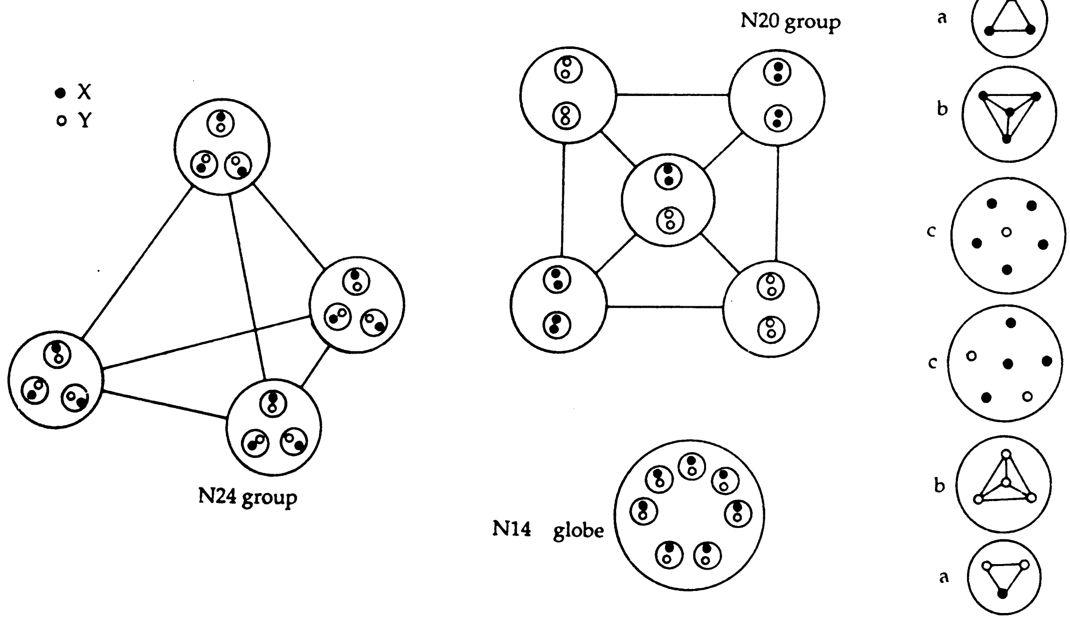


Figure 5.122 : Subquark composition of the groups of UPAs in the nitrogen MPA.

The other sextet c breaks up at the E2 stage into a u quark (2X-Y) and a bound state of three X subquarks with a circular string configuration:

$$5X\text{-}Y \rightarrow 2X\text{-}Y + X\text{-}X\text{-}X$$

(the two triplets 2c are not identical, as indicated in Figure 5.121). This prediction cannot be confirmed because these triplets were not further broken up.

In conclusion, every detail of the nitrogen MPA has been accounted for on the basis of the assumption that its description was compounded from observations of several sample MPAs, at least one of which happened to be formed from an N^{15} nucleus and an N^{14} nucleus.

Scandium MPA

The MPA consists (fig. 5.123) of a central globe, which contains at its centre a Be4 group surrounded by four B5 groups, and a face-centred cubic array of six funnels. There are two types of funnels: type A contains the N110 group, four pairs of triplets and an Ad6 group; type B contains an N63 group, two N24 groups and a B5 group.

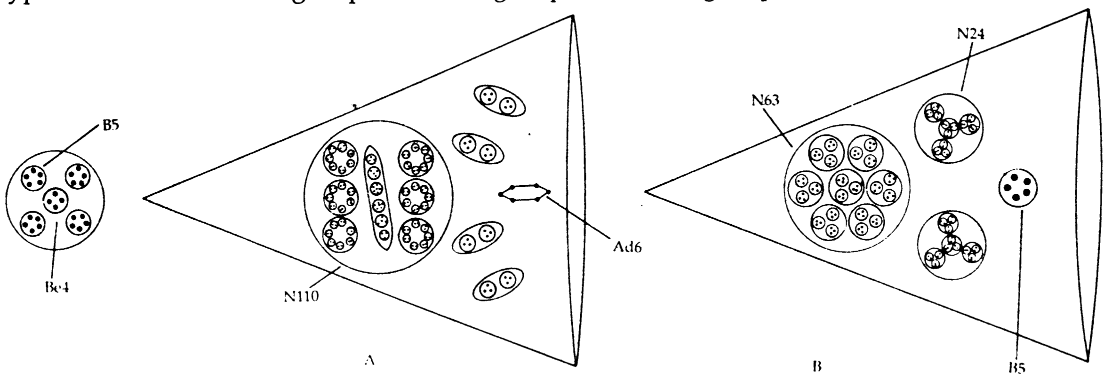


Figure 5.123 : Scandium MPA

$$MPA = (Be4 + 4B5) + 3[N110 + 4(2H3) + Ad6] + 3(N63 + 2N24 + B5).$$

The MPA is formed from two Sc^{45} nuclei (fig. 5.124), which provide 810 subquarks (Sc^{45} is the only stable nuclide of scandium and so must have formed its MPA). This number is eighteen more than the number of UPAs. It is more likely that either funnel A or funnel B is undercounted by six UPAs than that both types of funnels were misobserved. Moreover, the ubiquitousness of the constituent bodies N110, N63 and N24 amongst MPAs means that they were not wrongly observed but rather that three funnels contained additional particles. Either type A funnel has two Ad6 groups (or, alternatively, an Ad6 and an N6 group) or type B has an Ad6 or N6 group (as is the case for the vanadium MPA to be discussed next). The former possibility has been chosen arbitrarily in figure 5.124.

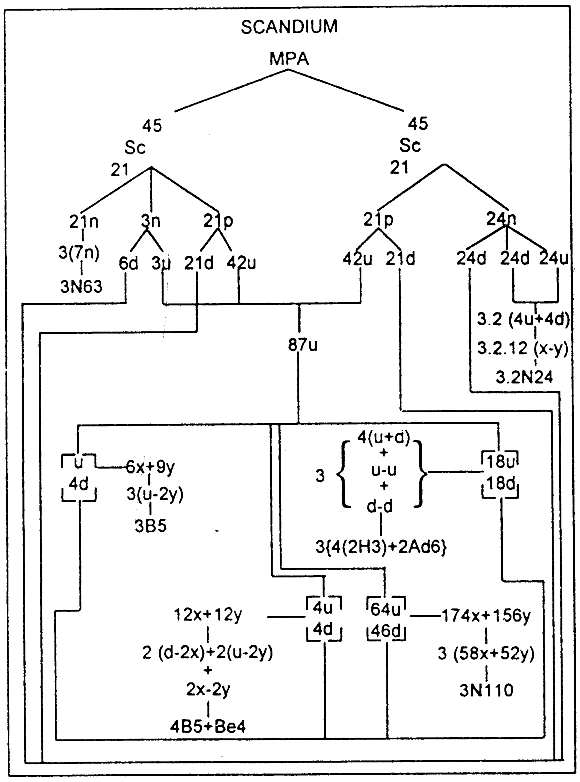


Figure 5.124

The four B5 groups in the central globe consist of two positively charged d-2X bound states and two negatively charged u-2Y mirror states - the mirror states B5 of the former (remember that the predicted electric charges of the X and Y subquarks are, respectively, +5/9 and -4/9). According to the disintegration diagram (fig. 5.125) published in the 3rd edition of *Occult Chemistry*, the central globe contains four (+) B5 groups (d-2X). However, according to the first edition of this book, the four B5 groups 'follow the boron type'[23] and the disintegration diagram for boron (fig. 5.126) appearing in this edition indicates that two of the B5 groups were (+), i.e. d-2X and two were (-), i.e. u-2Y, which agrees with the analysis presented here. It is easy to prove that, even if some of the N110 and/or B5 groups in the funnels are mirror states, the four B5 groups in the central globe cannot *all* be d-2X bound states, as figure 5.125 indicates. Theory therefore allows no other possibility than that — in agreement with the earlier edition of *Occult Chemistry* - two positive and two negative B5 groups were present in the central globe, not four positive B5 groups. The natural explanation of this discrepancy is that — as they were accustomed to do for sets of similar particles — Besant & Leadbeater did not examine every B5 group for its positivity or negativity but, instead, observed only a positive one and

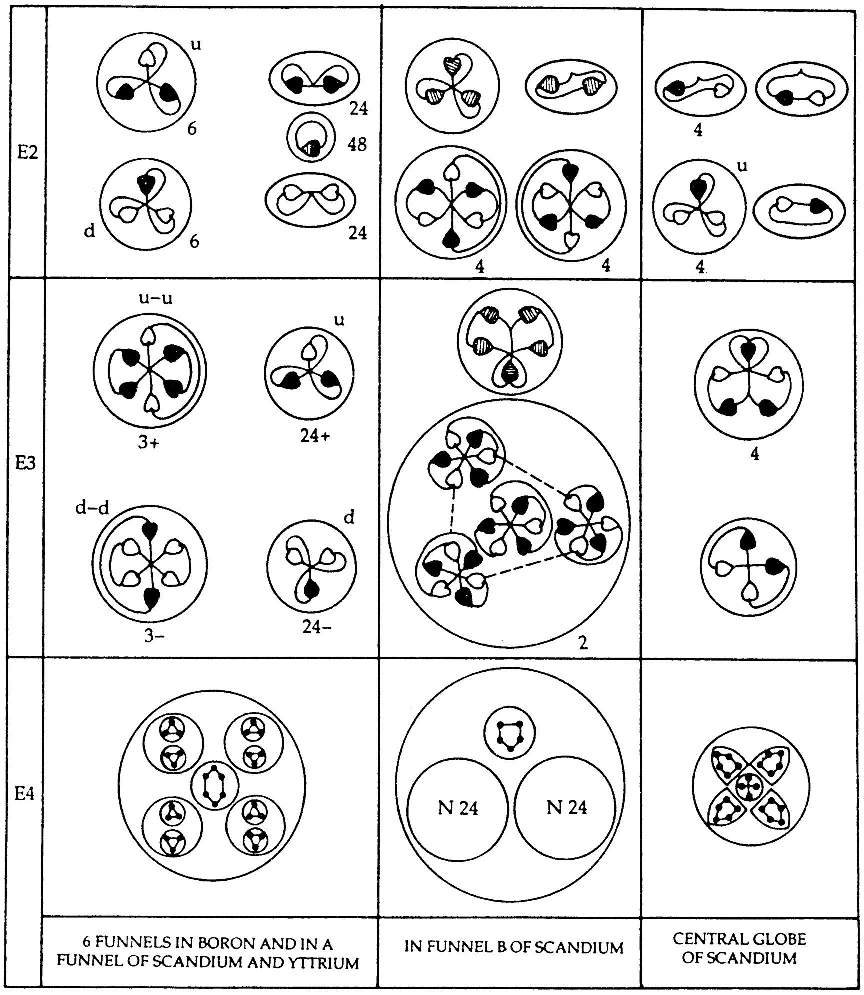


Figure 5.125

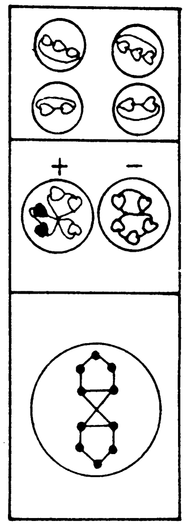


Figure 5.126

assumed that the others were similar. The central Be4 group is predicted to be a 2X-2Y bound state, as is confirmed by its products of disintegration at the E2 stage: two (0) duads (X-Y).

The N110, N63 and N24 groups have the same compositions as those found in the analysis of the nitrogen MPA. The pairs of triplets in funnel A consist of a u quark and a d quark, i.e. there are four (+) triplets and four (-) triplets in funnel A. This agrees with figure 5.125, which shows that funnel A of the scandium MPA resembles a funnel of the boron MPA in that it, too, contains four (+) triplets and four (-) triplets. The six N24 groups in funnel B are formed from the twenty-four neutrons present in a scandium nucleus. This is consistent with the analysis of the nitrogen MPA, which showed that its two N24 groups originated in the eight u quarks and eight d quarks that were part of the eight neutrons in the parent N^{15} nucleus, i.e. just as two N24 groups come from eight neutrons, so six such groups must come from twenty-four neutrons.

Vanadium MPA

The MPA (fig. 5.127) consists of a central globe, which contains an I7 group and four B5 groups, and a face-centred cubic array of six funnels (three of type A, three of type B). Type A is the type A of the scandium MPA with an N20 group added. Type B contains an N63, two N24, one N20 and one N6 group.

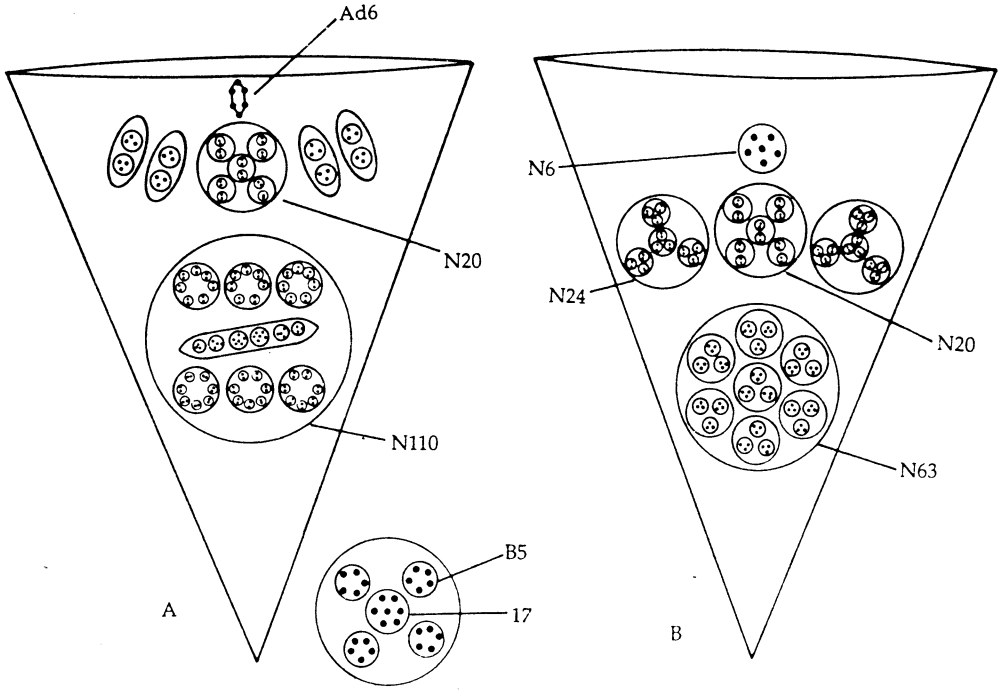


Figure 5.127 : Vanadium MPA

$$\text{Vanadium MPA} = (I7 + 4B5) + 3[N110 + N20 + 4(2H3) + Ad6] + 3[N63 + 2N24 + N20 + N6].$$

The MPA is formed from two V^{51} nuclei (fig. 5.128), which provide 918 subquarks - the same number as the number of UPAs. Unlike in the case of the scandium MPA, the four $\tilde{B5}$ groups are here *all* d-2X bound states. Funnel A contains two N110 groups and one $\tilde{N110}$ mirror state. The N63, N24 and N20 groups are as found in MPAs analysed previously. As also found earlier, the I7 group is a 4X-3Y bound state. The N6 group is a bound state of three X and three Y subquarks, agreeing with what was found for this group in the chromium MPA (the two N6 groups in the nitrogen MPA have different compositions from this because they break up into particles that are different from those shown in the disintegration diagrams of vanadium and chromium).

Figure 5.129 confirms the predicted similarity of the composition d-2X of the B5 groups in the central globe by showing that they break up into four (-) triplets (d quarks) and four (+) duads of UPAs (X-X).

Yttrium MPA

The MPA (fig. 5.130) consists of a globe at the centre of a face-centred cubic array of six funnels.

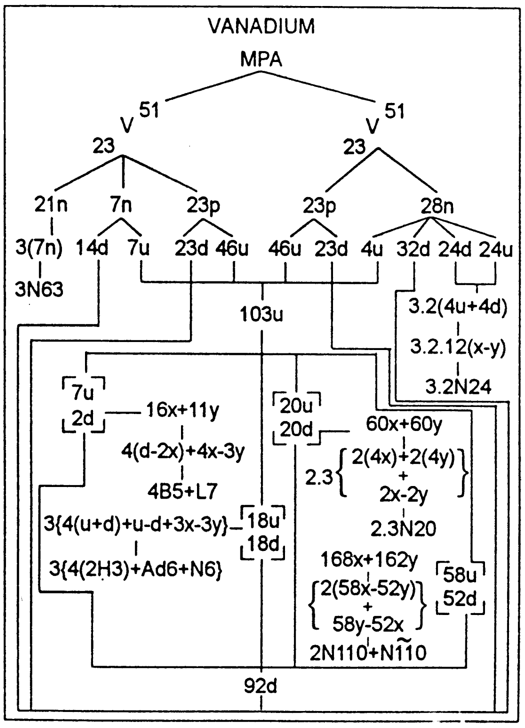


Figure 5.128

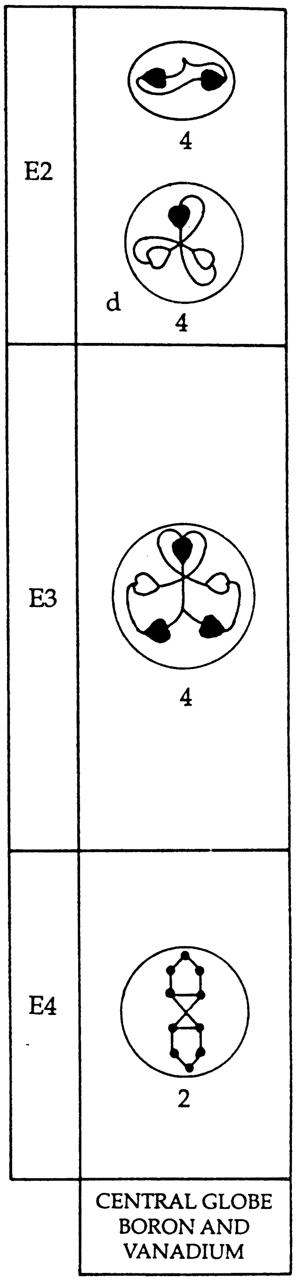


Figure 5.129

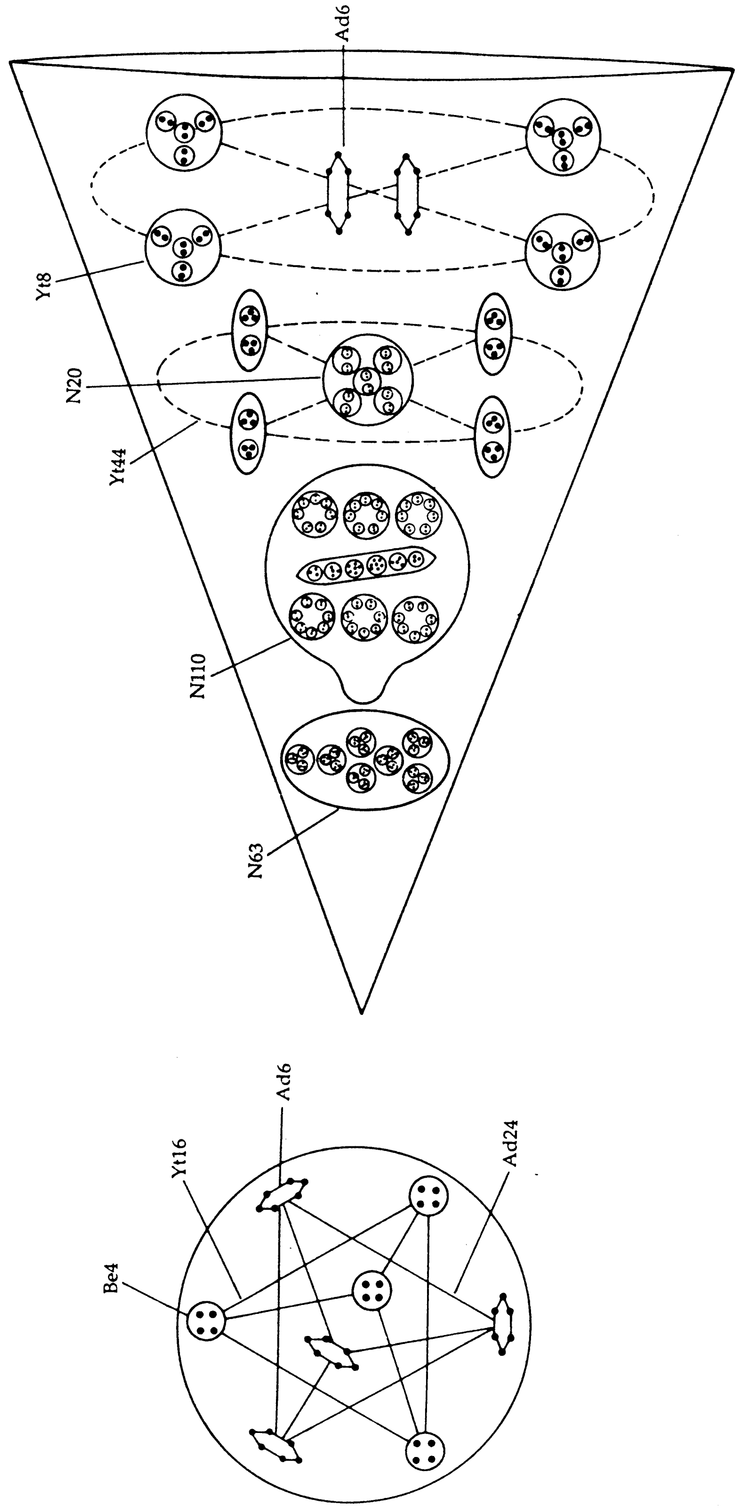


Figure 5.130 : Central globe and a funnel of the yttrium MPA.

The globe contains an Ad24 group and a tetrahedral array of four Be4 groups (Yt16). Near the bottom of each funnel is an N63 group, then an N110 group, which is followed by a Yt44 group consisting of four pairs of hydrogen triplets revolving around a globe containing an N20 group. Lastly, nearest the mouth of each funnel are four globes (Yt8), each containing four duads of UPAs and revolving around two Ad6 groups, the latter whirling on their own axes in the centre of the funnel near its mouth.

Yttrium MPA = (Ad24 + Yt16) + 6[N63 + N110 + Yt44 + (4Yt8 + 2Ad6)].

The MPA is formed from two Yt^{89} nuclei containing 1602 subquarks (fig. 5.131). The predicted overcounting of UPAs by 4 is not likely to be due to an Ad12 group in the central globe being mistaken for a Yt16 because four separate errors of observation - mistaking each

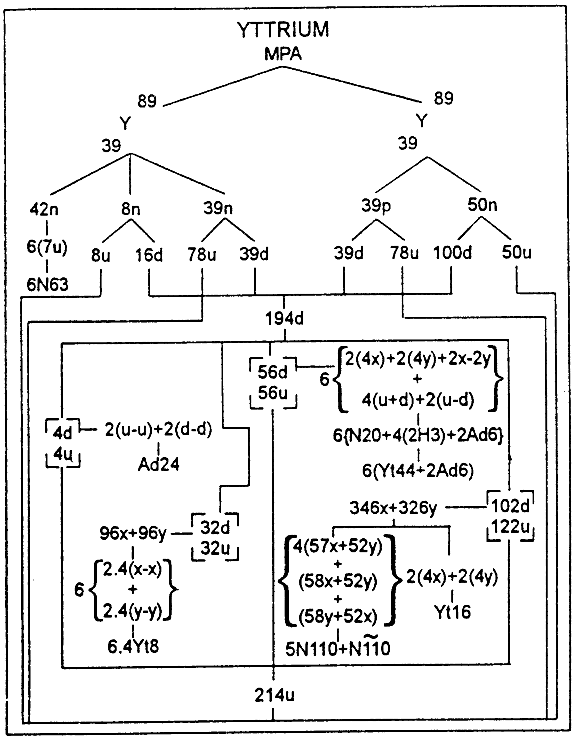


Figure 5.131

H3 triplet for a Be4 group - would then have had to be made, which is implausible. The symmetry of the particles in the Yt44:

Yt44 = N20 + 4(2H3),

and in the Yt8 and Ad6 groups also precludes the possibility of their being miscounted. The remaining possibility is that some of the N110 groups contain one or two fewer UPAs than the number assigned to this group. Such minute

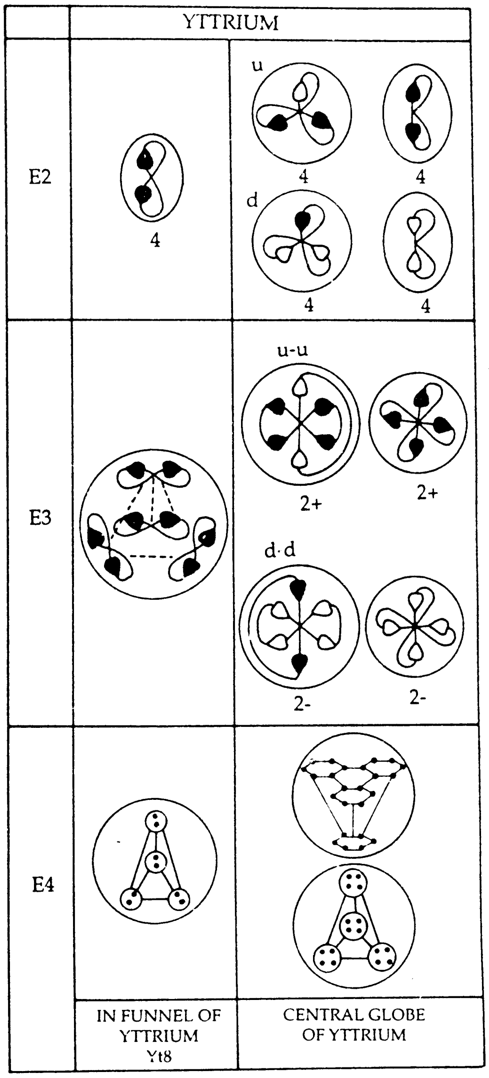


Figure 5.132

differences would have gone unnoticed by Besant & Leadbeater because (as they themselves admitted) they did not bother to examine closely every funnel of a given MPA. This variation in the UPA population of the N110 is not unprecedented because it was deduced in the analysis of the manganese MPA and is supported in general by the investigators' remark (referring to the fact that they did not count the UPAs in every similar division of an MPA): 'Later, it may be worth while to count each division separately, as in some we noticed that two groups, at first sight alike, differed by 1 or 2 Anu.'[24] Four N110 groups should contain one fewer X subquark than they normally contain (see figure 5.131).

Two Be4 groups in the Yt16 group are bound states of four X subquarks. The disintegration diagram (fig. 5.132) confirms this, showing that the Yt16 consists of two (+) Be4 groups (4X), which break up into four (+) duads (X-X), and two (-) Be4 groups (4Y), which break up into four (-) duads (Y-Y). It also shows that the Ad24 breaks up into four (+) triplets (u quarks) and four (-) triplets (d quarks), in agreement with its identification as a bound state of two u-u diquarks ((+) Ad6) and two d-d diquarks ((-) Ad6). Each pair of triplets in the Yt44 consists of a u and a d quark, in agreement with the disintegration diagram (fig. 5.125) for a funnel of the scandium MPA, which it shares with the yttrium MPA. The four Yt8 groups in a funnel consist of two clusters of four X- X disubquarks and two clusters of four Y-Y disubquarks, the tetrahedral arrangement of each Yt8 being due to the mutual electrostatic repulsion of the four similar electric charges carried by the disubquarks. Figure 5.132 exhibits the former type of cluster, which it shows breaking up at the E2 stage into four (+) duads (X-X).

Except for the unnoticed minute variations in some of the N110 groups, every detail of the yttrium MPA is consistent with the theory of MPAs, nuclear physics, quark theory and with the predicted composition of u and d quarks: u = X-X-Y, and d = X-Y-Y.

5.13 Cube group B

Aluminium MPA

The MPA consists (fig. 5.133) of six funnels directed towards the faces of a cube. Each funnel contains eight similar ovoids (Al9), each enclosing three spheres containing hydrogen triplets. Below these is an ovoid (Al9') containing three spheres. Two enclose duads of UPAs and the third encloses a group of five UPAs.

Aluminium MPA = 6(Al9' + 8Al9).

The MPA is formed (fig. 5.134) from two Al^{27} nuclei, which contain 486 subquarks - the same number as the number of UPAs. These comprise 242 X subquarks and 244 Y subquarks. The funnels cannot have the same set of particles because these numbers are not exactly divisible by 6. Seventy-two u quarks and seventy-two d quarks are equally distributed among the six funnels, four groups of three per funnel. An Al9 is either three u or three d quarks bound by the residual coupling between the subquarks in each quark in a way that is analogous to the nuclear force holding together protons and neutrons in atomic nuclei. The predictions that an Al9 is of two types, that there are four of each in a funnel and that they are u-u-u and d-d-d bound states are confirmed by the disintegration diagram (fig. 5.135), which shows that the eight Al9 groups separate at stage E3 into two types of sets of four, one

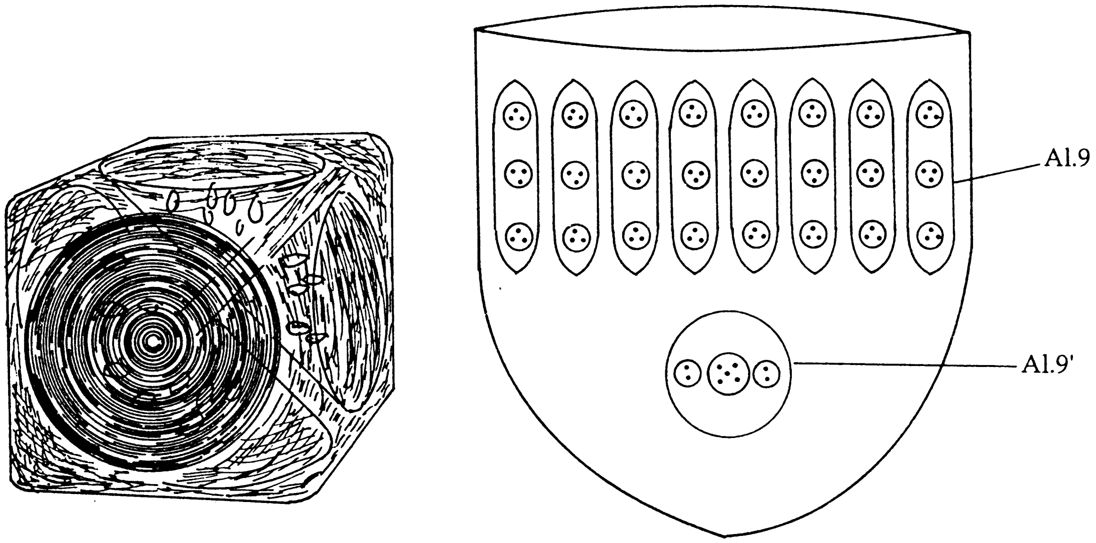


Figure 5.133 : Aluminium MPA

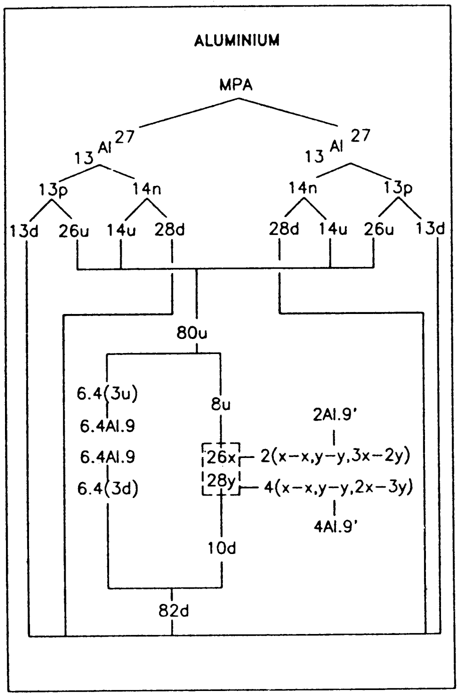


Figure 5.134

type breaking up at stage E2 into three (+) triplets (u quarks), the other breaking up into three (-) triplets (d quarks).

The twenty-six X subquarks and twenty-eight Y subquarks making up two protons and four neutrons recombine, those in the protons forming an Al9' group consisting of an X-X bound state, a Y-Y bound state and a 3X-2Y bound state:

proton (= 5X-4Y) → X-X + Y-Y + 3X-2Y,

those in the neutrons forming a Y-Y, an X-X and a 3Y-2X bound state:

neutron (= 5Y-4X) → Y-Y + X-X + 3Y-2X.

Four of the Al9' groups are thus the mirror states Al9' of the two others (fig. 5.136). This group is shown in the disintegration diagram as breaking up at the E2 stage into a free UPA and four (+) duads (X-X). This disagrees with the prediction above, which requires the Al9' to break up into a free UPA, two (+) duads and two (-) duads. But the disintegration diagram (fig. 5.79) of the calcium MPA, which also contains the Al9' group, indicates that this group is - as predicted - made up of a (+) duad and a (-) duad and that its group of five UPAs

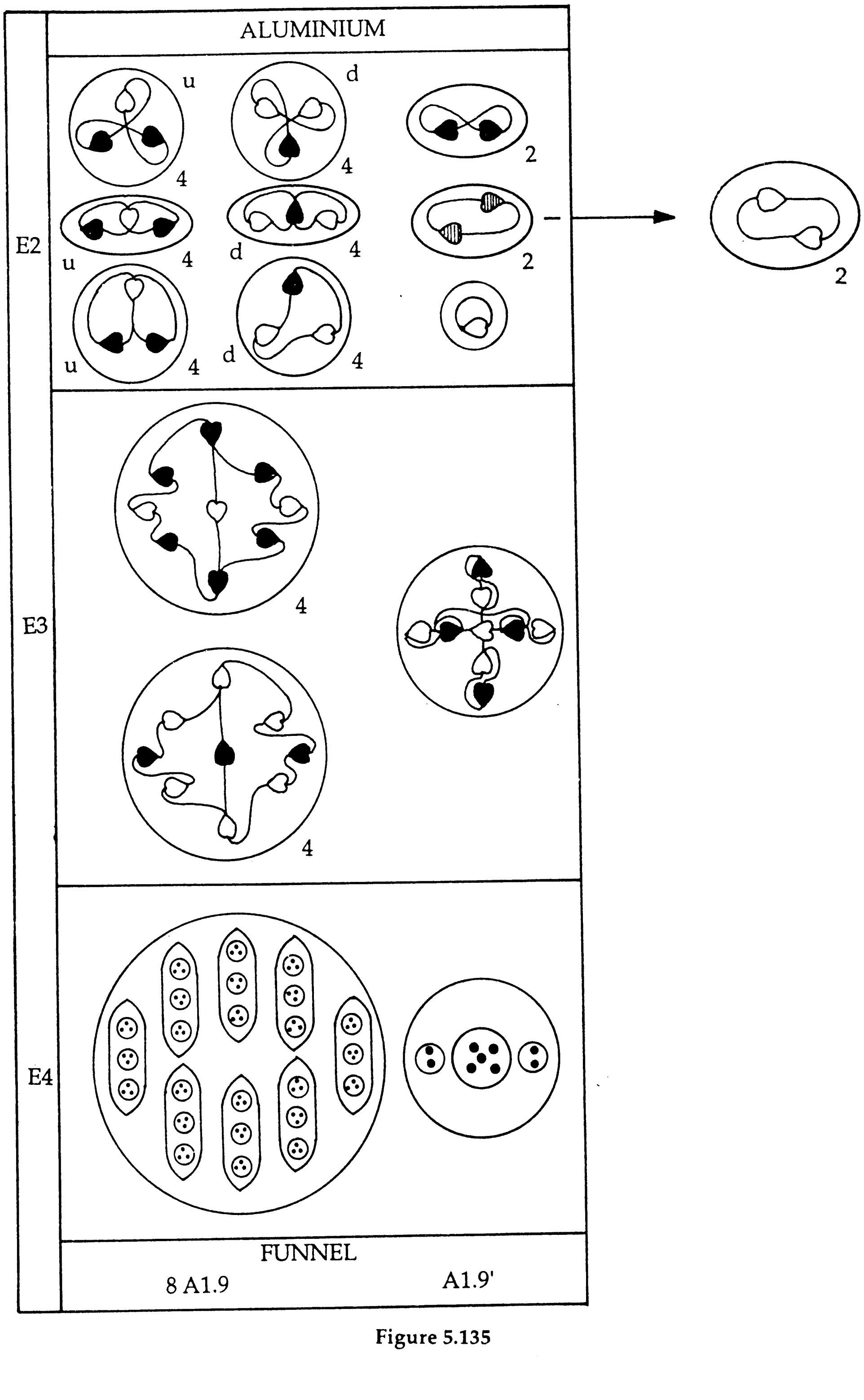


Figure 5.135

breaks up into two (0) duads and a UPA, so that it must contain at least two X and two Y subquarks - in agreement with prediction. Suppose, however, that the two protons and four neutrons did not separately transform into Al9′ groups but that, instead, their twenty-six X subquarks and twenty-eight Y subquarks rearranged themselves so as to form n Al9′ groups (1 ≤ n ≤ 6) with the composition:

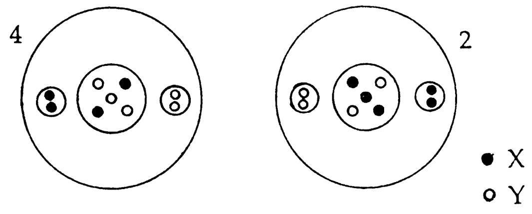


Figure 5.136 : Al9′ group

X-X + X-X + 4X-(X or Y),

allowing them to break up into the four (+) duads (X-X) recorded for the aluminium MPA. Letting the (6-n) funnels each contain A X subquarks and (9-A) Y subquarks (0≤ A≤ 9), then, if the group of five UPAs in n funnels is 4X-X,

$$9n + (6-n)A = 26$$

and

$$(6-n)(9-A) = 28.$$

These equations have the single solution n = 2, A = 2. If the group of five UPAs in n funnels is 4X-Y,

$$8n + (6-n)A = 26$$

and

$$n + (6-n)(9-A) = 28,$$

which simplifies to

$$(6-n)(9-A) = 22,$$

which has no solutions because 22 factorises only as 2×11 and 11>(9-A) or (6-n) for all positive values of n and A. Two Al9′ groups can only have the composition:

X-X + X-X + 4X-X,

and the remaining four Al9′ groups can only have the composition:

X-X + Y-Y + 4Y-Y.

Presumably, Besant & Leadbeater examined only one of the two funnels predicted to contain Al9′ groups comprising two X-X bound states and a bound state of five X subquarks. Two similar groups of UPAs observed in different MPAs may be mirror states of each other, and therefore they need not necessarily have the same subquark composition unless their products of disintegration are indicated in their disintegration diagrams to be identical. This is not the case for the aluminium and calcium MPAs. It was asserted in ESPQ[25] that the duads released from the Al9′ were wrongly observed because they differ from those recorded in the Al9′ of the calcium MPA. But the numbers of X and Y subquarks available to form the six Al9′ groups *do* allow their constituent particles to have been correctly observed if the composition of their central group of five UPAs (and the Al9′ groups themselves) differ in these MPAs.

Phosphorus MPA

The MPA is a face-centred cubic array of six funnels (fig. 5.137). Each funnel contains two segments. Segment A contains at the bottom a B5 group, then three N6 groups and, lastly, three spheres, each containing nine UPAs (P9) located at the centre and corners of a cube. Segment B contains a tetrahedral array of four UPAs (Li4), then three spheres containing four UPAs (Be4) and, finally, three spheres containing P9 groups.

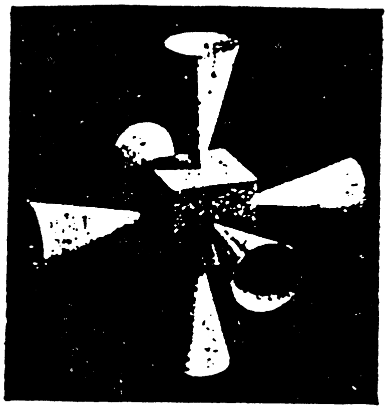


Figure 5.137: Phosphorus MPA

Phosphorus MPA = 6[(B5 + 3N6 + 3P9) + (Li4 + 3Be4 + 3P9)].

The MPA is formed (fig. 5.138) from two P^{31} nuclei, which provide 558 subquarks - the same number as the number of UPAs. These comprise 278 X subquarks and 280 Y subquarks. As neither number is divisible exactly by 6, the funnels cannot have the same subquark composition. Four funnels each contain the forty-six X subquarks and forty-seven Y subquarks making up the fifteen u quarks and sixteen d quarks originally present in, respectively, the fifteen protons and sixteen neutrons in a P^{31} nucleus:

P9 (×6): 5X-4Y Be4 (×3): 4X + 4Y + 4Y;

N6 (×3): 3X-3Y B̃5 (×1): 2X-3Y;

L̃i4 (×1): X-3Y.

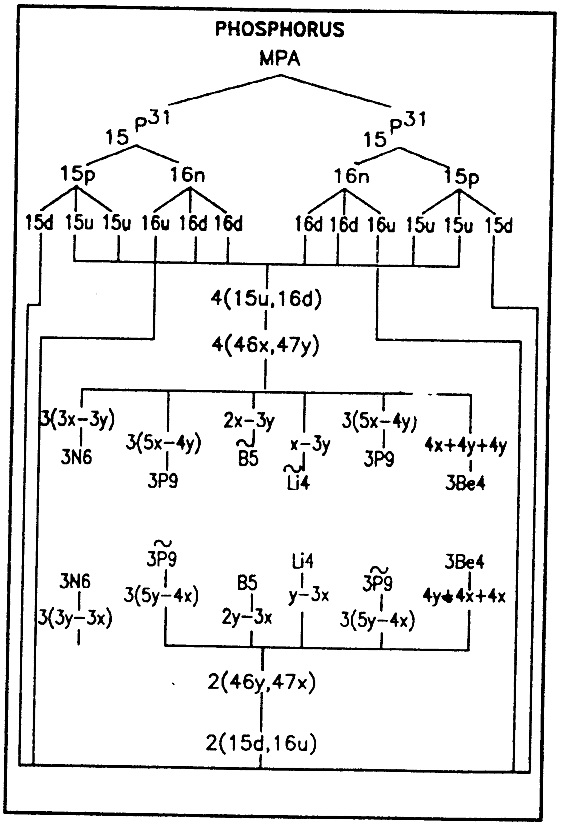


Figure 5.138

Two funnels each contain the forty-seven X subquarks and forty-six Y subquarks making up the sixteen u quarks and fifteen d quarks originally present in, respectively, the sixteen neutrons and fifteen protons in a P^{31} nucleus:

P̃9 (×6): 4X-5Y Be4 (×3): 4Y + 4X + 4X;

N6 (×3): 3Y-3X B5 (×1): 2Y-3X;

Li4 (×1): Y-3X.

The particles in two funnels are the mirror states of their corresponding particles in the four other funnels. A P9 (P̃9) is a body-centred cubic array (fig. 5.139) of nine subquarks consisting of intersecting tetrahedra of four X subquarks and four Y subquarks that are bound by strong forces to an X (Y) subquark acting as their nucleus. Repulsive coulombic forces between the identical charges of the X subquarks create their tetrahedral orientation.

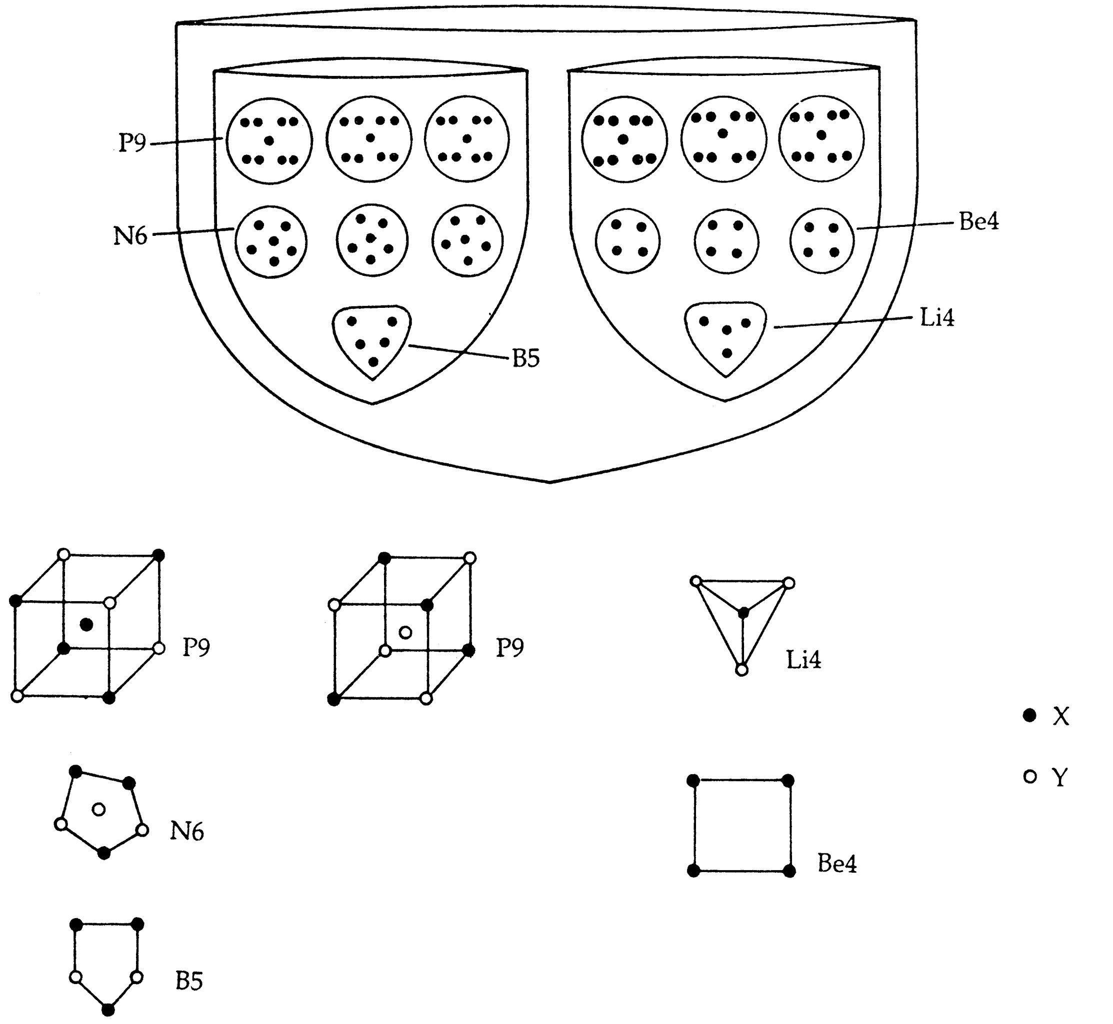


Figure 5.139

Similarly for the four Y subquarks. The disintegration diagram (fig. 5.140) confirms the predicted composition of the P9 because it shows that it breaks up at stage E2 into a (+) duad (X-X), three (0) duads (X-Y) and a UPA:

$$5X\text{-}4Y \rightarrow X\text{-}X + 3(X\text{-}Y) + Y.$$

The UPAs in an N6 released at the E3 stage rearrange themselves into an Ad6 group, which dissociates at the E2 stage into a (+) triplet (u quark) and a (-) triplet (d quark). It consists, therefore, of three X subquarks and three Y subquarks, in agreement with the prediction above. The B5 group breaks up at stage E2 into a (-) triplet (d quark) and a (+) duad (X-X), confirming its subquark composition:

$$2Y\text{-}3X \rightarrow \text{d quark } (2Y\text{-}X) + X\text{-}X.$$

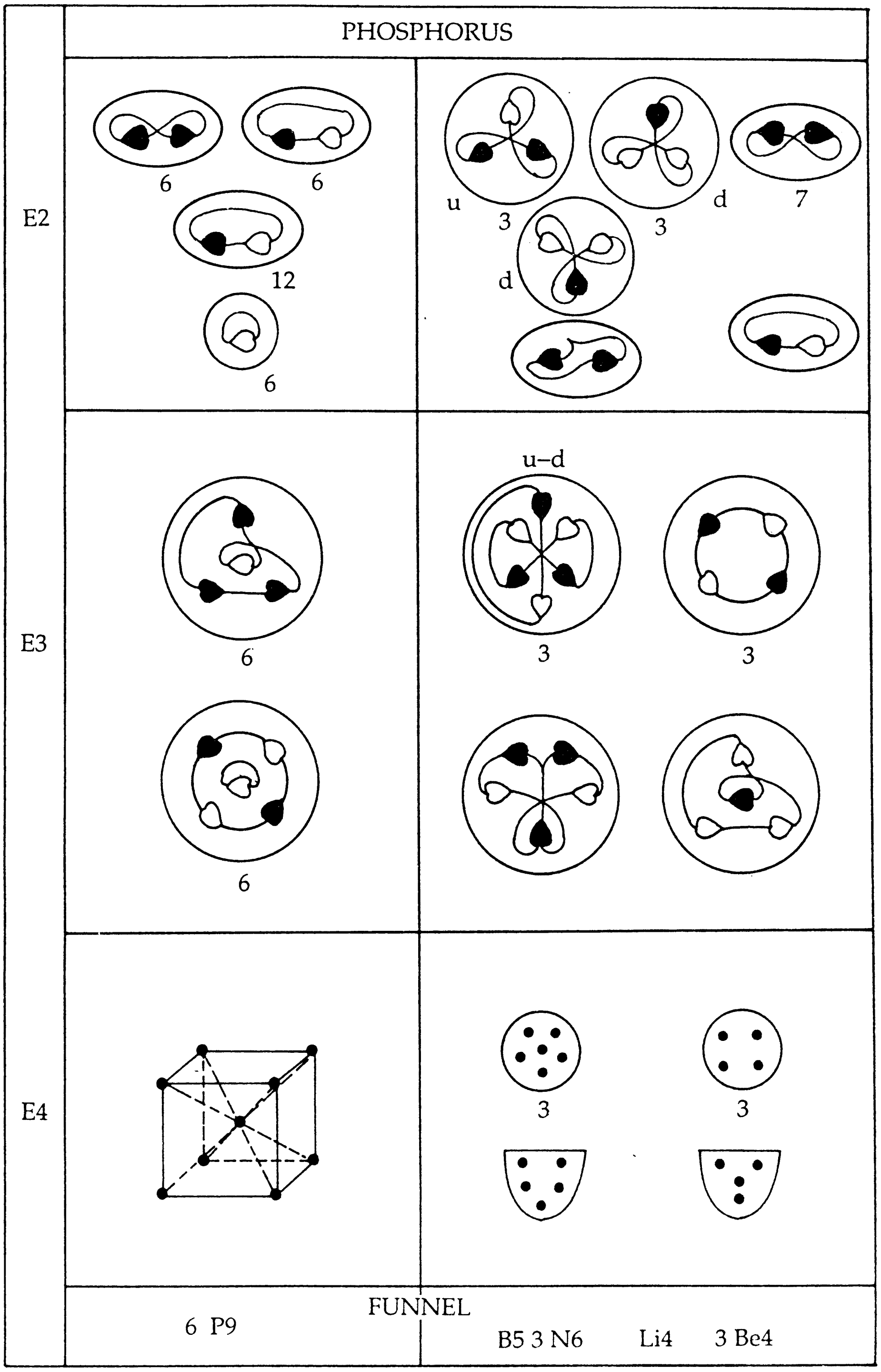

PHOSPHORUS
E2
6
6
12
6
u
3
3
d
7
d
E3
u–d
6
3
3
6
E4
3
3
FUNNEL
6 P9
B5 3 N6
Li4
3 Be4

Figure 5.140

According to figure 5.140, the three Be4 groups and the Li4 group break up at stage E2 into seven (+) duads and a (0) duad. As, according to many disintegration diagrams, the (+) Be4 group breaks up into two (+) duads, figure 5.140 implies that the Li4 group must consist of a (+) duad (X-X) and a (0) duad (X-Y), i.e. it is a bound state of three X subquarks and one Y subquark, in agreement with the above prediction for the groups in two funnels. But the three Be4 groups are not all positive, as figure 5.140 indicates, because one of them is a bound state of four Y subquarks and so should be negative. As earlier analyses have suggested, these groups were, presumably, not examined individually.

The Be4 groups in the phosphorus MPA were misinterpreted in ESPQ[26] as 2X-2Y bound states instead of being identified correctly as bound states of either four X or four Y subquarks. This revised analysis means that the six P9 groups in a funnel are identical and that the suggestion in ESPQ concerning the wrong assignment of the number 7 is irrelevant.

Gallium MPA

The MPA (fig. 5.141) consists of a face-centred cubic array of six funnels. Each funnel has two segments. Segment A contains a cone enclosing seven UPAs (Ga7), three Ga15 groups, each made up of an N6 and a P9 group, and three Ga20 spheres, each made up of two Be4 groups and two hydrogen triplets arranged in the shape of a cross with an Ad6 group at its centre. Segment B contains a B5 group, three Ga13 groups, each consisting of a Be4 group and a P9 group, and three Ga18 spheres, each containing four triplets arranged in the shape of a cross with an N6 group at its centre.

Gallium MPA = 6[(Ga7 + 3Ga15 + 3Ga20) + (B5 + 3Ga13 + 3Ga18)].

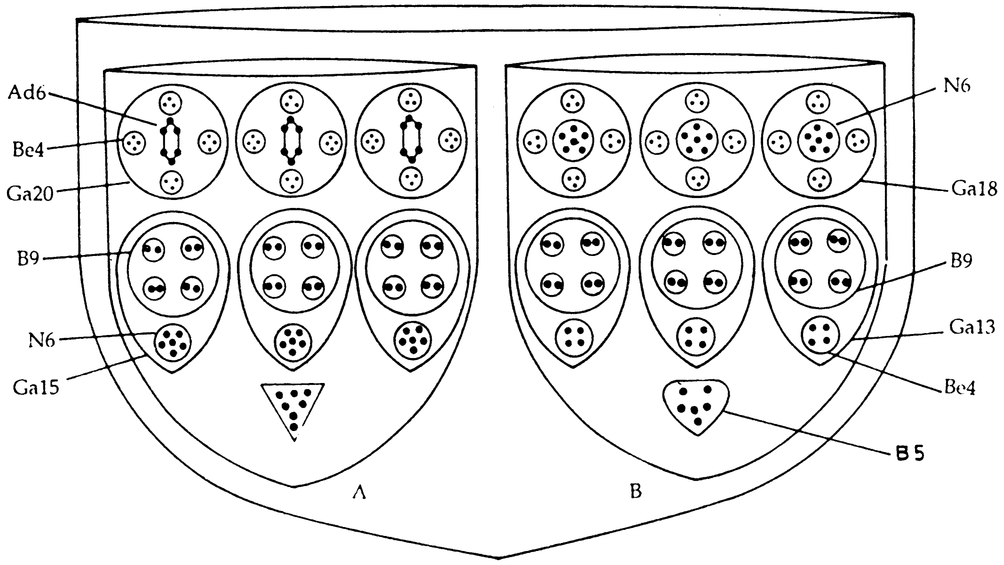


Figure 5.141 : A funnel of the gallium MPA.

The MPA is formed (fig. 5.142) from a Ga^{69} nucleus and a Ga^{71} nucleus, the two stable nuclides of gallium, which provide 1260 subquarks - the same as the number of UPAs. The MPA of gallium differs from that of phosphorus in having three extra Ga20 in segment A and three extra Ga18 in segment B, a B5 group replacing the Li4 in segment B of the funnel of the phosphorus MPA and the Ga7 group replacing the B5 in segment A of the funnel of the phosphorus MPA. The difference:

$$6(Ga7 - Li4 + 3Ga20 + 3Ga18)$$

between the MPAs of gallium and phosphorus should be due to the thirty-two more protons and forty-six more neutrons that nuclei of Ga^{69} and Ga^{71} contain compared with the two P^{31} nuclei forming the phosphorus MPA. Figure 5.142 demonstrates that this, indeed, is true. Fourteen protons and twenty-eight neutrons provide the subquarks contained in six sets of (Ga7 + 3Ga20) LESS those present in six Li4 groups. The latter subquarks are present in the Li4 groups belonging to the P^{31} MPA, which is formed from thirty protons and thirty-two neutrons. Instead of making Li4 groups in the gallium MPA, these subquarks are added to the 388 subquarks provided by the fourteen protons and twenty- eight neutrons to assemble the six sets of gallium groups.

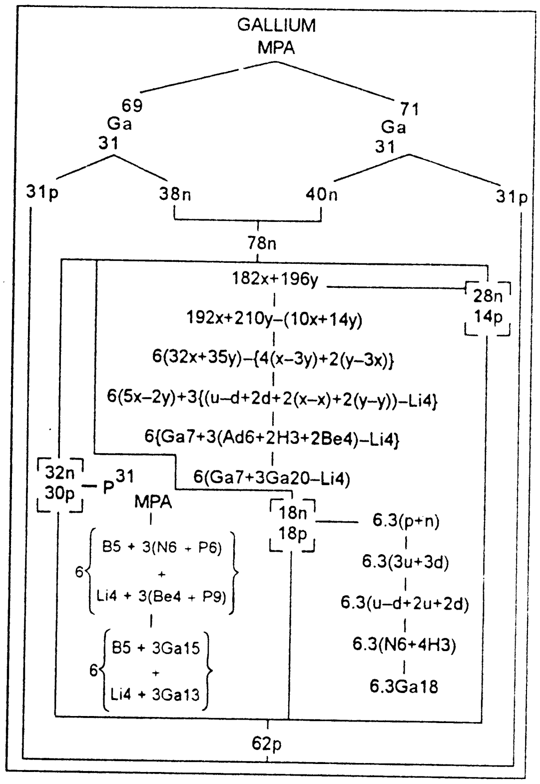


Figure 5.142

Eighteen protons and eighteen neutrons break up and their subquarks regroup as eighteen Ga18 groups. The N6 group in the Ga18 is a bound state of one u quark and one d quark, and the four triplets consist of two u quarks and two d quarks. Three Ga18 groups, therefore, contain nine u quarks and nine d quarks. This is confirmed by their disintegration products at the E2 stage (fig. 5.143), namely, nine (+) triplets (u quarks) and nine (-) triplets (d quarks).

The Ga7 group is a bound state of five X subquarks and two Y subquarks. This composition is consistent with figure 5.143, which shows that the particle breaks up at the E2 stage into two (0) duads (X-Y), one (+) duad (X-X) and a UPA (X subquark). In the Ga20 group the Ad6 is an u-d diquark, the two triplets are d quarks and the two Be4 groups are bound states of four X subquarks and four Y subquarks. Figure 5.143 confirms this, showing, firstly, that three Ga20 groups release six (-) triplets (d quarks) at the E2 stage (segment A, top row) and, secondly, that the six Be4 groups in the three Ga20 groups break up into six (+) duads (X-X) and six (-) duads (Y-Y), i.e.,

$$3(4X + 4Y) \rightarrow 6(X\text{-}X) + 6(Y\text{-}Y).$$

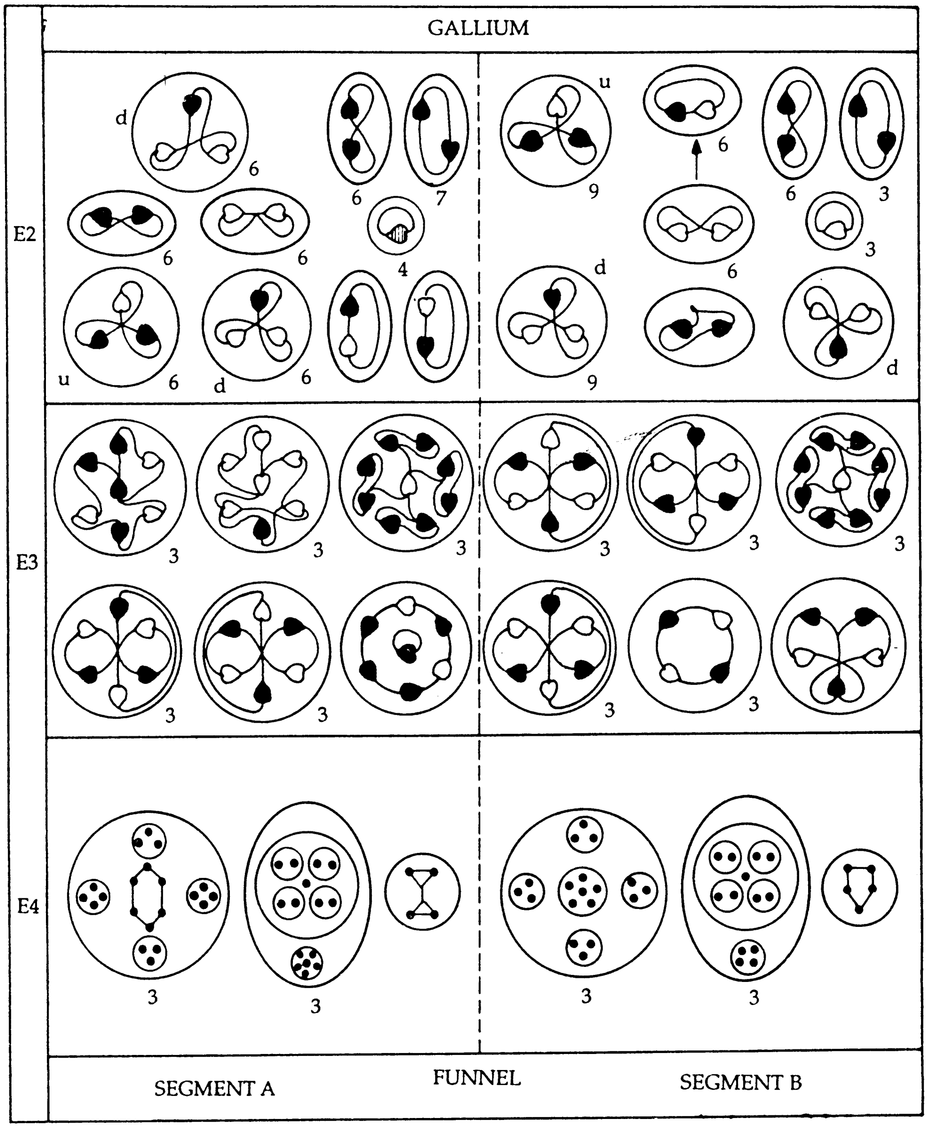


Figure 5.143

It should be pointed out that figure 5.143 contains an error of draughtsmanship: the three P9 groups in segment B should break up into three UPAs and (6+6) duads, not (6+3) duads, as shown. Notice also that the P9 groups in this MPA differ in composition from those in the phosphorus MPA, for the duads released from the P9 are all (+), according to figure 5.143, whereas in the phosphorus MPA they consist of one (+) and three (0) duads (compare figures 137 and 140). Both compositions are compatible with theory provided that the duads in the P9 groups are X-X disubquarks in three funnels and Y-Y disubquarks in the other three funnels.

Arsenic MPA

The MPA (fig. 5.144) is a face-centred cubic array of six similar funnels. Each funnel contains an Al9′ group and eight segments, each of which contains an Al9 group and two spheres enclosing N9 groups, the Al9 and Al9′ groups being found in the aluminium MPA. The Al9′ is made up of three spheres, two enclosing a duad of UPAs and the third enclosing a group of five UPAs. The Al9 consists of three hydrogen triplets.

$$\text{Arsenic MPA} = 6[\text{Al9}' + 8(2\text{N9} + \text{Al9})].$$

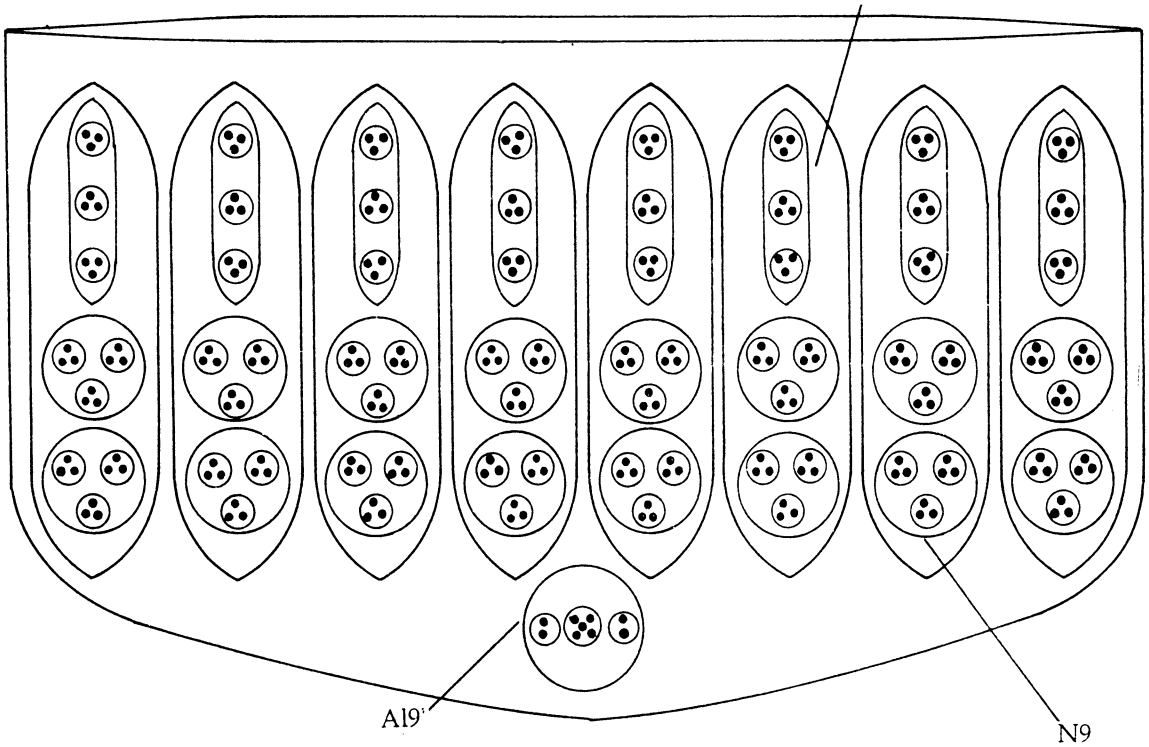


Figure 5.144 : A funnel of the arsenic MPA.

The MPA is formed from two As^{75} nuclei (fig. 5.145), which provide 1350 subquarks - the same as the number of UPAs. It differs from the aluminium MPA solely by having sixteen N9 groups in each funnel, i.e. by having a total of ninety-six such groups. Since an N9 was identified as a neutron in the analysis of the nitrogen MPA and as a proton in the analysis of the chlorine MPA, the arsenic MPA should contain ninety-six nucleons as well as the particles belonging to the aluminium MPA. The two As^{75} nuclei forming the MPA contain forty more protons and fifty-six more neutrons than two Al^{27} nuclei forming an aluminium MPA, i.e. ninety-six more nucleons. This MPA therefore provides one of the clearest proofs of the hypothesis that the MPA of an element is formed from two nuclei of that element.

Four funnels each contain eight pairs of N9 groups consisting of a proton and a neutron; each of the other funnels contain four pairs of N9 groups consisting of a proton and a neutron and four pairs consisting of two neutrons. Notice that this 4:2 division of funnels with respect to the N9 group also holds with respect to the Al9′ group, analysis of the aluminium MPA indicating that in two funnels the Al9′ is the mirror state of those in the four other funnels.

The Al9 groups in each funnel consist of four u-u-u bound states and four d-d-d bound states. Four of the funnels each contain twenty-four u quarks and twenty-four d quarks present in the eight protons and eight neutrons that constitute the sixteen N9 groups. There are therefore thirty-six u quarks and thirty-six d quarks in each funnel. The disintegration diagram (fig. 5.146) furnishes spectacular evidence of this prediction because it shows that thirty-six (+) triplets (u quarks) and thirty-six (-) triplets (d quarks) are released at the E2 stage from the Al9 and N9 groups. Moreover, the fact that eight segments of particles form twelve (+) and twelve (-) bodies at stage E3 is very significant for the following reason: according to the disintegration diagram of the aluminium MPA (fig. 5.135), eight Al9 groups change into four (+) and four (-) bodies of the same kind when released at the E3 stage. Since four (+) bodies break up into twelve (+) triplets (u quarks) and four (-) bodies break up into twelve (-) triplets (d quarks) according to figure 5.135, it follows that

$$8(2N9) \equiv 24u + 24d,$$

i.e.

$$2N9 \equiv 3u + 3d,$$

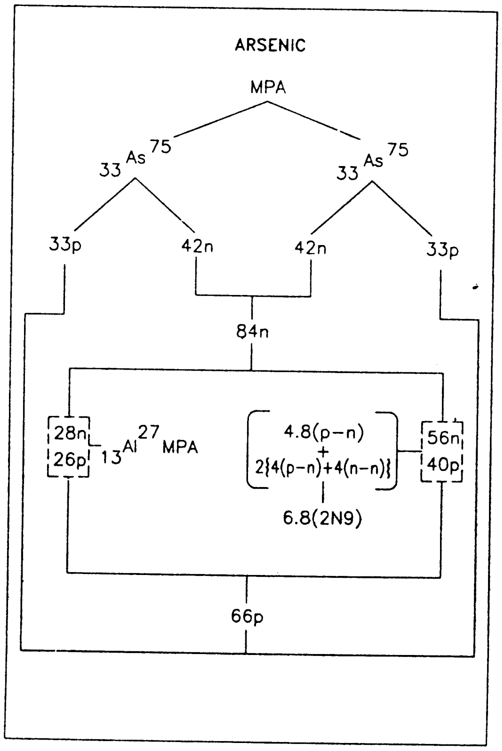


Figure 5.145

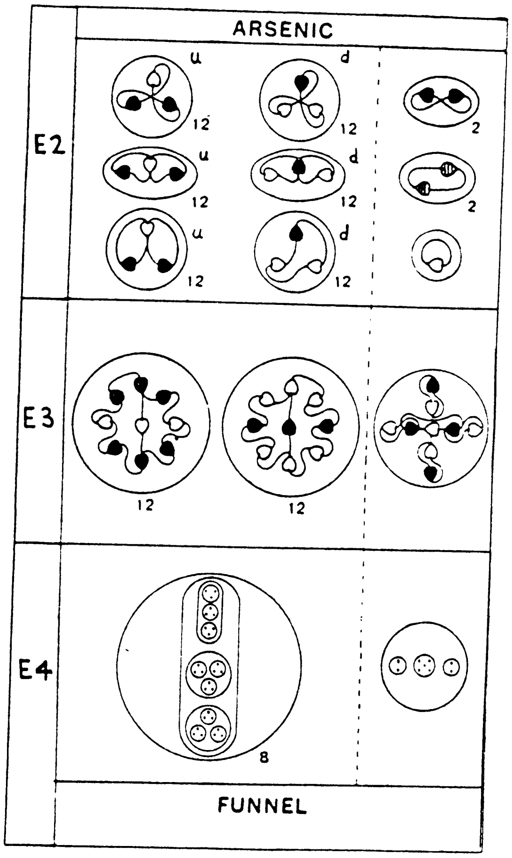


Figure 5.146

which is consistent with one N9 group being a proton (u-u-d) and the other being a neutron (u-d-d). It should be said that the main reason why the N9 group is identified here as either a proton or neutron and not as either a u-u-u or d-d-d bound state (both of which are also consistent with the above equivalence) is that of consistency, for the N9 group is depicted in *Occult Chemistry* as made up of either two (+) triplets and one (-) triplet (e.g. see the break-up in figure 5.41 of the N9 belonging to the chlorine MPA) or one (+) triplet and two (-) triplets (e.g. see the break-up in figure 5.121 of the seven N9 groups belonging to the N63 group of the nitrogen MPA). No disintegration diagram was provided for the group which could indicate whether it really was an N9 or, instead, a cluster of three (+) triplets or three (-) triplets that was misidentified. The fact that no separate diagram exists could mean either that Besant & Leadbeater did not examine this group because its similar form to the N9 made them assume that it was such a particle or that they did examine it and found no difference requiring a new diagram. They stated: 'On the E3 level three groups of nine Anu from the ovoids are liberated and form groups having the same design as those in Aluminium.'[27] But this does not make it clear whether the N9 groups *themselves* form the (+) and (-) 'groups having the same design as those in Aluminium' or whether pairs of N9 groups break up into triplets which recombine differently to form the (+) and (-) groups. If the N9 groups were protons and neutrons, the latter rearrangement would be needed. No examples exist where either theory or a disintegration diagram requires an N9 group to be a bound state of three u quarks or three d quarks, which is fortunate in view of the short lifetime of such states.

As pointed out in ESPQ,[28] the Al9 group is neither the highly unstable, spin-3/2 baryonic resonance N^{*++} (u-u-u) nor the N^{*-} (d-d-d), even though it contains the same quarks. The Al9 is a bound state of three, *effectively colourless* quarks, coupled together by the quasi-nuclear, residual interaction between their subquarks, not (as in the baryonic resonances) by the string bonds between coloured quarks. Hence there arises no problem of reconciling very short lifetimes with the assigned u and d quark composition of the triplets in the N9 group. The real problem set by the large variety of multi-subquark and multi-quark bound states observed in MPAs is: what local physical conditions accompanying micro-psi observation can suppress wholly or partially the colour degree of freedom of QCD (and, more generally, the hypercolour degree of freedom of subquarks) to allow formation of stable particles made up of subquarks confined in *varying* numbers by string forces? This question is too technical to be addressed here.

Indium MPA

The MPA (fig. 5.147) is a face-centred cubic array of six funnels, each having three segments. The latter are of two types: segment A contains three Ga15 groups, three Ga20 groups and one In16 group, which consists of two mNe5 groups and an Ad6 group; segment B contains three Ga13 groups, three Ga18 groups and one In14 group, which consists of two mNe5 groups and an Li4 group. Three funnels (type A) contain two segments of type A and one of type B; the other three funnels (type B) enclose one segment A and two segments B.

$$\text{Indium MPA} = 3(2A + B) + 3(A + 2B),$$

where

$$A = \text{In16} + 3\text{Ga15} + 3\text{Ga20}$$

and

$$B = In14 + 3Ga13 + 3Ga18.$$

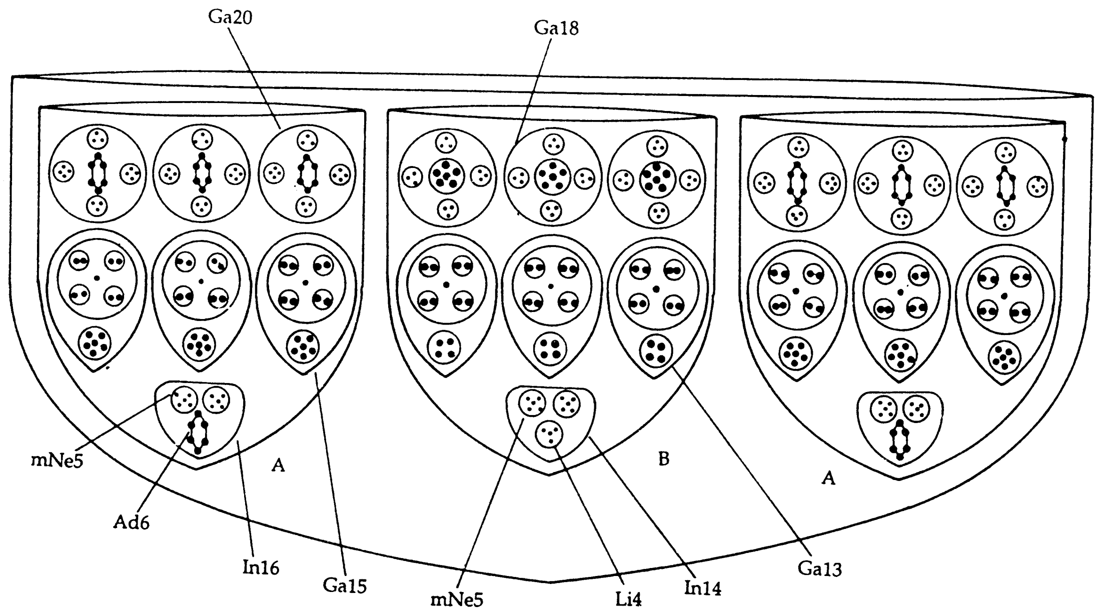


Figure 5.147 : Type A funnel of the indium MPA.

The MPA is formed from nuclei of In^{113} and In^{115} (fig. 5.148), which provide 2052 subquarks - the same number as the number of UPAs. This is the reason for assuming that two different nuclides of indium formed the MPA (these are the only isotopes found on Earth; although it is unstable, In^{115} has a half-life of 6×10^{14} years and has a relative terrestrial abundance of 95.8%). Since neither the number of X subquarks (1010) nor the number of Y subquarks (1042) present in these nuclei is divisible by 6, the funnels cannot have the same subquark composition. Moreover, since neither of these numbers is divisible by 3, the three type A funnels cannot be identical and nor can the type B funnels be the same. The six funnels have the following composition:

type A (×2): 2A + B; type A (× 1): $2\tilde{A} + \tilde{B}$;
type B (× 1): A + 2B; type B (× 2): $\tilde{A} + 2\tilde{B}$,

where $\tilde{A}$ and $\tilde{B}$ are the mirror states of, respectively, A and B. For either type of funnel, one of the three funnels is the mirror state of the two others. The particles in the segments are identified below:

Segment A

In16 = 2mNe5 + Ad6 = 3X-2Y + 3Y-2X + u-d;

3Ga15 = 3(P9 + N6) = 4(2X)-Y + u-d + 2[4(2Y)-X + d-u];

3Ga20 = 3(2Be4 + 2H3 + Ad6) = 2[(4X + 4Y) + 2d + u-d] + (4Y + 4X) + 2u + d-u];

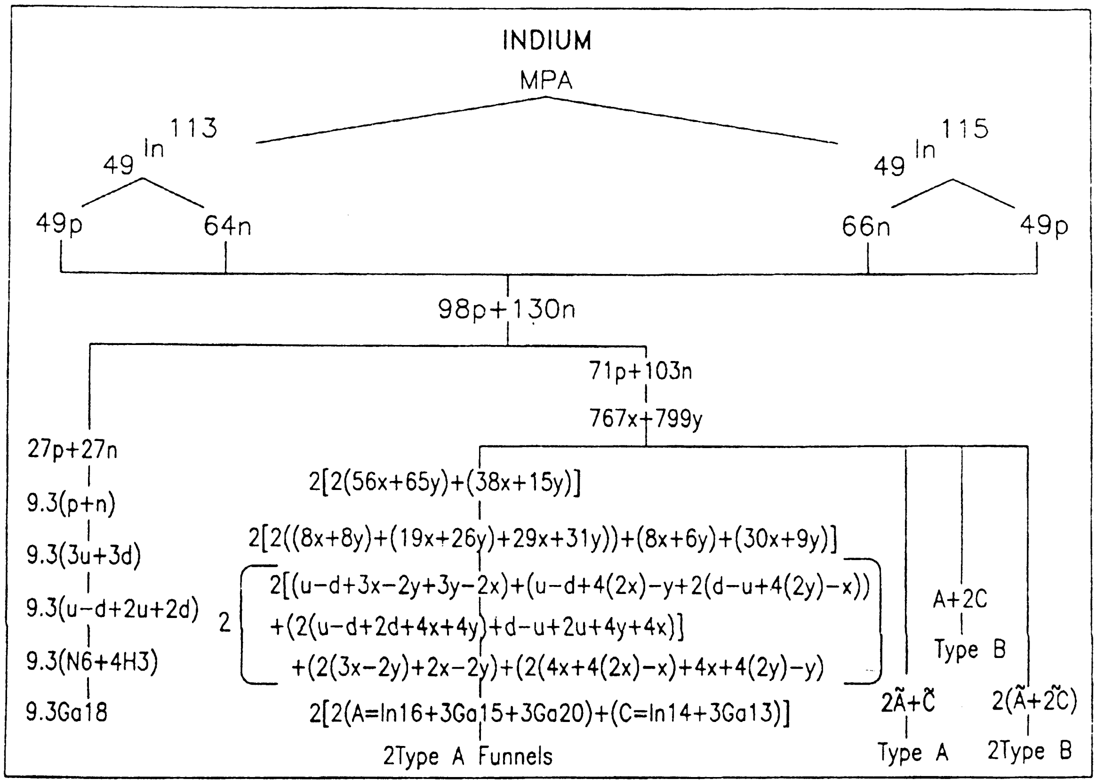


Figure 5.148

Segment $\tilde{A}$

As above, with X↔Y and u↔d. Notice that In$\widetilde{16}$ = In16;

Segment B

In14 = 2mNe5+ Li4 = 2(3X-2Y) + 2X-2Y;

3Ga13 = 3(P9 + Be4) = 2[4(2X)-X + 4X] + 4(2Y)-Y + 4X;

3Ga18 = 3(4H3 + N6) = 3(2u + 2d + u-d).

Segment $\tilde{B}$

As above, with X↔Y and u↔d. Notice that Ga$\widetilde{18}$ = Ga18.

The disintegration diagram (fig. 5.149) indicates that a Ga20 group may contain two d quarks as two (-) triplets, for the six (-) triplets shown at stage E2 originate from the three Ga20 groups, i.e. the observed group contains two (-) triplets. But the three groups are not similar in composition, as figure 5.149 implies (as we have already pointed out, Besant & Leadbeater generally did not bother to examine every member of a set of particles if they looked similar). The two Be4 groups in the Ga20 are a bound state of four X subquarks and a bound state of four Y subquarks. This is consistent with their products of disintegration, namely, two (+) duads (X-X) and two (-) duads (Y-Y). The Ad6 groups in the Ga20 are u-d diquarks.

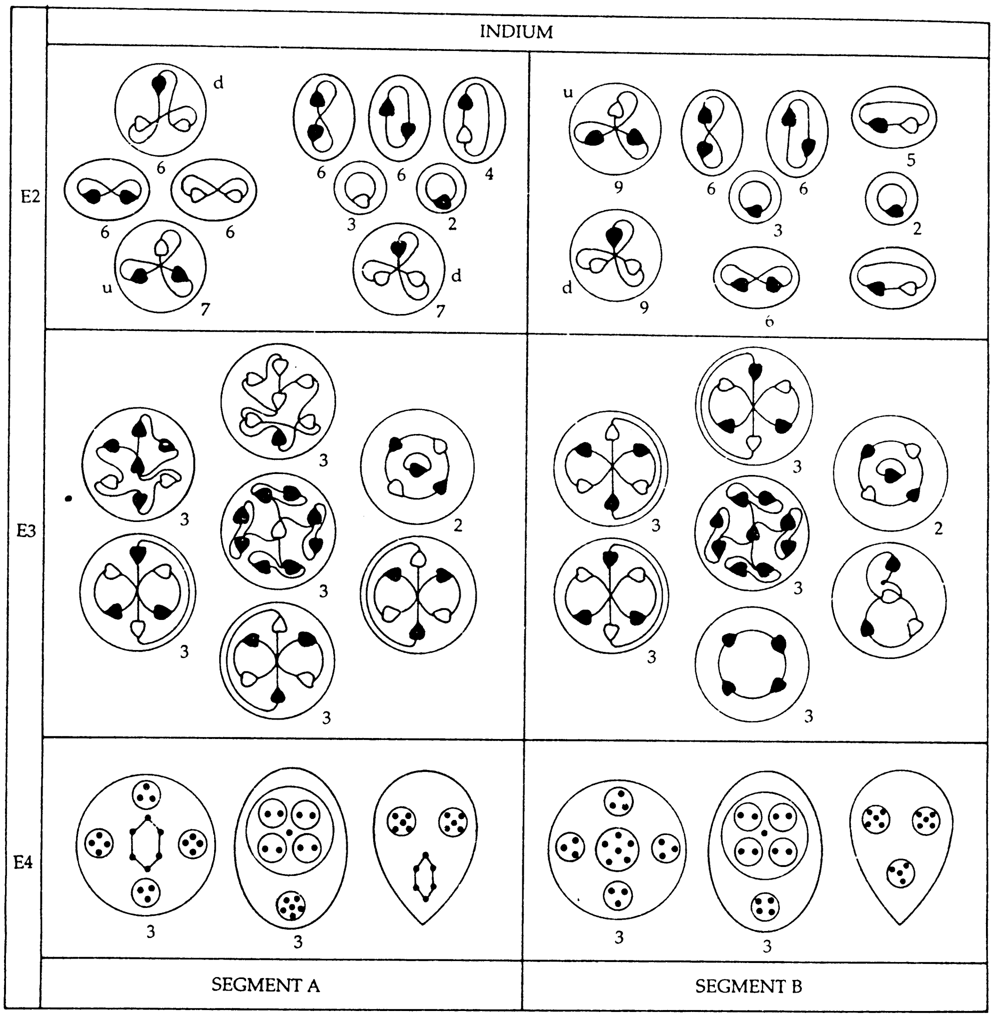


Figure 5.149

The two mNe5 groups in the In16 are actually mirror states of each other and, according to figure 5.149, split up into four (0) duads and two UPAs:

$$3X\text{-}2Y + 3Y\text{-}2X \rightarrow 4(X\text{-}Y) + X + Y.$$

The (6+6) (+) duads shown there must therefore originate from the three P9 groups, i.e. each of the four duads making up the P9 must be the (+) type (X-X). This agrees with the predicted composition of one of the P9 groups in segment A given above. But the three P9 groups do not have the same composition, two being the mirror state of the third.

The In14 group breaks up at stage E2 into (5+1) duads and two UPAs. This is consistent with the predicted composition of the In14 because

$$2(3X\text{-}2Y) + 2X\text{-}2Y \rightarrow 6(X\text{-}Y) + 2X.$$

The three Be4 groups in the three Ga13 groups are bound states of four X subquarks. This predicted composition is confirmed by figure 5.149, which shows that they break up into six (+) duads (X-X). The P9 in the Ga13 group breaks up into (2+2) (+) duads, i.e. four X-X disubquarks. This agrees with the composition given above for the P9 in two of the Ga13 groups. But the P9 groups do not have the same composition - as the diagram implies - because one is the mirror state of the two others.

The three Ga18 groups in segment B comprise three u quarks and three d quarks, in agreement with the products of disintegration of the former at the E2 stage, namely, nine (+) triplets (u quarks) and nine (-) triplets (d quarks).

Every detail of the indium MPA has been shown to be consistent with theory. The 2:1 division of the type A funnel and the 1:2 division of the type B funnel reflect the 2:1 and 1:2 ratio of the number of u and d quarks in, respectively, protons and neutrons and the number of X and Y subquarks in, respectively, u and d quarks.

Antimony MPA

The MPA (fig. 5.150) is a face-centred cubic array of six funnels, three of type A and three of type B. It differs from that of indium by, firstly, the substitution of an I7 group for the Ad6 group in the In16 group present in the indium MPA (thereby changing the In16 into an Sb17' group) and, secondly, the replacement of the central UPA in a P9 group belonging to the Ga13 and Ga15 groups by a triplet of UPAs (thereby turning these groups into, respectively, the Sb15 and Sb17 groups).

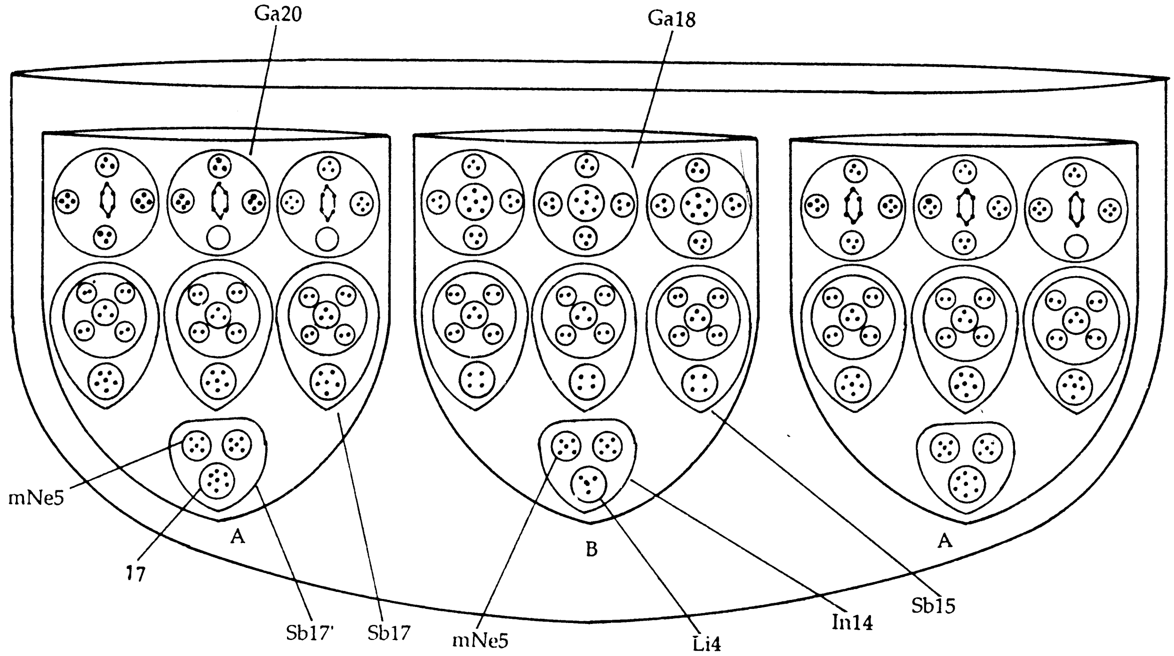


Figure 5.150

Antimony MPA = 3(2A+B) + 3(A+2B),

where

A = Sb128 = Sb17′ + 3Sb17 + 3Ga20,

and

B = Sb113 = In14 + 3Sb15 + 3Ga18.

The MPA (fig. 5.151) is formed from two Sb^{121} nuclei, which provide 2178 subquarks - nine more than the number of UPAs (although having a mass number smaller by one unit, the nuclide Sb^{120} is radioactive and short-lived and so could not have participated with the nuclide Sb^{121} in the formation of the MPA even though its number of predicted subquarks would then have been the same as its number of UPAs). Since neither the number of X subquarks (1070) nor the number of Y subquarks (1108) is divisible by 3, the three type A funnels containing two A segments and one B segment cannot be similar. Nor can the type B funnels containing one type A and two type B segments be the same. Like the indium MPA, the antimony MPA has six funnels with the following composition:

type A (× 2): 2A + B; type $\tilde{A}$ (× 1): $2\tilde{A} + \tilde{B}$;

type B (× 1): A + 2B; type $\tilde{B}$ (× 2): $\tilde{A} + 2\tilde{B}$.

The segments are identified below, using figure 5.151:

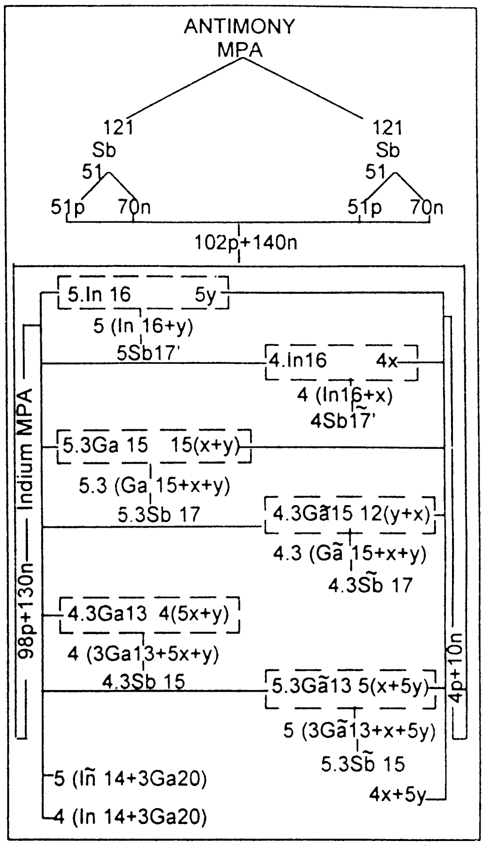


Figure 5.151

Segment A

Sb17′ ≡ I7 + 2mNe5 = Y + In16 = Y + 3X-2Y + 3Y-2X + u-d (= 3X-3Y),

→4X-3Y + 2(2X-3Y),

i.e. the I7 group is a 4X-3Y bound state. This agrees with the composition of the I7 found in many other MPAs;

3Sb17 = 3Ga15 + 3(X+Y) = [u-d + 4(2X)-Y + X + Y] + [2(d–u + 4(2Y)–X + Y + X)],

= u–d + 4(2X)–d + 2(d–u + 4(2Y)–u),

i.e. two Sb17 groups are the mirror state of the third. Ga20 has the composition given in the analysis of the indium MPA;

Segment $\tilde{A}$

As above, with X↔Y and u↔d.

Segment B

3Sb15 = 5X + Y + 3Ga13 = 5X + Y + 2[4X + 4(2X)-X] + 4X + 4(2Y)-Y
$\rightarrow$2[4X + 4(2X)-d] + 4Y + 4(2X)-d.

In14 and Ga18 have the compositions found for them in the analyses of the indium and gallium MPAs.

Segment $\tilde{B}$

As above, with X$\leftrightarrow$Y and u$\leftrightarrow$d.

Figure 5.152 confirms that the I7 group has the composition given above, for it indicates that the particle breaks up at stage E2 into two (+) triplets (u quarks) and a UPA:

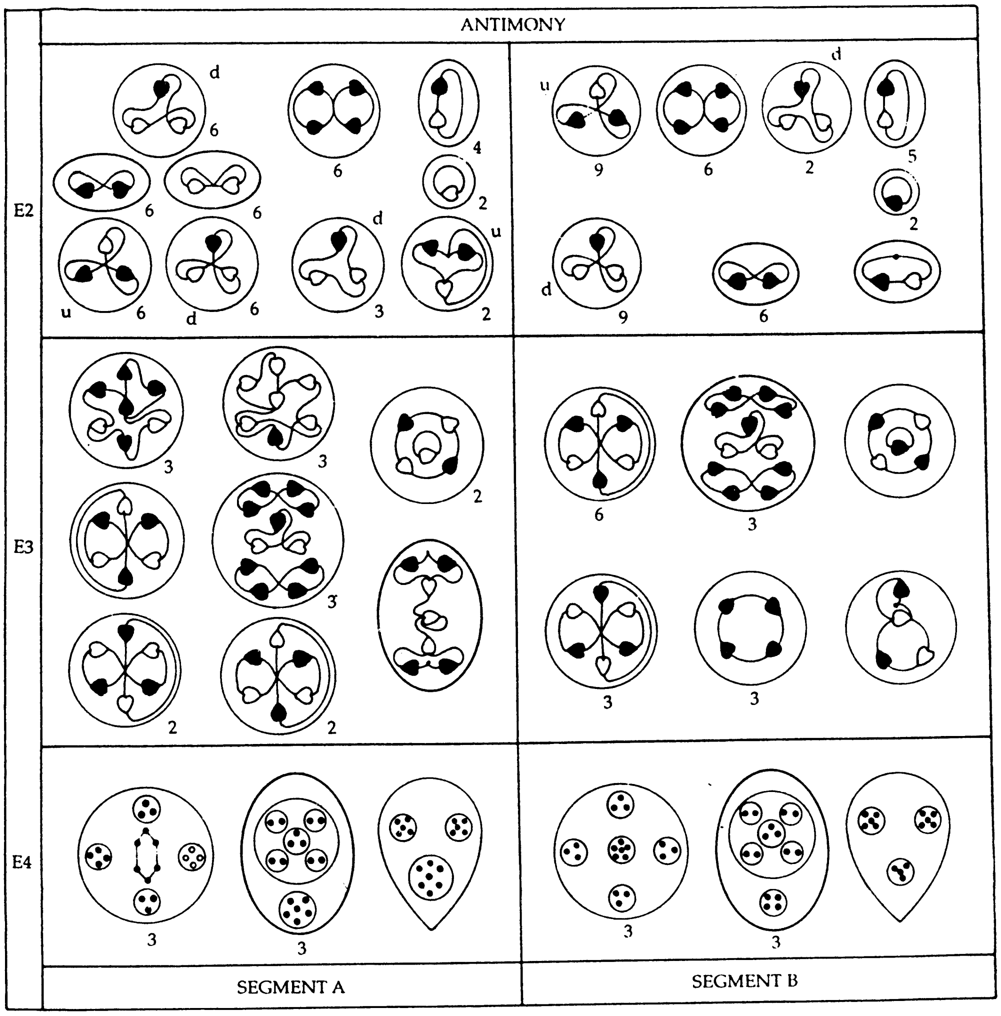


Figure 5.152

$$4X\text{-}3Y \rightarrow 2u(= 2X\text{-}Y) + Y.$$

That the Sb17 group contains a d quark at the centre of the P9 is confirmed by the (-) triplet shown at stage E2 with the number '3' attached to it (the Sb17 groups are not identical, however, one being the mirror state of the two others). That the Sb15 group in segment B also contains a d quark at the centre of the P9 is confirmed by the (-) triplet shown at stage E2 with the number '3' next to it (these, too, are not identical). Notice that the label '2' by the free UPA released at the E2 stage from the Sb17' group is wrong; it should be '3.' Figure 5.153 shows the compositions of the Sb15, Sb17 and Sb17' groups.

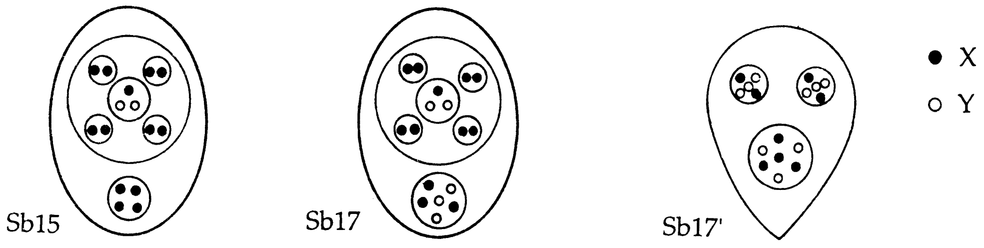


Figure 5.153

Four extra X subquarks and five extra Y subquarks should be in the MPA. As there are nine Sb17' groups and nine In14 groups, the missing UPAs can be only in either of these groups. Either an extra UPA was in the I7 of the Sb17', or more likely, there was another UPA in the In14, i.e. 4In14 → 4(In14 + X) and 5In14 → 5(In14 + Y). This, plausibly, went unnoticed if Leadbeater & Besant did not examine it in detail because they had observed it before. Notice that this would mean that there are predicted to be four 'true' In14 groups and five 'true' In14 groups. The fact that the extra numbers of X and Y subquarks in two Sb^{121} nuclei compared with two In^{115} nuclei still preserve - as required - the same particle/mirror state structure of the MPA:

$$MPA = 5A + 4B + 4\tilde{A} + 5\tilde{B},$$

as that found in the indium MPA is very significant because, as is now shown, it implies that protons must consist of five positively charged subquarks and four negatively charged subquarks. Since the MPA has the form:

$$MPA = 5C + 4\tilde{C},$$

where $C \equiv A + \tilde{B}$, and the four extra protons and ten extra neutrons provide 126 extra subquarks, fourteen per group C or $\tilde{C}$, there are n X and m Y subquarks in a group $\tilde{C}$ if C contains m X subquarks and n Y subquarks (n + m = 14). Hence:

$$\text{total number of extra X subquarks} = 5m + 4n = 56 + m,$$

$$\text{total number of extra Y subquarks} = 5n + 4m = 70 - m.$$

Suppose that a proton contains p X subquarks and q Y subquarks and a neutron contains q X subquarks and p Y subquarks, where, by definition, X is positively charged and Y is negatively charged. Therefore:

$$56 + m = 4p + 10q$$
$$70 - m = 10p + 4q,$$

that is,

$$6p = 34 - m.$$

Since $0 \leq m \leq 14$, possible solutions are $p = 4$ or 5 ($m = 10$ or 4) and $q = 5$ or 4, respectively. But $p = 4$ is forbidden because it implies - contrary to definition - that subquark X has the negative electric charge -4/9 and that Y has the positive charge 5/9. Hence $p = 5$ and $q = 4$, that is, a proton must contain five X and four Y subquarks and a neutron must contain four X and five Y subquarks in order that the antimony and indium MPAs have the same particle/mirror state structure.

Now suppose that the u quark is made up of r X subquarks and (3-r) Y subquarks and that the d quark is made up of s Y subquarks and (3-s) X subquarks ($1 \leq r, s \leq 3$). Then, since a proton contains two u quarks and one d quark and a neutron contains one u quark and two d quarks:

$$2r + 3 - s = 5,$$

and

$$2(3-s) + r = 4,$$

the solution of which is $r = s = 2$. The subquark composition: u = 2X-Y, d = 2Y-X, which is used throughout this paper, has thus been deduced from the assumption that the neutron is the mirror state of the proton.

5.14 Octahedron group A

Carbon MPA

The carbon MPA (fig. 5.154) is an octahedral array of eight funnels that project from a central sphere containing four free UPAs. The funnels are of two types: four C27 funnels (fig. 5.155) each contain three Ad6 groups, two linear H3' triplets and one H3 triplet; four C26 funnels each contain two Ad6 groups, one B5 group, two H3 triplets and one H3' triplet. In the C27 funnel the H3 triplet lies between the two H3' triplets; in the C26 funnel the H3' triplet lies between the two H3 triplets.

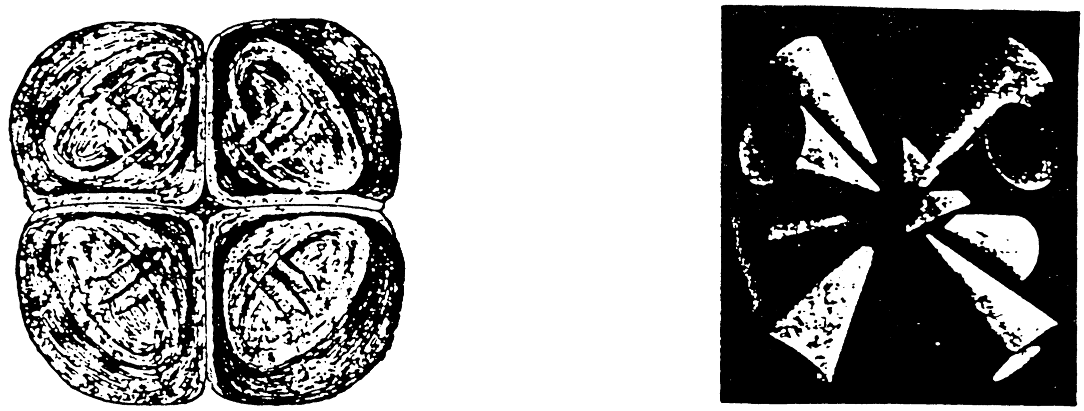


Figure 5.154 : Carbon MPA

Carbon MPA = 4 + 4C27 + 4C26.

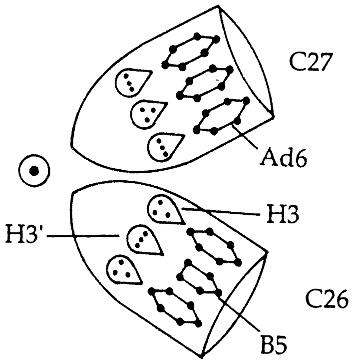


Figure 5.155 : A pair of C27 and C26 funnels.

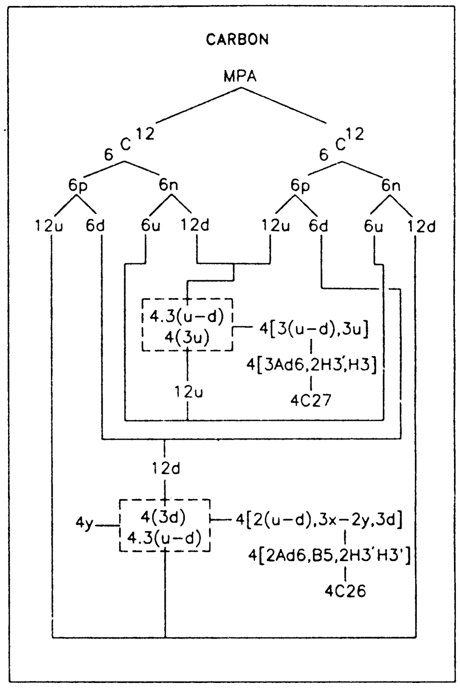


Figure 5.156

The MPA is formed (fig. 5.156) from two C^{12} nuclei, which provide 216 subquarks - the same number as the number of UPAs. These make up thirty-six u quarks and thirty-six d quarks, of which twenty-four u quarks and twelve d quarks form the particles in the C27 funnels and of which twenty-four d quarks and twelve u quarks form the particles in the C26 funnels and the four UPAs linking a pair of C26 and C27 funnels. But for these linking UPAs, a C27 would be the mirror state of a C26. In fact - apart from the B5 group in the C26, which has no counterpart in the C27 - each particle in one type of funnel is the mirror state of its counterpart in the other type.

In each of the C27 funnels there are three u-d diquarks (Ad6) and three u quarks (2H3' + H3). These have a total electric charge of +3. The four C27 funnels therefore have a charge of +12. As the MPA is formed from two carbon nuclei with twelve protons, it has a charge of +12, i.e. the total electric charge of the particles in the four C27 funnels is the *same* as that of the two parent carbon nuclei. Each of the remaining identical funnels would therefore contain twenty-seven UPAs with a total charge of zero if the MPA had no central core. But, as was pointed out in ESPQ,[29] the total electric charge of the particles in a funnel cannot be zero because, when an MPA is formed from the nuclei of two atoms, the subquarks released from each nucleus interact electromagnetically with the valence electrons of both atoms. This coupling attracts the subquarks into different regions of space, divides them up and leads to separate sets of bound states of subquarks within funnels, the number of such sets being determined by the number of valence electrons belonging to each original atom, thus explaining the correlation between the shapes of MPAs and the position of their elements in the periodic table, which depends upon the valency of the latter. Hence, one or more UPAs of *negative* charge must be absent from a funnel of zero net charge in order to leave the other particles in the funnel with a net positive charge, which they must have in order for the electromagnetic coupling between subquarks freed from the two atomic nuclei and valence electrons to lead to aggregation of the former into funnels. According to *Occult Chemistry*: 'In the centre of the octahedron is a globe containing four Anu, each within its own wall; these lie on the dividing lines of the faces and each holds a pair of funnels together. It seems as though this Anu had been economically taken from one Ad6 in the funnels, to form the link.'[30] Since it is 'within its own wall,' it must be a free subquark, that is, one which is not bound by strings to any subquarks in the funnels. The particles in each pair of funnels must therefore be bound by *electromagnetic* forces to their single UPA nucleus, so that, as the C27 funnel is positively charged, the UPA must be negatively charged, i.e. it must be a Y subquark (fig. 5.157). This prediction is confirmed by the disintegration diagram (fig. 5.158) of a pair of funnels for the following reason: it shows that the B5 group breaks up at stage E2 into a (-) triplet (d quark) and a (+) duad (X-X). As all the Ad6 groups should be u-d diquarks (this is confirmed by figure 5.158, which shows that the five Ad6 groups break up at stage E2 into five (+) triplets (u quarks) and five (-) triplets (d quarks)), the UPA 'economically taken from one Ad6' must be a negatively charged Y subquark because

$$u\text{-}d\ [= (2X\text{-}Y)\text{-}(X\text{-}2Y)] \rightarrow 3X\text{-}2Y + Y$$

and

$$3X\text{-}2Y \rightarrow X\text{-}2Y\ (= d) + X\text{-}X.$$

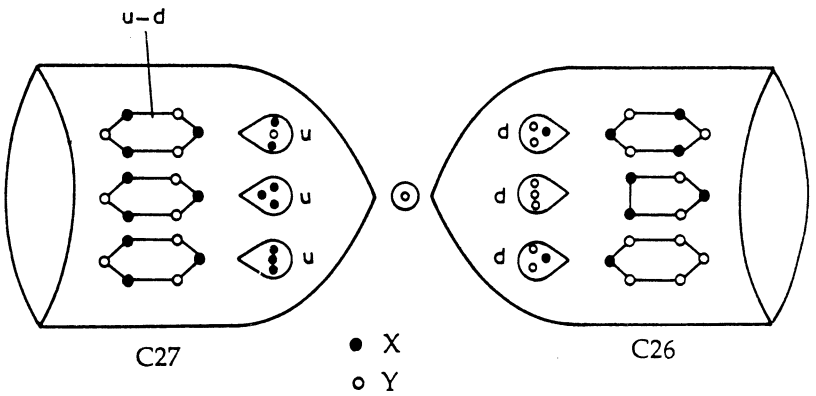


Figure 5.157

Notice that, according to figure 5.158, the three H3 triplets in a pair of funnels break up at stage E2 into three (0) duads and three UPAs. This is consistent with the basic identification of a (0) duad as an X-Y bound state and with these triplets being d quarks, that is, X-2Y bound states:

$$d\ (= X\text{-}2Y) \rightarrow X\text{-}Y + Y.$$

Titanium MPA

The MPA (fig. 5.159) consists of a central globe with a ring of twelve ovoids around it and four arms in the shape of a cross. The globe contains an Ne120 group at the centre of which

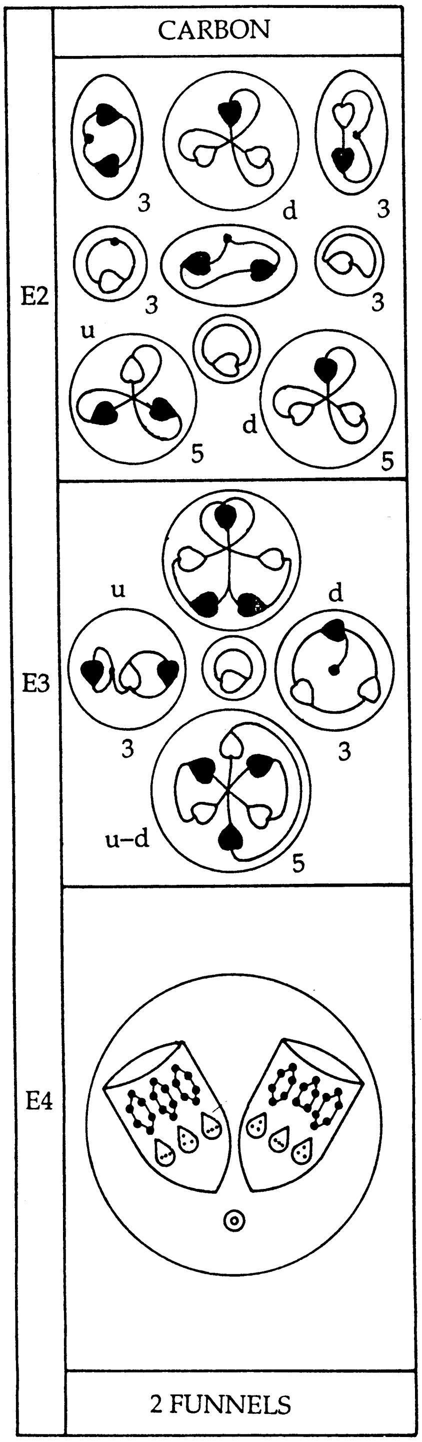


Figure 5.158

there is a UPA in the middle of a ring of seven UPAs. Each ovoid (Ti14) contains two quartets and a sextet of UPAs. Each arm encloses a pair of C26 and C27 funnels linked by a UPA, as well as a Ti88 group, which consists of, firstly, two spheres, each containing a quintet and four triplets of UPAs, and, secondly, two spheres enclosing a septet, four linear hydrogen triplets (H3′) and two Li4 groups.

Titanium MPA = (Ne120 + 8) + 12Ti14 + 4(Ti88 + C26 + C27 + 1).

The MPA (fig. 5.160) is formed from two Ti^{48} nuclei, which provide 864 subquarks - the same as the number of UPAs. Twelve protons and twelve neutrons form the carbon MPA present in the arms. As found for many other MPAs, the Ne120 group is a tetrahedral array of twenty u-d diquarks, as is confirmed by the disintegration diagram (fig. 5.161), which shows that the Ne120 breaks up at stage E2 into twenty (+) triplets (u quarks) and twenty (-) triplets (d quarks). The ring of seven UPAs consists of three X subquarks and four Y subquarks. This is consistent with its break-up at stage E2 into three (0) duads (X-Y) and a UPA (Y subquark). The UPA at the centre of the ring is an X subquark.

The Ti14 group is made up of bound states of four X subquarks and four Y subquarks and a 3X-3Y bound state, as is shown in figure 5.161 by the break-up of the quartets into two (+) duads (X-X) and two (-) duads (Y-Y) and by the break-up of the sextet of UPAs into a (+) triplet (u quark = 2X-Y) and a (-) triplet (d quark = 2Y-X). In the Ti88 group the two spheres containing four triplets and a quintet of UPAs are identified as enclosing (in one) a bound system of two u quarks, two d quarks and an X-4Y bound state, and (in the other) their mirror states: two d quarks, two u quarks and a Y-4X bound state. The spheres are made up of four u quarks and four d quarks. These are the four (+) triplets (b) and four (-) triplets (a) shown in figure 5.161. The quintet (c+d) is the X-4Y bound state, breaking up into a (-) duad (d), i.e. a Y-Y disubquark, and a triplet (c), i.e. a d quark:

X-4Y → Y-Y + d (= X-2Y).

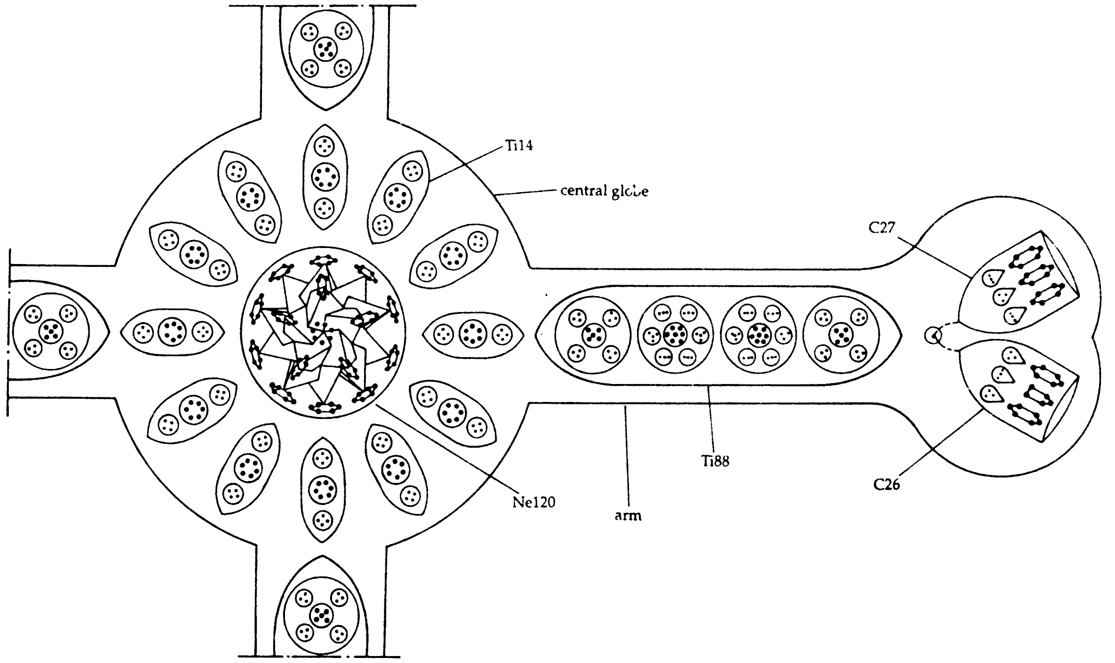


Figure 5.159 : Central globe and one arm of the titanium MPA.

In both spheres the septet, four triplets and two Li4 groups consist of, respectively, a d-(2X-2Y) bound state, two u quarks and two d quarks, and an X-3Y and a Y-3X bound state. Figure 5.161 confirms these predicted compositions, showing that the spheres break up into four (+) triplets (4f), i.e. four u quarks, four (-) triplets (4e), i.e. four d quarks, two (-) Li4 groups (g), which further break up into two UPAs and two (-) triplets (2g), i.e. two d quarks:

$$2(X\text{-}3Y) \rightarrow 2d(= 2Y\text{-}X) + 2Y,$$

and, finally, two (+) Li4 groups (h), which break up into two (+) triplets (2h), i.e. two u quarks, and two UPAs:

$$2(Y\text{-}3X) \rightarrow 2u(= 2X\text{-}Y) + 2X.$$

The two septets (j+k) break up into two (-) triplets (2k), i.e. two d quarks, and two quartets (2j), that is, two 2X-2Y bound states, thus confirming their identification as d-(2X-2Y) bound states:

$$2[d\text{-}(2X\text{-}2Y)] \rightarrow 2d + 2(2X\text{-}2Y).$$

All the observational details of the titanium MPA have been shown to be consistent with theoretical predictions about their composition in terms of X and Y subquarks.

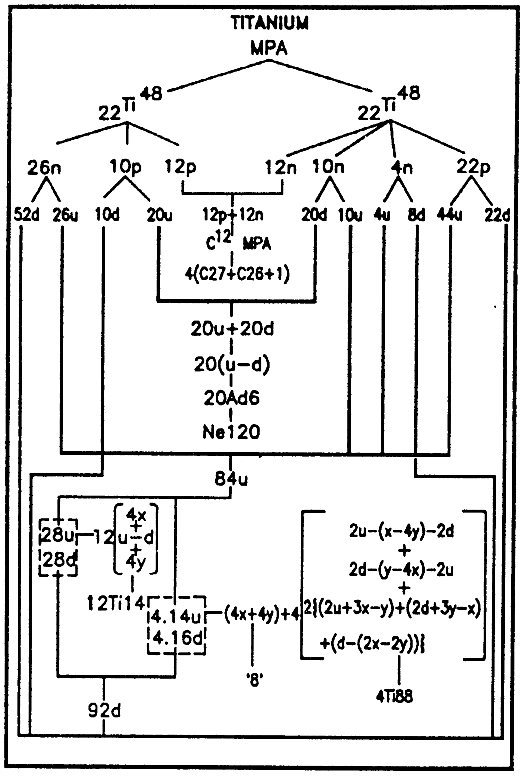


Figure 5.160

Zirconium MPA

The MPA (fig. 5.162) consists of a central globe (Ne120+8) similar to that in the titanium MPA, twelve ovoids (Zr36), each containing two quartets, two sextets and a globe enclosing four quartets of UPAs, and finally, four arms, each of which contains an ovoid (Zr212) and a pair of C26 and C27 funnels linked by a single UPA. The Zr212 consists of a Ti88 group and a sphere that encloses, firstly, a central globe containing an Ad6 group, two triplets and two quartets of UPAs and, secondly, eight smaller globes, each containing a B5 group and four duads of UPAs.

MPA = (Ne120+8) + 12Zr36 + 4(Zr212 + C26 + C27 + 1).

The MPA is formed (fig. 5.163) from two Zr^{90} nuclei, which provide 1620 subquarks - four fewer than the number of UPAs (having the greatest terrestrial abundance of the zirconium nuclides, the Zr^{90} most likely formed the MPA). The symmetry of the Zr212 group with respect to the arrangement of its constituents makes an overcounting by one of the UPAs in each of the four groups highly unlikely. This is also true for the Zr36 group which, because of its 12-fold arrangement about the central Ne120, would have led to a discrepancy between numbers of subquarks and UPAs that is a multiple of 12 if its UPAs had been wrongly observed. Nor is the discrepancy of four too many UPAs likely to be due to misobservation of the group of eight UPAs in the central globe because any deviation from the central globe of the titanium MPA would have been noticed by Besant & Leadbeater. The most probable explanation of the discrepancy is that the two carbon funnels in each of the four arms do not have their linking UPA (Besant & Leadbeater could have assumed this without checking). This feature would not be unique to the zirconium MPA because the elements cerium and hafnium, which follow zirconium in Octahedron Group A, have MPAs with funnels containing a pair of C26 and C27 funnels which were reported[31] to be without their linking UPAs.

The subquarks in twenty-four protons and twenty-four neutrons form the twelve Zr36 groups. The two quartets of UPAs at the ends of the Zr36 ovoid are bound states of four X subquarks and four Y subquarks (fig. 5.164). The disintegration diagram (fig. 5.165) confirms this by showing that they break up at stage E2 into two (+) duads of UPAs (X-X) and two (-)

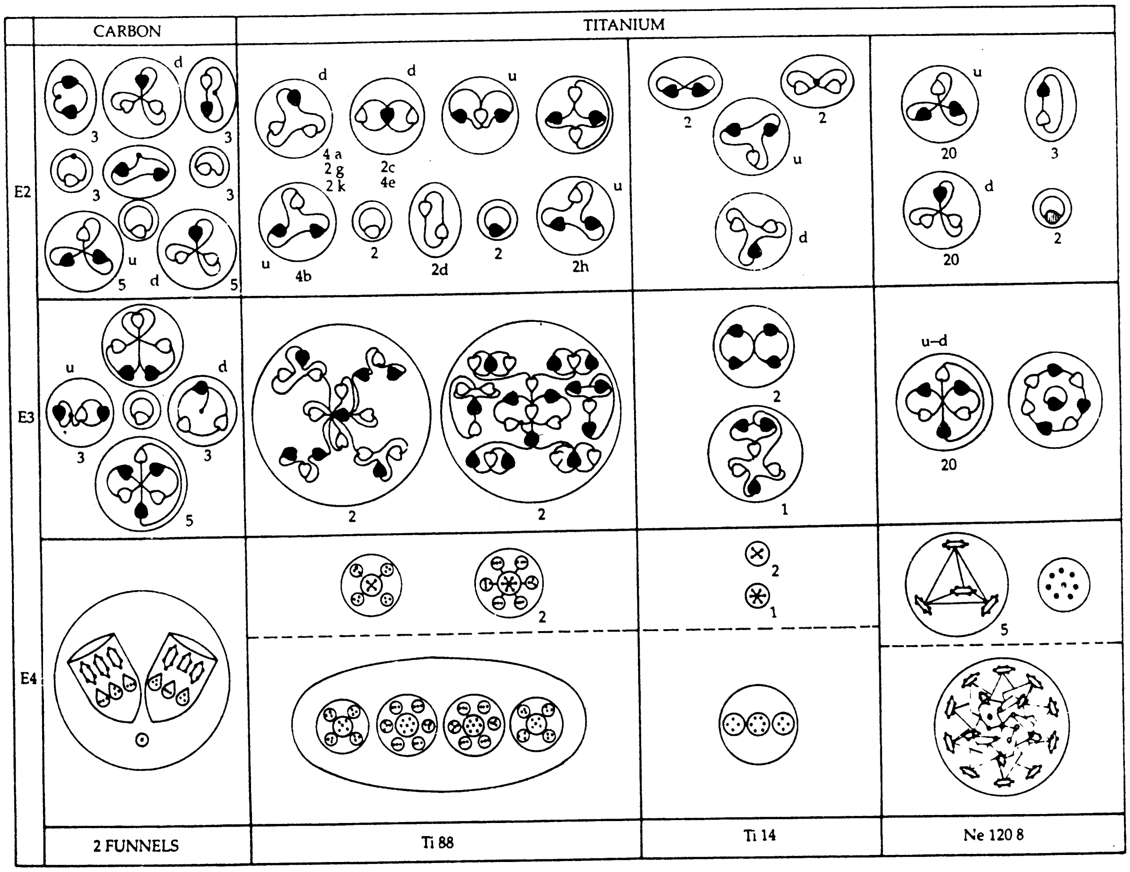


Figure 5.161

duads (Y-Y). Each of the sextets is a 3X-3Y bound state, as is indicated in figure 5.165 by their breaking up into two (+) triplets (u quarks) and two (-) triplets (d quarks):

$$2(3X\text{-}3Y) \rightarrow 2u(= 2X\text{-}Y) + 2d(= 2Y\text{-}X).$$

The two (+) quartets and the two (-) quartets in the central globe of the Zr36 are bound states of, respectively, four X subquarks and four Y subquarks. This is partly confirmed by their disintegration into two (+) duads (X-X) and two (-) duads (Y-Y). The other duads released at the E2 stage rarely appear in disintegration diagrams and cannot be readily identified in terms of X and Y subquarks because they do not conform to the convention whereby Besant & Leadbeater represented positive and negative groups by depicting their UPAs pointing, respectively, away from and towards one another.

As found for many MPAs, the Ne120 group is a bound state of twenty u-d diquarks. As found for the titanium MPA, the four Ti88 groups and the group of eight UPAs in the Ne120 are formed from fifty-six u quarks and sixty-four d quarks. Of the eight globes in the Zr212 group, four contain two X-X disubquarks, two Y-Y disubquarks and a d-2X bound state and

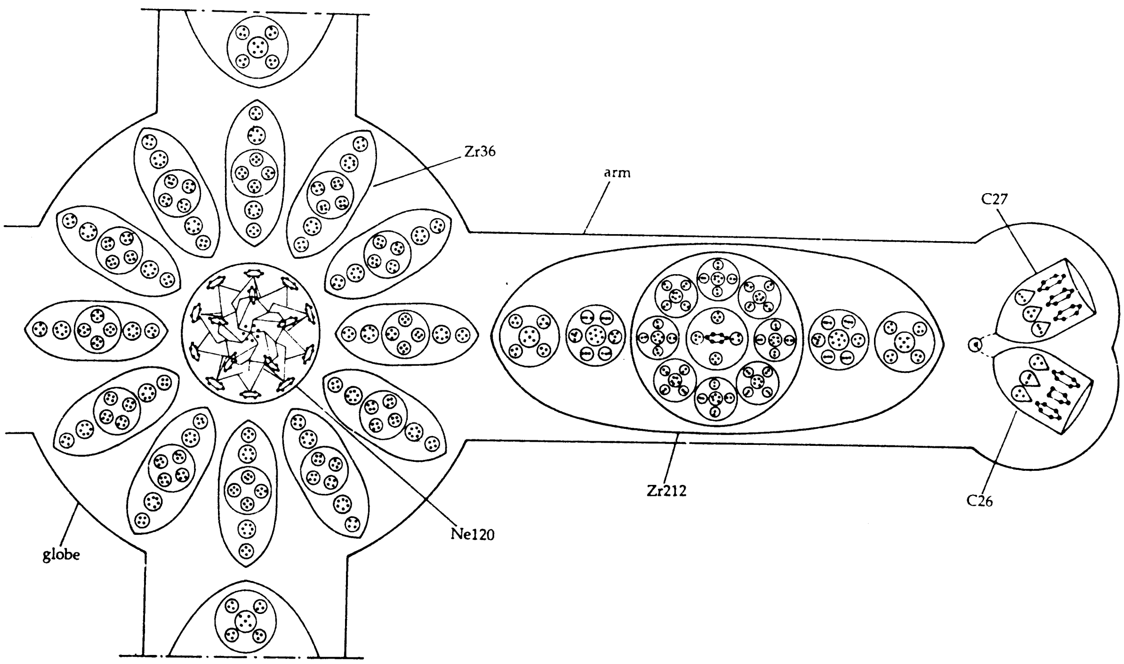


Figure 5.162 : Central globe and one arm of the zirconium MPA.

four contain two Y-Y disubquarks, two X-X subquarks and an u-2Y bound state, i.e. four globes contain particles which are the mirror states of the particles in the other four globes. There are sixteen X-X and Y-Y disubquarks in the eight spheres surrounding the central globe in the Zr212 group. These are, respectively, the sixteen (+) duads and sixteen (-) duads shown in figure 5.165 to be released at the E3 stage. The B5 group at the centre of each of the eight globes is a d-2X bound state, for it breaks up at the E2 stage into a (-) triplet (d quark) and a (+) duad (X-X). The Ad6 group at the centre of the central globe is a u-d diquark, as is confirmed by its breaking up at the E2 stage into a (-) triplet (d quark) and one of the two (+) triplets (u quarks) shown in figure 5.165. The other (+) triplet and one of the nine (-) triplets released at the E2 stage originate in the bound state of six UPAs formed at the E3 stage from the two triplets in the central globe. This agrees with prediction (see figure 5.163), for the triplets should be a u quark ((+) triplet) and a d quark ((-) triplet). The two quartets in the central globe of the Zr212 comprise a 2X-2Y bound state and a bound state of four Y subquarks, the latter particle also appearing in figure 5.163 at stage E3 as one which is released from the central sphere of the Zr36 group and which breaks up into two (-) duads (Y-Y), thus demonstrating consistency in the analysis.

All the particles present in the zirconium MPA have been shown to be consistent with theory.

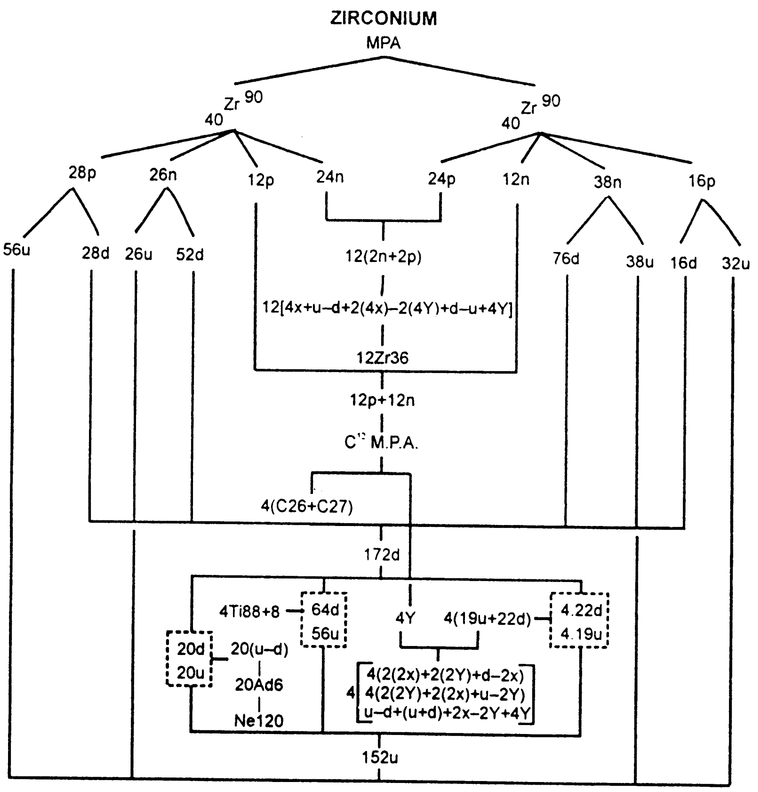


Figure 5.163

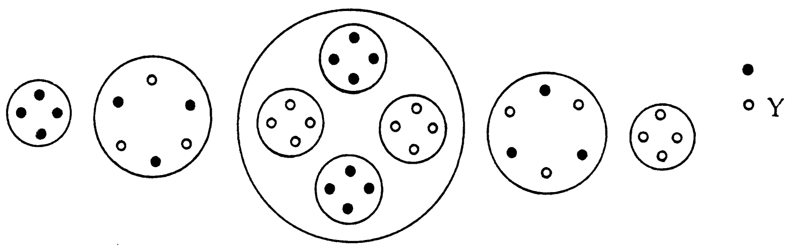


Figure 5.164 : Zr36 group.

5.15 Octahedron group B

Silicon MPA

The silicon MPA (fig. 5.166) consists of eight funnels directed towards the faces of an octahedron. Each funnel contains a B5 group and four ovoids (Si15), each enclosing an Ad6 group, a group of four UPAs and a group of five UPAs similar to that in the middle of an Al9′ group.

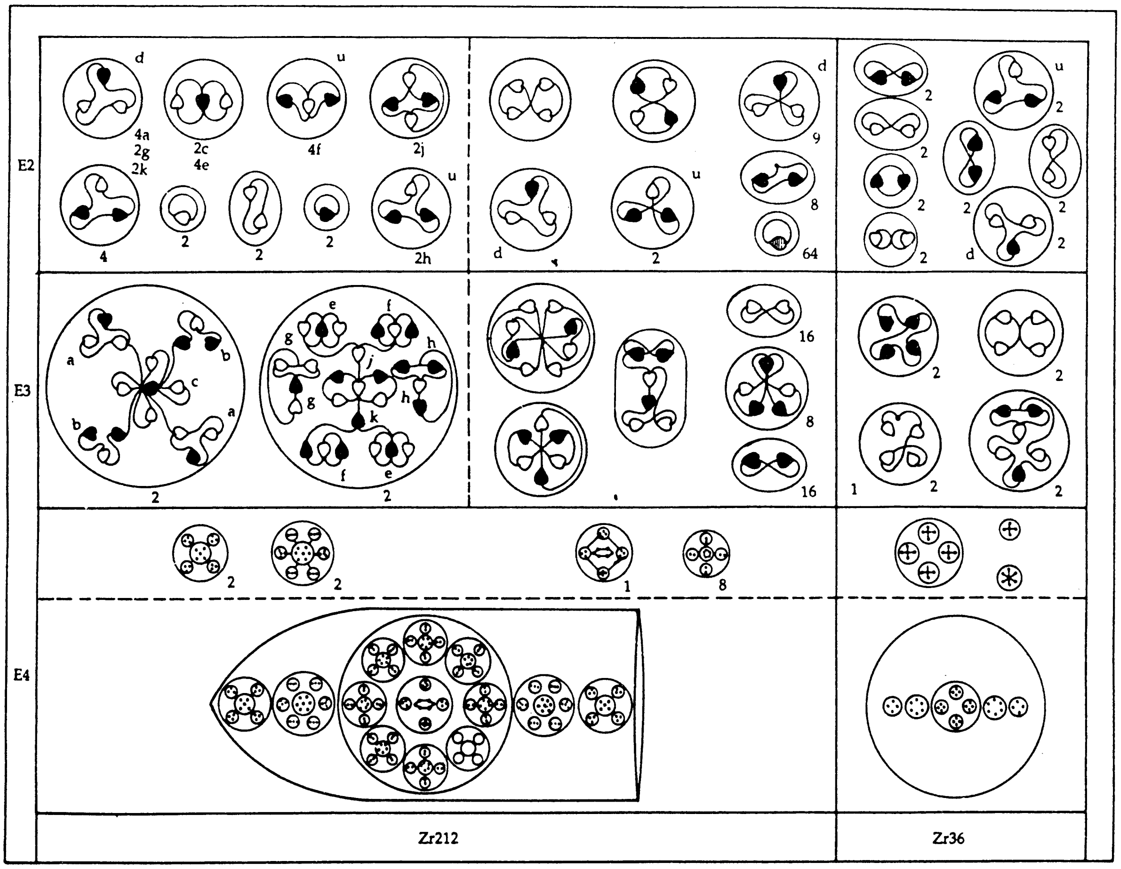


Figure 5.165

Silicon MPA = 8(B5 + 4Si15).

The MPA is formed (fig. 5.167) from two nuclei of Si^{28} (the most abundant of the isotopes of silicon), which provide 504 subquarks - sixteen fewer than the number of UPAs. Thirty-two u quarks and thirty-two d quarks form thirty-two u-d diquarks (Ad6), four to a funnel (fig. 5.168). The disintegration diagram (fig. 5.169) confirms that the four Ad6 groups are u-d diquarks because it shows that they break up at stage E2 into four (+) triplets (u quarks) and four (-) triplets (d quarks). The B5 groups in four funnels are bound states of three X subquarks and two Y subquarks, in agreement with the analysis of the boron

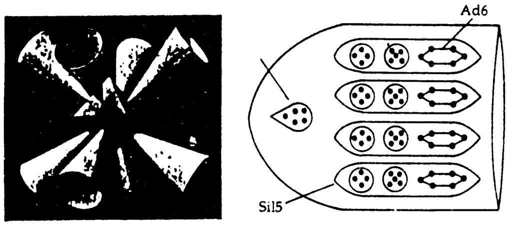


Figure 5.166 : Silicon MPA

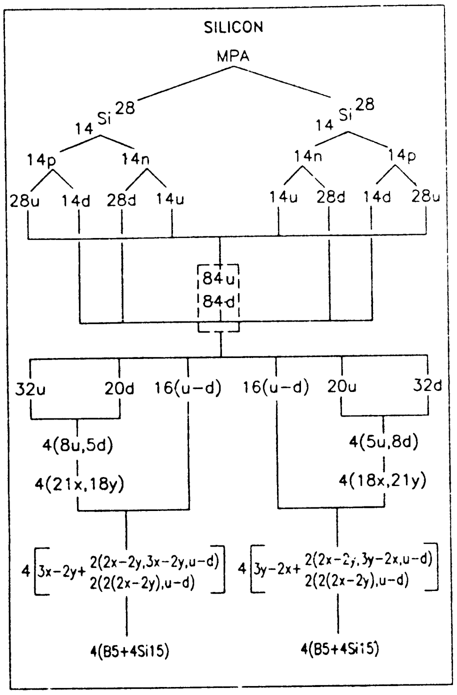


Figure 5.167

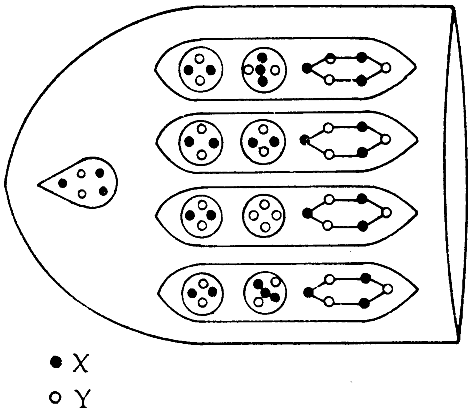


Figure 5.168 : Predicted funnel of the silicon MPA.

MPA. This is confirmed by figure 5.169, which indicates that a B5 group breaks up at the E2 stage into a (-) triplet (d quark) and a (+) duad (X-X):

3X-2Y → d quark (= X-2Y) + X-X.

In the other four funnels they are the mirror state $\tilde{B}5$, which is a bound state of two X subquarks and three Y subquarks. The group of four UPAs is a 2X-2Y bound state. This composition cannot be tested by means of the disintegration diagram because it indicates that the group of four UPAs combines with the group of five UPAs at the E3 stage, the resulting bound state then breaking up into a group of six UPAs and a triplet of UPAs, so that the break-up of the group of four UPAs was never observed.

In two Si15 ovoids belonging to each of four funnels, the group of five UPAs consists of three X subquarks and two Y subquarks; in the other two there should be two quartets of UPAs (either two (2X-2Y) or 4X and 4Y) instead of two groups of five. In the other four funnels the group of five UPAs in two Si15 ovoids consists of three Y subquarks and two X subquarks, i.e. it is the mirror state of that in the second set of four funnels, whilst the other two Si15 ovoids also contain quartets of UPAs (either two (2Y-2X) or 4Y and 4X). The particles in four funnels are the mirror states of their corresponding particles in the remaining funnels. Sixteen too many UPAs are present in the MPA due to an overcounting of two UPAs in each funnel, there being two groups of five and two groups of four instead of four groups of five UPAs in the Si15 ovoids of each funnel. Such an error could have happened if Besant & Leadbeater, having examined one Si15 ovoid in detail, made only a cursory observation of the others, assuming that they were similar, and thus overlooked the absence of one UPA in two of them.

Germanium MPA

The MPA (fig. 5.170) consists of a central globe, which contains a small sphere of four UPAs (Be4) and two intersecting Ad24 tetrahedra, and an octahedral array of eight similar funnels. Each funnel consists of four similar segments (Ge39) containing three Ge11 ovoids and an Ad6 group. The Ge11 ovoid encloses two triplets and a quintet of UPAs (mNe5).

Germanium MPA = (Be4 + 2Ad24) + 8(4Ge39).

The MPA (fig. 5.171) is formed from two Ge^{72} nuclei, which provide 1296 subquarks - four fewer than the number of UPAs. The overcounting of UPAs by four cannot be due to an error of observation of the Ge39 group because there are thirty-two of these groups in the MPA and any miscounting of their UPAs in one would lead to a total discrepancy that is a multiple of 32 provided that no other errors were made. The central globe, therefore, must contain the predicted mistake. There are two possibilities: either the Be4 group is not actually present or one of the Ad24 groups is actually a tetrahedral array of four B5 groups like that present in the central globe of the boron MPA. Either possibility is compatible with theory because the subquarks in eight u quarks and eight d quarks forming the particles in the central globe (see figure 5.171) can build either two bound states of four u-d diquarks (2Ad24) or, instead, one Ad24, two B5 groups (d-2X), two B5 groups (u-2Y) and one Be4 group (2X-2Y). It seems more likely that a B5 group was misidentified as an Ad6 group than that a quartet of UPAs was described that should not have been in the central globe. The fact that the predicted composition of the Be4 is consistent with the disintegration diagram (fig. 5.172), which shows that it breaks up into a (+) duad (X-X) and a (-) duad (Y-Y), makes the former possibility all the more probable. It will be assumed, therefore, that one of the Ad24 groups is actually a group of four B5 groups. The four Ge39 segments have the following composition:

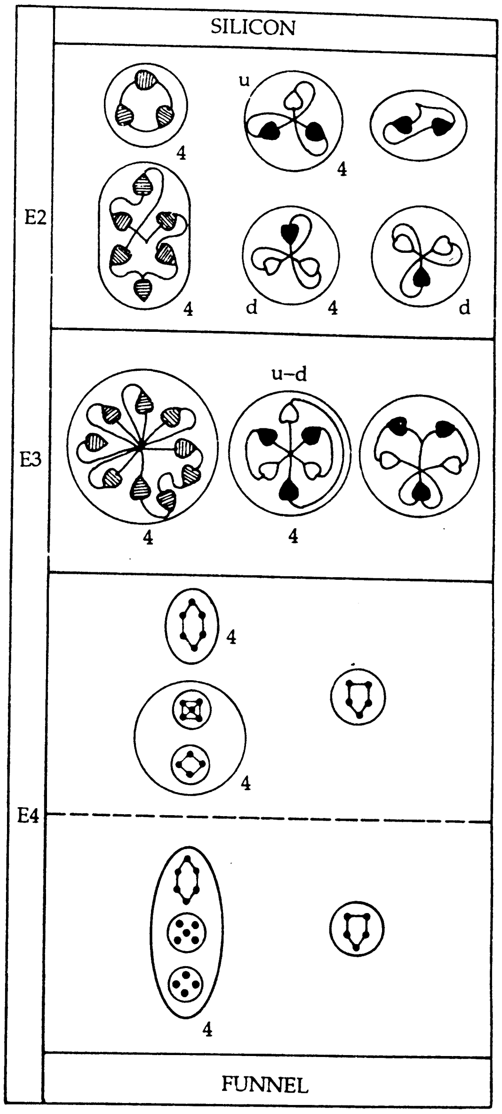


Figure 5.169

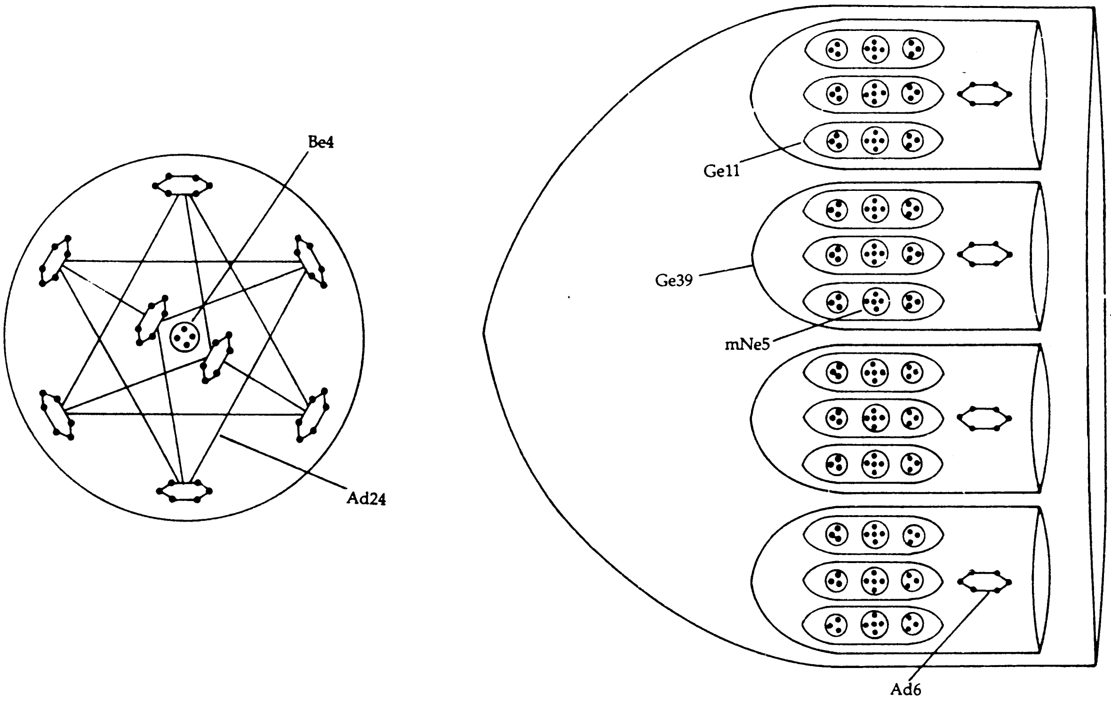


Figure 5.170 : Central globe and a funnel of the germanium MPA.

$$\text{Ge39} \ (\times 1): (u + 2X\text{-}3Y + u) + 2(u + 2Y\text{-}3X + u) + u\text{-}d;$$

$$\text{G}\tilde{\text{e}}\text{39} \ (\times 3): (u + 2Y\text{-}3X + u) + 2(d + 2X\text{-}3Y + d) + d\text{-}u,$$

i.e. three segments are the mirror state G$\tilde{\text{e}}$39 of the other one. In six Ge11 groups the two triplets are u quarks; in the other six groups they are d quarks. The former type is shown in figure 5.172, the two (+) triplets released at the E2 stage being u quarks and the (-) mNe5 group being a 2X-3Y bound state, as previous analyses of many MPAs containing this group have revealed. It is likely that Besant & Leadbeater did not examine all twelve Ge11 groups to determine whether they were all similar in terms of their positivity and negativity but that they examined only one group and assumed the rest were similar. Hence the twenty-four (+) triplets indicated at stage E2 in figure 5.170 should, instead, be twelve (+) and twelve (-) triplets.

Tin MPA

The MPA (fig. 5.173) consists of a central globe containing an Ne120 group, an octahedral array of eight funnels, each of which contains four Ge39 segments, and six spikes (Sn126), which point towards the six corners of the octahedron. In each spike are three pillars (Sn35) and a cone containing twenty-one UPAs (Ag21). A pillar consists of two triplets, two mNe5 groups, two sextets of UPAs and an I7 group.

$$\text{Tin MPA} = \text{Ne120} + 8(4\text{Ge39}) + 6\text{Sn126}.$$

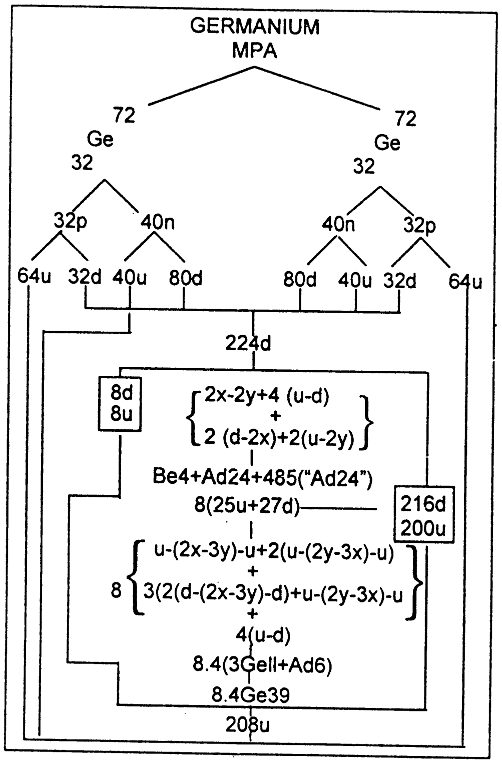


Figure 5.171

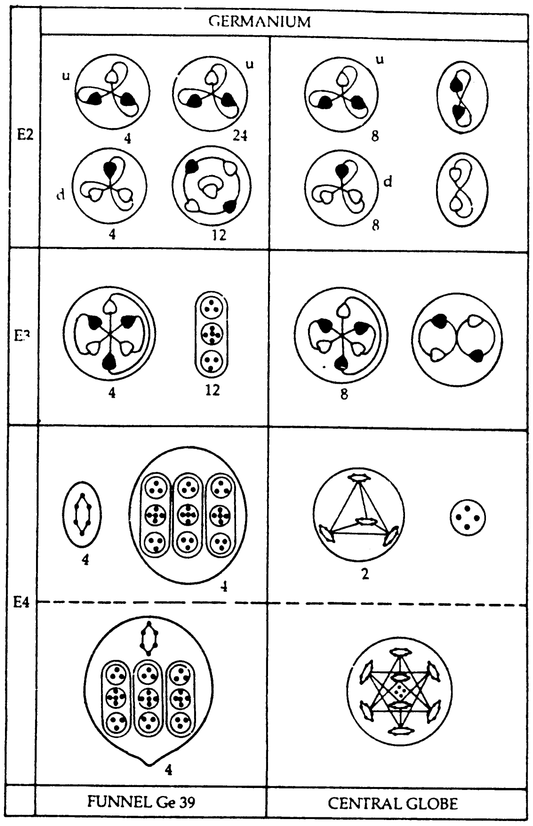


Figure 5.172

The MPA is formed (fig. 5.174) from two Sn^{118} nuclei, which provide 2124 subquarks - the same number as the number of UPAs. As found for many MPAs, the Ne120 group is a bound system of twenty u-d diquarks. The disintegration diagram (fig. 5.175) confirms this composition, showing that the group breaks up at stage E2 into twenty (+) triplets (u quarks) and twenty (-) triplets (d quarks). As found for the germanium MPA, 200 u quarks and 216 d quarks form the thirty-two Ge39 segments.

The remaining 122 u quarks and 130 d quarks form the particles in the spikes, which cannot be identical because neither the 394 X subquarks nor the 382 Y subquarks making up these quarks can be distributed equally among them. Four spikes are the mirror states ($Sn\tilde{126}$) of the other two. The three pillars in the Sn126 consist of two Sn35 groups and one $Sn\tilde{35}$ group. The two triplets consist of a u quark and a d quark, as is confirmed by figure 5.175, which indicates that one is positive and the other is negative. The (+) and (-) mNe5 groups are, respectively, 3X-2Y and 3Y-2X bound states, the former being positively charged and the latter - its mirror state $mN\tilde{e}5$ - being negatively charged. These compositions are consistent with their products of disintegration: four (0) duads (X-Y) and two UPAs pointing in opposite directions, suggesting that they are oppositely charged, i.e. an X and a Y subquark. The two sextets are 3X-3Y bound states, as is confirmed in figure 5.175 by their breaking up

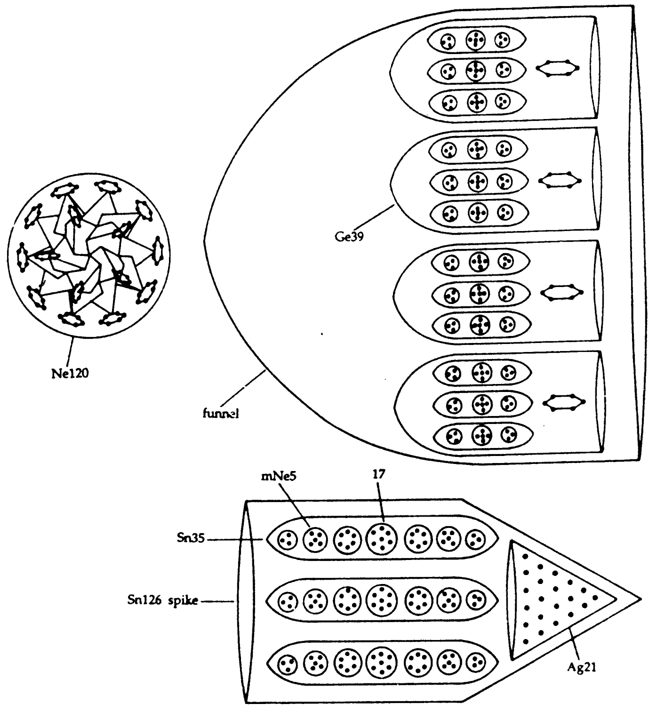


Figure 5.173 : Central globe, a funnel and a spike of the tin MPA.

at stage E2 into a (+) triplet (u quark = 2X-Y) and a (-) triplet (d quark = 2Y-X). In agreement with the result of analysis of the iodine MPA, the I7 group is a 3X-4Y bound state. This is confirmed by its disintegration into a (-) Li4 group (X-3Y) and a (+) triplet (u quark = 2X-Y):

$$3X\text{-}4Y \rightarrow X\text{-}3Y + 2X\text{-}Y.$$

The Ag21 group consists of three bound states of two u quarks and a Y subquark. This composition agrees with that found for the Ag21 in the silver MPA and is partially confirmed by its breaking up into six (+) triplets (u quarks), the three UPAs being Y subquarks.

Every detail concerning the particles in the tin MPA has been interpreted in a way that is consistent with theory and the results of analysis of other MPAs.

5.16 Bars group

Iron MPA

The MPA (fig. 5.176) consists of fourteen bars, of which eight have a body-centred cubic arrangement in space and of which six have a face-centred cubic arrangement. Each bar consists of two Fe14 groups, one Fe16 group and a cone-shaped body (Fe28) made up of twenty-eight UPAs. The Fe14 group consists of a sextet of UPAs, a square array of UPAs and a tetrahedral array of four UPAs. The Fe16 group is made up of two sextets and a square

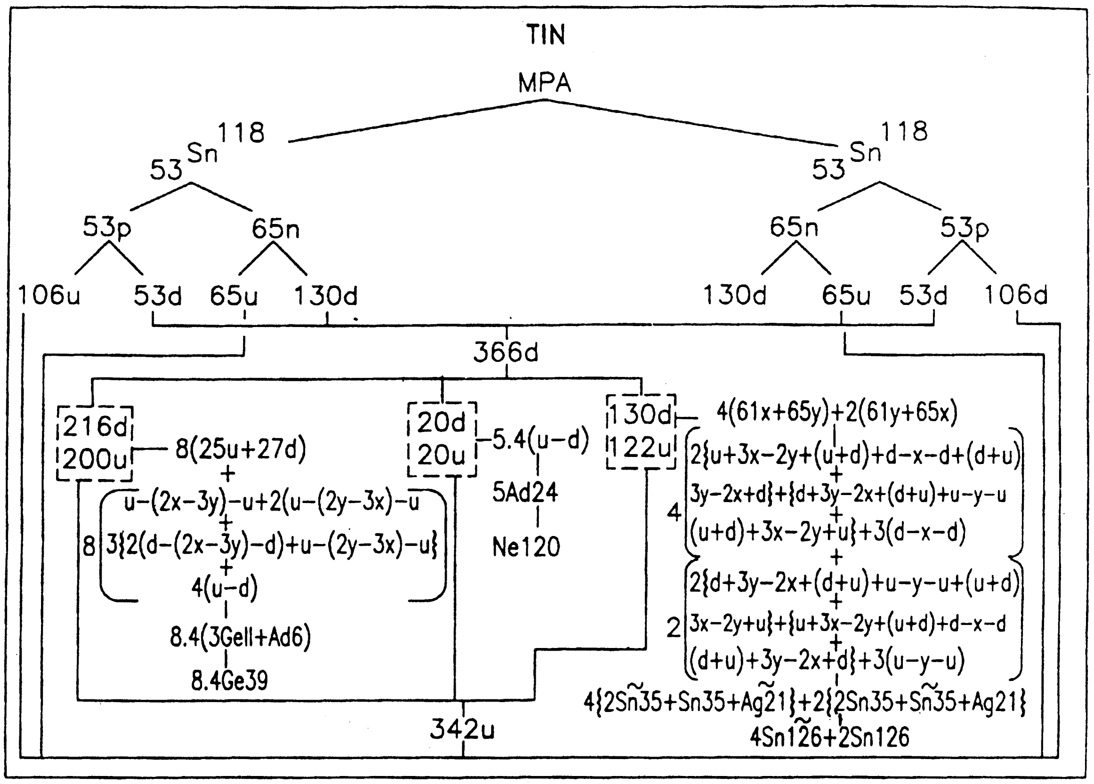


Figure 5.174

array of UPAs. The long ovoids within each bar both spin on their own axes and revolve around its central axis. The Fe28 'spins round as though impaled on the axis.'[32]

Iron MPA = 14(2Fe14 + Fe16 + Fe28).

The MPA is formed (fig. 5.177) from two Fe^{56} nuclei, which provide 1008 subquarks - the same number as the number of UPAs. As the most abundant of the isotopes of iron, Fe56 was the most likely nuclide to be selected for micro-psi observation. They comprise 500 X subquarks and 508 Y subquarks. Since neither number is divisible by 14, not all the bars can have the same subquark composition. Assuming that - as with some MPAs with funnels - the only difference between the bars is that some contain particles which are mirror states of particles in the others, two subquark compositions are possible for the fourteen bars of the iron MPA:

a) 9(35X + 37Y) + 5(35Y + 37X);

b) 6(38X + 34Y) + 8(38Y + 34X).

Only (b) is consistent with the combined face-centred and body-centred cubic geometry of the bars (and - as will be seen - with the detailed compositions of the groups of UPAs indicated by the disintegration diagram of iron).

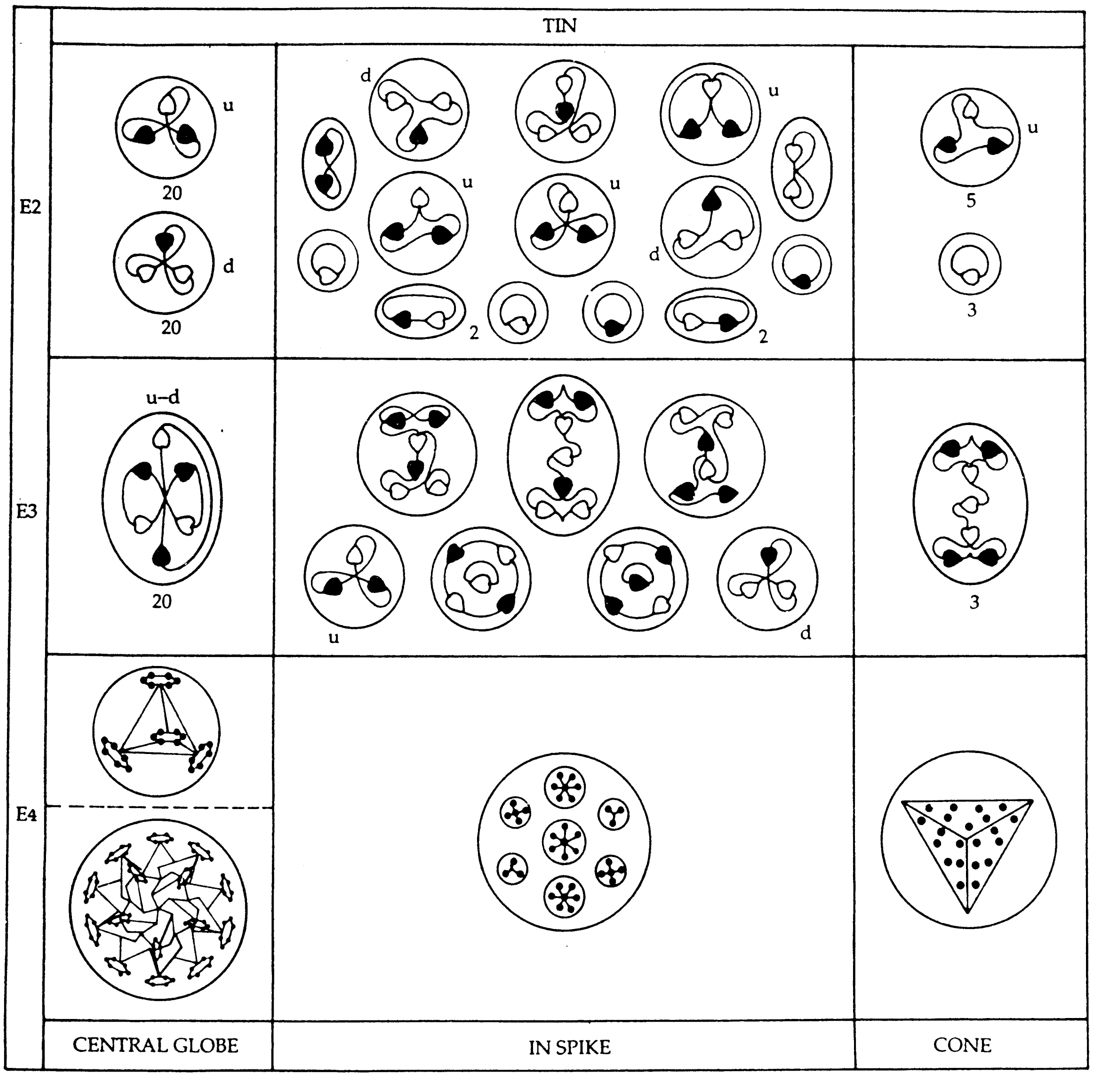


Figure 5.175

The Fe28 group is composed of two u-Y-u bound states and two d-X-d bound states (the mirror states $\widetilde{\text{Fe}}28$ of the former). These are the two varieties of septets shown at the E3 stage of the break-up of the Fe28 group in figure 5.178. Their disintegration into four (+) triplets (u quarks), four (-) triplets (d quarks) and four UPAs (two X subquarks and two Y subquarks) is consistent with these compositions.

The two Fe14 groups are identical in composition, the quartet a being a 2X-2Y bound state, the sextet b being a bound state of three X-Y disubquarks and the tetrahedron c being a Y-3X bound state. The quartet a in the Fe16 group is a 2X-2Y bound state (as in the Fe14 group) and the two sextets b are also bound states of three X-Y disubquarks. Figure 5.178 indicates

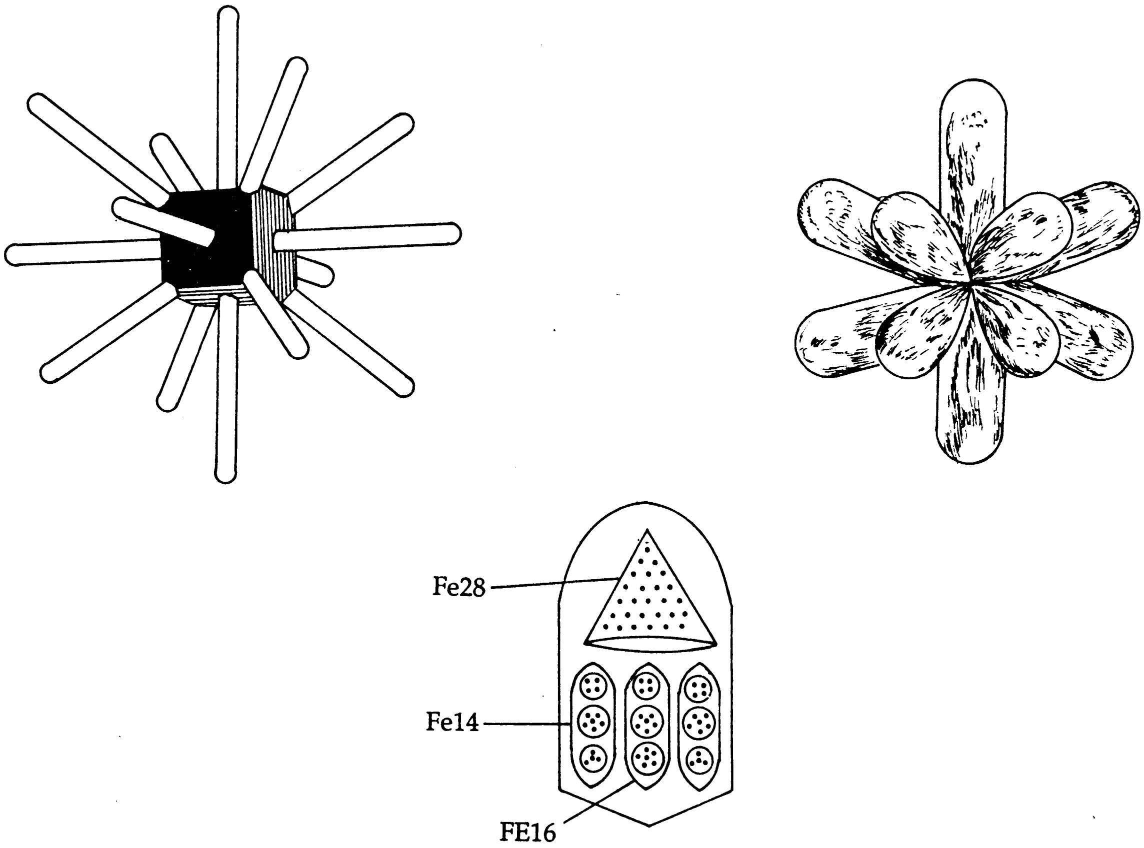


Figure 5.176 : Iron MPA

that the two Fe14 groups and the Fe16 group, which comprise forty-four UPAs, break up into twenty duads. This is obviously wrong - two few duads are shown. The three quartets a are shown to break up into six (0) duads (X-Y), *i.e.,*

$$3(2X\text{-}2Y) \rightarrow 6(X\text{-}Y).$$

Group c appears also in the Co8 group of the cobalt MPA (see figure 5.181) and as the group b in the Ni10 of the nickel MPA (see figure 5.184). In both cases two of these groups break up into two (+) duads (X-X) and two (0) duads (X-Y) (note that there is only one Ni10 group present in a bar of the nickel MPA; the number '2' should not appear under each particle in figure 5.184). This is consistent with the identity of group c:

$$2(Y\text{-}3X) \rightarrow 2(X\text{-}X) + 2(X\text{-}Y).$$

The compositions:

$$2Fe14 = 2[2X\text{-}2Y + (X\text{-}Y)\text{-}(X\text{-}Y)\text{-}(X\text{-}Y) + Y\text{-}3X]$$

and

$$Fe16 = 2X\text{-}2Y + 2[(X\text{-}Y)\text{-}(X\text{-}Y)\text{-}(X\text{-}Y)]$$

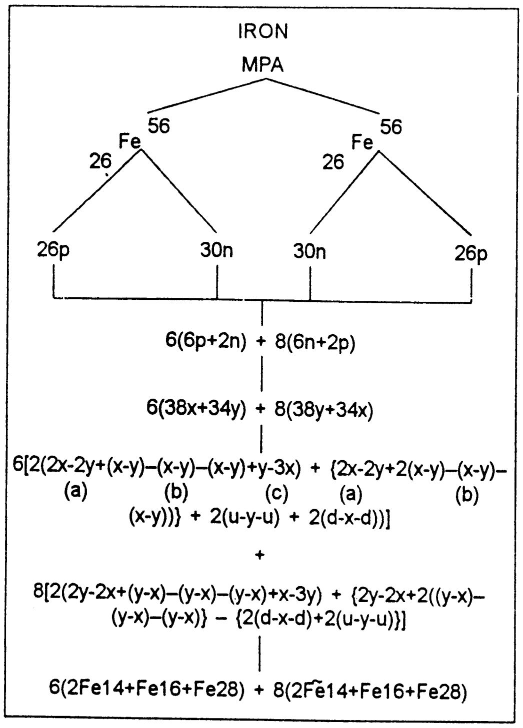


Figure 5.177

imply that they should break up into twenty X-Y disubquarks and two X-X disubquarks, i.e. twenty (0) duads and two (+) duads. The disintegration diagram should indicate (12+2+6) (0) duads and two (+) duads. The following evidence supports this prediction: the group b occurs only in one other MPA - the lithium MPA, where two of them are present in the Li63 spike. According to its disintegration diagram (fig. 5.178), group b breaks up at stage E2 into three (0) duads (X-Y), which is precisely what would be expected of a bound state of three X-Y disubquarks. Consistency with the disintegration diagrams of the lithium, cobalt and nickel MPAs requires

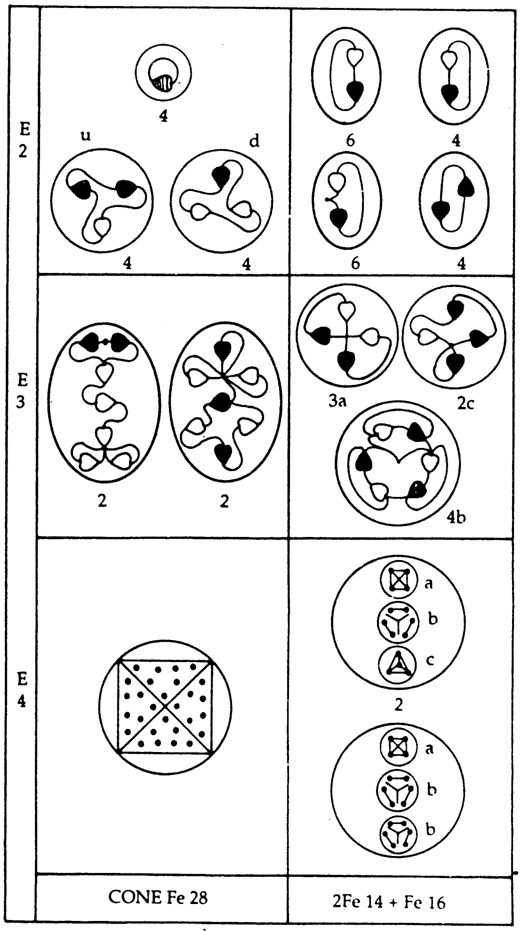


Figure 5.178

$$3a \rightarrow 6(0) \text{ duads,}$$

$$2c \rightarrow 2(0) \text{ duads} + 2(+) \text{ duads,}$$

and

$$4b \rightarrow 12(0) \text{ duads,}$$

i.e. the two Fe14 groups and the Fe16 group should break up into twenty (0) duads and two (+) duads, in agreement with the above prediction.

Cobalt MPA

The MPA (fig. 5.179) consists of fourteen bars pointing as in the iron MPA towards the corners and centres of faces of a cube. Each bar has two segments, one containing two Fe14 groups and one Fe16 group, the other containing two Co11 groups and a Co8 group. The Co11 consists of a quintet of UPAs and an N6 group. The Co8 consists of two quartets of UPAs like group c in the iron MPA.

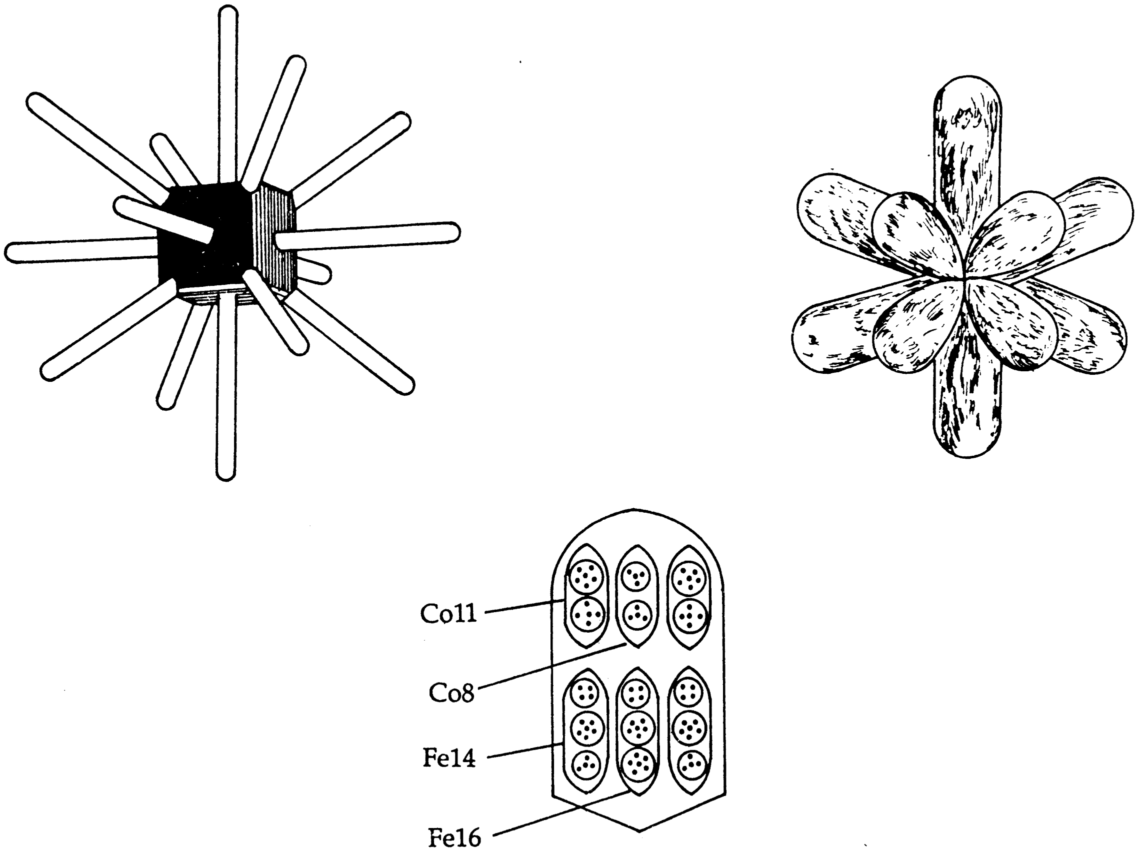


Figure 5.179 : Cobalt MPA

Cobalt MPA = 14(2Fe14 + Fe16 + 2Co11 + Co8).

The MPA is formed (fig. 5.180) from two Co^{59} nuclei (the only stable isotope of cobalt), which provide 1062 subquarks - twenty-six more than the number of UPAs. As the deficit is not exactly divisible by 14, the bars cannot be identical. The two different types of orientation — face-centred cubic and body-centred cubic — make it plausible that the eight bars with the former arrangement are different from the six bars with the latter arrangement, just as was found for the bars in the iron MPA. It is simple to deduce that the discrepancy can be due only to an undercounting of UPAs by three in each of the six bars and an undercounting by one in each of the eight bars. Since (according to their own testimony) Besant & Leadbeater did not count every UPA in an MPA but only those present in a typical structural unit like a funnel or bar, it is understandable that such small variations among the bars of the cobalt MPA would go unnoticed. It is more likely that they missed small additions to the Fe14 and/or Fe16 groups than that they observed wrongly other particles present in the bar they examined. This is because they would probably have restricted their detailed observation to the new groups, having made, as they were accustomed to do when examining new MPAs, the tacit assumption that the Fe14 and Fe16 groups were exactly the same as those they had observed when they examined the iron MPA. Mere cursory observation would have left the predicted small differences unnoticed.

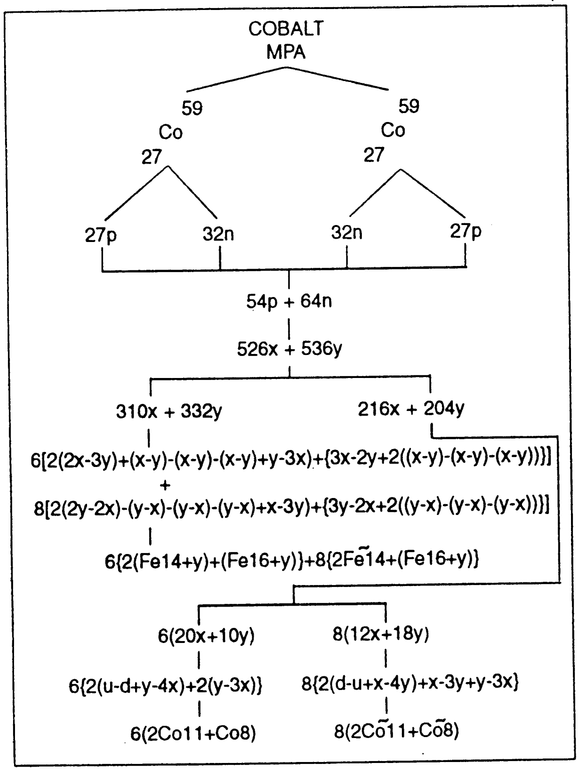


Figure 5.180

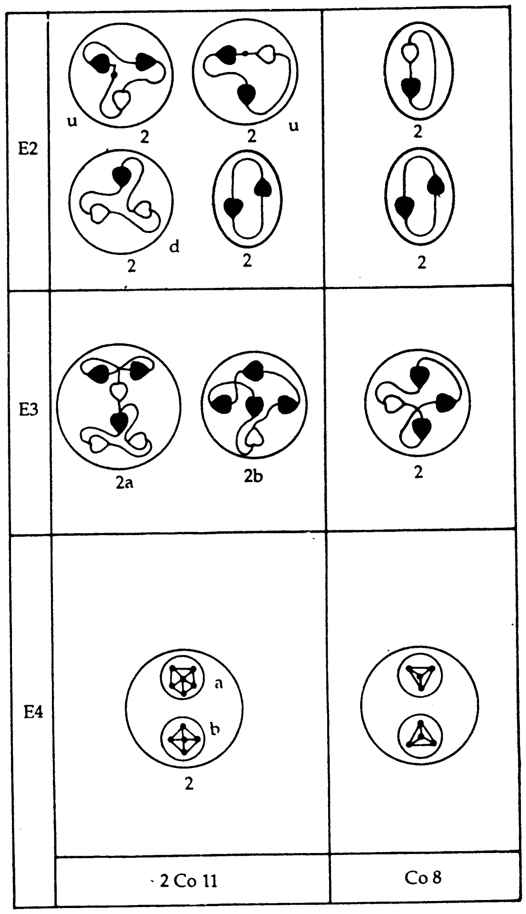


Figure 5.181

In six bars an extra Y subquark should be present in the Fe14 group. It is probably in group a (see figure 5.178), which would then be a (-) mNe5 group (2X-3Y). An extra X subquark should be in the Fe16 group, probably in another of the group a quartets, which would then be a (+) mNe5 group (2Y-3X). In the other eight bars an extra Y subquark should be in the Fe16 group (again, probably in group a, which should be a (-) mNe5 group). The two Co11 groups are identical, the N6 group (group a in figure 5.181) being a 3X-3Y bound state and the quintet b being a Y-4X bound state. Figure

5.181 confirms these predictions, for the two groups a break up at stage E2 into two (+) triplets (u quarks) and two (-) triplets (d quarks), and the two groups b break up into two (+) triplets (u quarks) and two (+) duads (X-X):

$$2(Y\text{-}4X) \rightarrow 2u(= 2X\text{-}Y) + 2(X\text{-}X).$$

Each quartet in the Co8 group is a Y-3X bound state, as was found for this type of particle in the analysis of the iron MPA and as is confirmed by its disintegration into a (+) duad (X-X) and a (0) duad (X-Y):

$$Y\text{-}3X \rightarrow X\text{-}X + X\text{-}Y.$$

Nickel MPA

The MPA (fig. 5.182) consists of fourteen bars arranged in space like those of the iron and cobalt MPAs. Each bar contains two segments, one containing two Fe14 groups and one Fe16 group, the other containing two Co11 groups and an Ni10 group. The Ni10 consists of an N6 group and a tetrahedral array of four UPAs similar to groups c and b in the MPAs, respectively, of iron and cobalt.

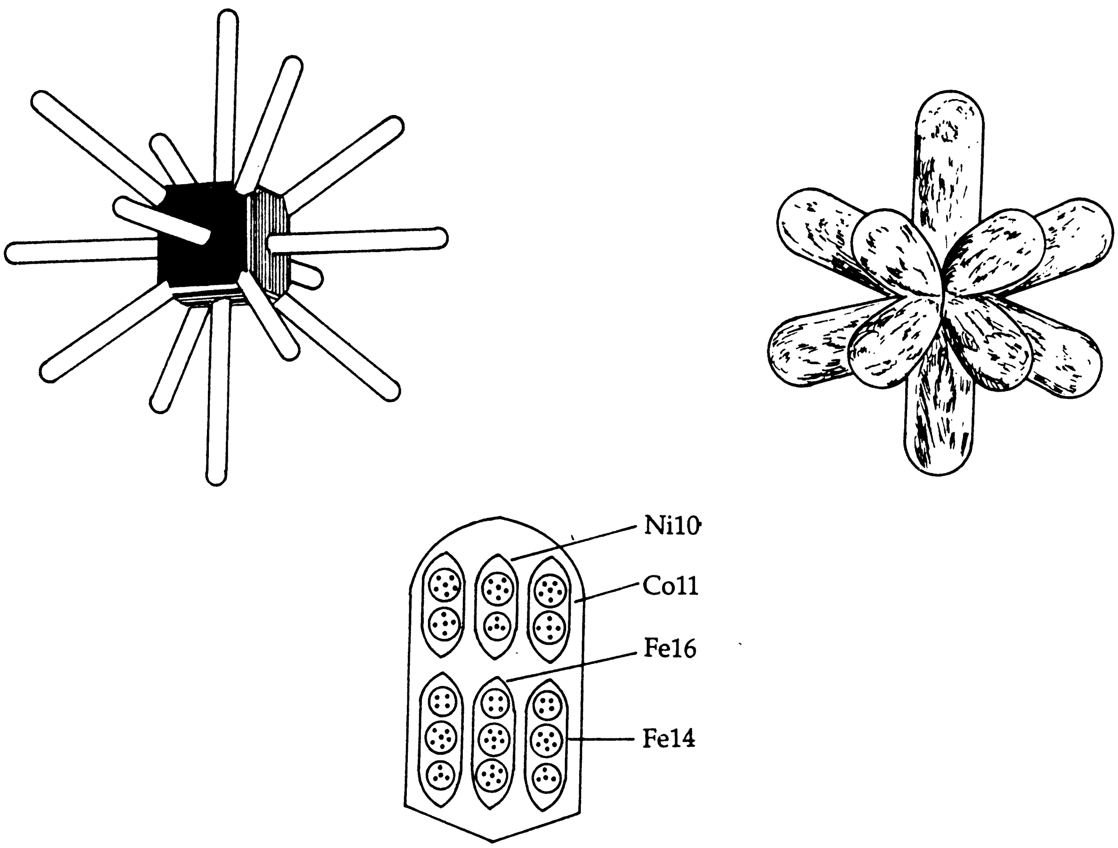


Figure 5.182 : Nickel MPA

Nickel MPA = 14(2Fe14 + Fe16 + 2Co11 + Ni10).

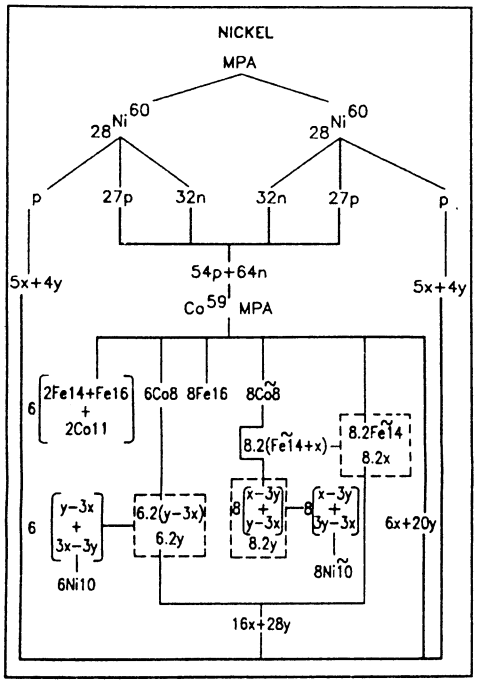


Figure 5.183

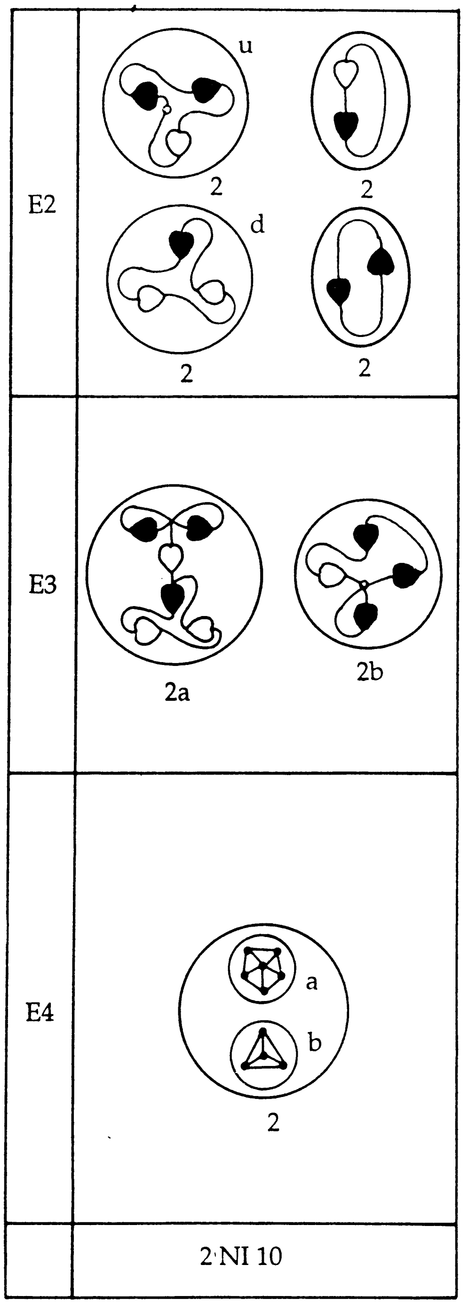


Figure 5.184

The MPA is formed (fig. 5.183) from two Ni^{60} nuclei, which provide 1080 subquarks - sixteen more than the number of UPAs. This discrepancy can be explained if the eight bars pointing towards the corners of the cube each contain two more UPAs. As argued in the case of the cobalt MPA, it is more likely that small differences in the Fe14 and Fe16 groups went undetected by Besant & Leadbeater than that the Co11 and/or Ni10 group in eight bars contained extra UPAs. These variations amount to just one extra X subquark in the Fẽ14 groups in the set of eight bars, which contain the mirror states of the particles in the set of six bars. Figure 5.183 shows how the nickel MPA is related to the cobalt MPA.

In the Ni10 group belonging to the set of six bars, the N6 group (a) is a 3X-3Y bound state. This is confirmed by the disintegration diagram (figure 5.184), which shows that group a breaks up into a (+) triplet (u quark = 2X-Y) and a (-) triplet (d quark = 2Y-X):

3X-3Y → 2X-Y + 2Y-X.

As was mentioned in the discussion of the iron MPA, figure 5.184 indicates erroneously two Ni10 groups, not one, leading to a wrong factor of 2 appearing in the depiction of each type of particle released from the Ni10 group. The group b is a Y-3X bound state, as was found for similar groups in the iron and cobalt MPAs and as is confirmed by its break-up into a (+) duad (X-X) and a (0) duad (X-Y). In the other eight bars the Ni10 group is the mirror state Ni̅10 of that in the six bars, consisting of a 3Y-3X bound state and an X-3Y bound state.

5.17 Star group

Neon MPA

The neon MPA is a flat, six-armed star (fig. 5.185). All the arms contain the same set of particles and radiate from a central sphere (Ne120), which contains twenty cigar-shaped Ad6 groups, each of six UPAs, located at the twenty corners of a regular dodecahedron (fig. 5.186). They form five intersecting, tetrahedral clusters of four Ad6 groups, each cluster being an Ad24 group similar to those present in the MPAs of deuterium ('Adyarium') and helium. Each arm contains three bodies: a pair of hydrogen triplets (H3) at the end of the arm, a set of three Li4 groups and a sphere containing five spheres (Ne22), four of which enclose quartets of UPAs and surround the central one containing six UPAs. Figure 5.187 shows the central Ne120 group and the particles in one arm.

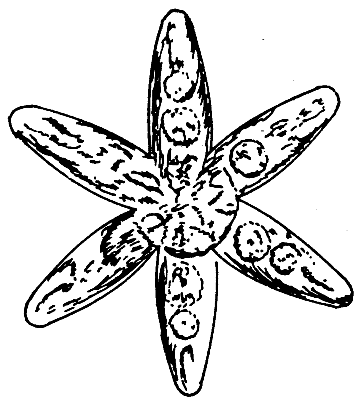


Figure 5.185 : Neon MPA.

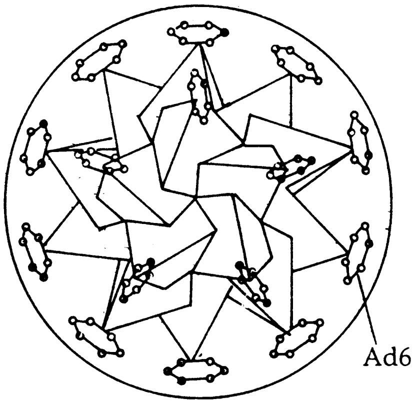


Figure 5.186 : Ne120 group.

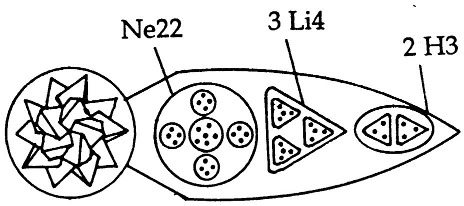


Figure 5.187 : Central sphere and one arm of neon MPA.

Neon MPA = Ne120 + 6[Ne22 + (3Li4) + (2H3)].

The MPA is formed (fig. 5.188) from two Ne^{20} nuclei, which provide 360 subquarks - the same number as the number of UPAs. Ten u quarks and ten d quarks making up either the ten neutrons or the ten protons in each nucleus (the former is assumed for the sake of analysis) combine in pairs to form twenty u-d diquarks (Ad6). The Ne120 group is a bound system of twenty u-d diquarks of charge +⅓, which minimize their Coulomb interaction energy by maximizing their mutual separation. The regular solid figure allowing this is a dodecahedron with twenty corners equally spaced apart. The Ne120 group is the central core of all other inert gas MPAs and is found in the MPAs of titanium, zirconium, tin, lanthanum, gadolinium, terbium and dysprosium. Its frequent presence in MPAs indicates that it has great stability, as is confirmed by the fact that it never appears broken up or otherwise modified. It can be regarded as the quark counterpart of the especially stable, closed shell structure of the doubly magic Ca^{20} nucleus. The disintegration diagram (fig. 5.189) confirms that there are twenty u quarks and twenty d quarks in the Ne120 because it breaks up at stage E2 into twenty (+) triplets (u quarks) and twenty (-) triplets (d quarks). The two H3 triplets in the arm are u quarks, which figure 5.189 confirms by indicating that they are both (+) triplets. In agreement with their composition predicted in the analysis of the lithium

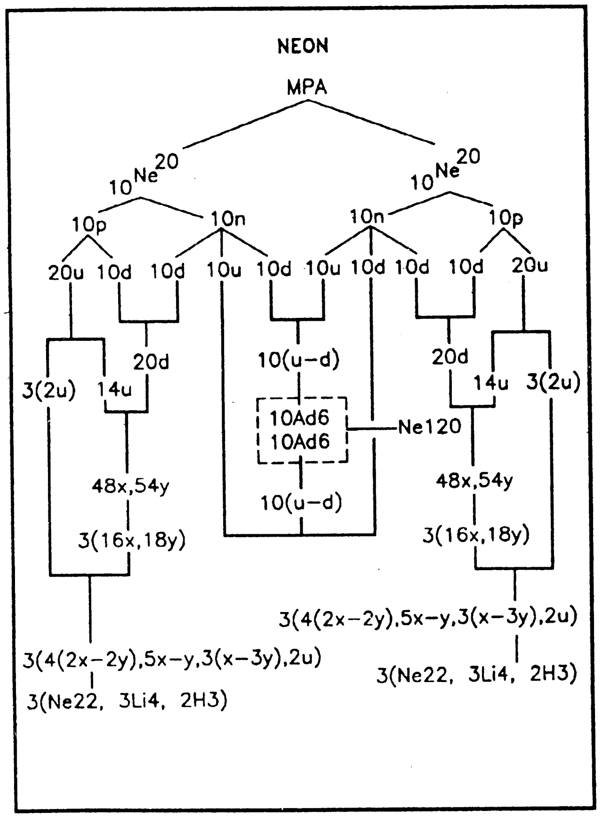


Figure 5.188

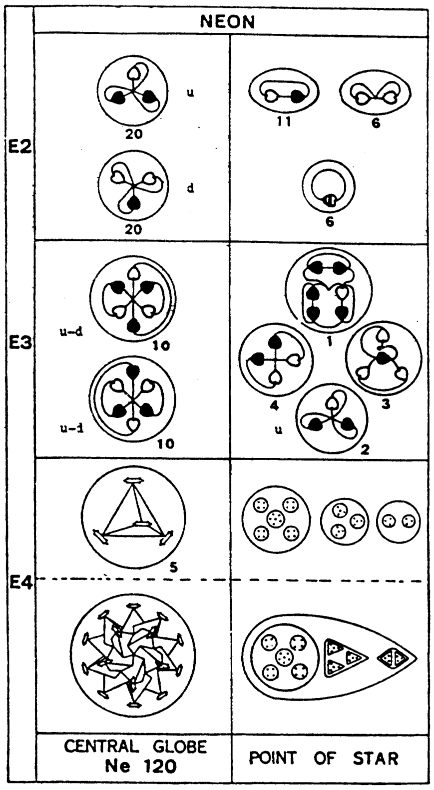


Figure 5.189

MPA, the Li4 groups consist of X-3Y bound states (fig. 5.190). It is not clear whether the six free UPAs indicated at stage E2 come from the two triplets, the bound state of six UPAs or from both. The foremost is consistent with the eleven (0) duads (X-Y) shown at stage E2 being released from the four quartets (2X-2Y) and the three Li4 groups (X-3Y):

$$4(2X\text{-}2Y) + 3(X\text{-}3Y) \rightarrow 11(X\text{-}Y) + 3(Y\text{-}Y).$$

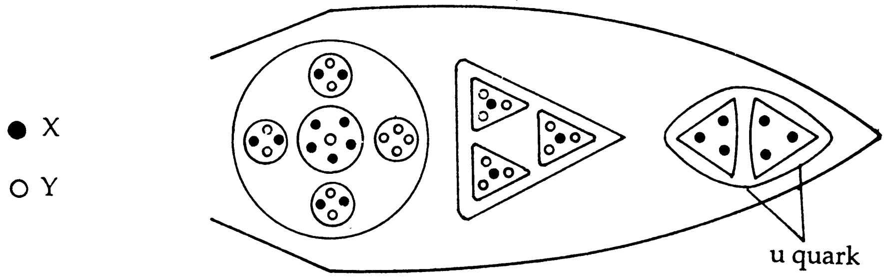


Figure 5.190 : Subquark composition of arm of neon MPA.

However, an arm (the 'point of star' in figure 5.189) cannot disintegrate into the eleven (0) duads (X-Y), six (-) duads (Y-Y) and six UPAs shown there because this would imply that it contains at least twenty-three Y subquarks, whereas theory allows only eighteen Y subquarks. The first edition of *Occult Chemistry* has no disintegration diagram for neon which might confirm or invalidate this prediction.

Meta-neon, the isotopic variation of the neon MPA will not be discussed here because it contains a group of UPAs (mNe15) whose disintegration was not described and whose subquark composition cannot therefore be compared with theory.

Argon MPA

The argon MPA (fig. 5.191) consists of a central globe, which contains the Ne120 group, and six arms projecting from this centre in a Star of David pattern. Each arm is made up of an N63 group, an Ne22 group and, at its outer end, a group of fourteen UPAs (Ar14) comprising a cluster of seven, a quartet and a triplet of UPAs. Although it has no disintegration diagram, the argon MPA is analysed here because its Ar14 - the only new particle not found in the other MPAs with disintegration diagrams - consists of three simple groups of UPAs whose disintegrations have been described in many MPAs analysed in this chapter.

Argon MPA = Ne120 + 6(N63 + Ne22 + Ar14).

The MPA is formed (fig. 5.192) from two Ar^{40} nuclei, this being the most abundant of the isotopes of argon. They provide 720 subquarks - six more than the number of UPAs. Forty-two of the forty-four neutrons originally belonging to these nuclei are present still as six clusters of seven groups of three hydrogen triplets, i.e. the N63 is a cluster of seven neutrons. The Ne120 group cannot be a bound state of twenty u-d diquarks (as found in the case of the MPA of neon) because the 128 X subquarks and 94 Y subquarks making up the remaining fifty-four u quarks and twenty d quarks could not then be distributed equally among the six arms. It cannot be a bound state of twenty d-d diquarks for a similar reason. It can be only a bound state of twenty u-u diquarks, the 108 X subquarks and the 114 Y

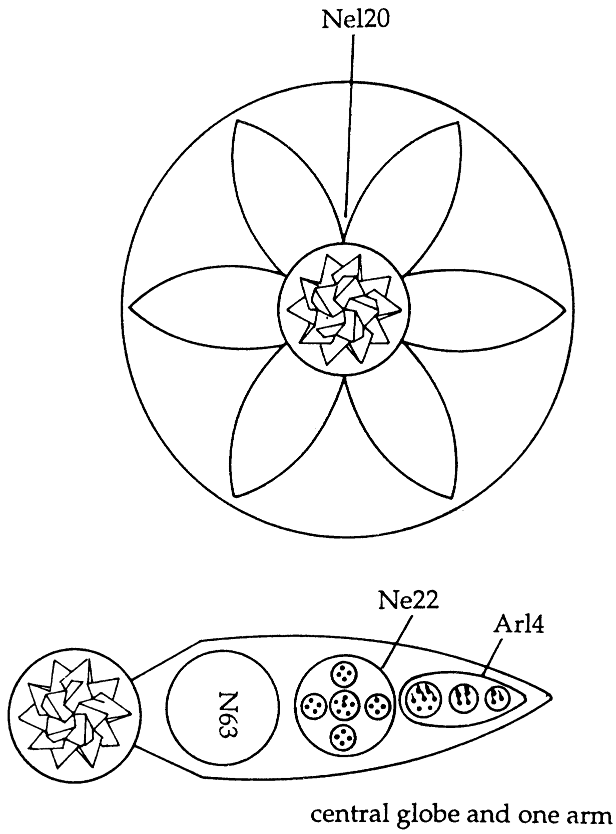


Figure 5.191 : Argon MPA.

subquarks making up the remaining thirty-four u quarks and forty d quarks being uniformly distributable among the six arms.

As was found for the neon MPA, the Ne22 group is a cluster of four bound states of two X subquarks and two Y subquarks surrounding a core made up of five X subquarks and one Y subquark. The extra subquark predicted to be in each arm is either in the group of six UPAs at the centre of the Ne22 or — less probably, because this group was a new one unique to this MPA and unlikely to have been misobserved — in the Ar14 group (the latter was assumed in the analysis of the argon MPA in ESPQ,[33] where the triplet of the Ar14 group is wrongly labelled in figure 5.111 as a u quark instead of the d quark correctly indicated in figure 5.110). Assuming the more likely former possibility and noting that the cluster of seven UPAs in the Ar14 group, although not explicitly described, must be either the I7 (4X-3Y) or its mirror particle Ĩ7 (4Y-3X) because a similarly depicted group is recorded in the proto-argon MPA to be discussed shortly, the following compositions are possible for the Ar14 group:

4X-3Y + 4Y + d quark (extra Y subquark present in the centre of the Ne22);

4Y-3X + 4Y + d quark (extra X subquark present in the Ne22);

4Y-3X + 4Y + u quark (extra Y subquark in the Ne22).

As no disintegration diagram was provided for argon (presumably because the only new group Ar14 was made up of groups recorded in many other MPAs), it is not possible to test these predictions, as well as the prediction that the Ne120 is made up of forty (+) triplets, not twenty (+) and twenty (-) triplets, as recorded in the neon MPA.

The MPA of proto-argon differs from that of argon by the absence of a quartet and triplet of UPAs in each of its six arms:

proto-argon MPA = Ne120 + 6(N63 + Ne22 + I7),

whilst the MPA of meta-argon differs from that of argon by having seven more UPAs in each arm, the Ar14 being replaced by mNe15 and a cone of six UPAs (mAr6):

meta-argon MPA = Ne120 + 6(N63 + Ne22 + mNe15 + mAr6).

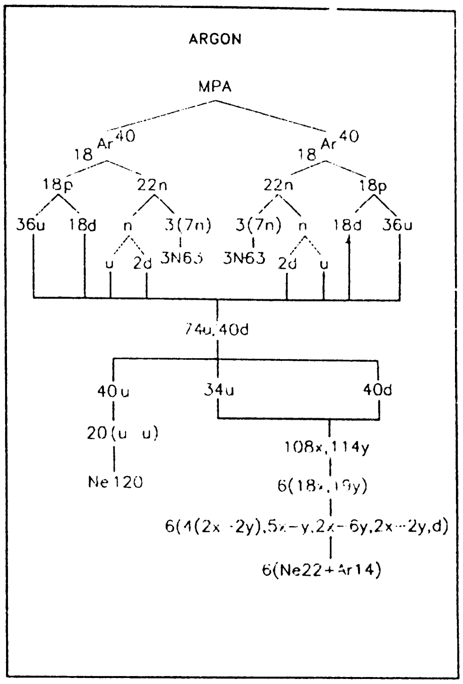


Figure 5.192

There are three stable isotopes of argon: Ar^{36}, Ar^{38} and Ar^{40}, with relative terrestial abundances of 0.337%, 0.063% and 99.60%, respectively. In principle these could provide six different MPAs of argon, those formed from the combinations (Ar^{40}+Ar^{40}), (Ar^{40}+Ar^{38}) and (Ar^{40}+Ar^{36}) being the most likely to have been observed. Because meta-argon has a more populous MPA than proto-argon, one might expect the former to be formed from an Ar^{38} nucleus and an Ar^{40} nucleus and the latter to be formed from nuclei of Ar^{36} and Ar^{40}. But the greater abundance of the Ar^{36} nuclide would then make proto-argon more likely to have been observed than meta-argon, whereas, according to *Occult Chemistry*: 'It is extremely rare in the atmosphere.'[34] Identification of the appropriate nuclide cannot therefore be based solely on UPA populations, this conclusion being supported by the fact that the ordinary argon MPA, which is supposedly formed from the stable argon nuclide with the largest mass number, has fewer UPAs than meta-argon, even when its predicted, six, unobserved UPAs are taken into consideration. The possible presence of errors of observation makes identification of the nuclides responsible for the MPAs of ordinary argon and meta-argon uncertain. The only combination of argon nuclides that makes the MPA of proto-argon BOTH the least populous AND the rarest of the three observed MPAs is (Ar^{36}+Ar^{38}). These nuclei contain 332 X subquarks and 334 Y subquarks. As a bound state of twenty identical diquarks, the Ne120 group could consist either of sixty X and sixty Y subquarks (Ad6 = u-d), eighty X and forty Y subquarks (Ad6 = u-u) or forty X and eighty Y subquarks (Ad6 = d-d). The number of subquarks present in each arm would be:

	X	Y
Ad6 = u-d:	272	274
Ad6 = u-u:	252	294
Ad6 = d-d:	292	254

Only the second pair of numbers is divisible exactly by 6, which means that the Ad6 groups in the Ne120 must be u-u diquarks, implying that there are forty-two X and forty-nine Y subquarks in each arm. Given that the N63 group consists of either seven neutrons (twenty-eight X and thirty-five Y subquarks) or seven protons (thirty-five X and twenty-eight Y subquarks), i.e. the mirror state N63, and given that the Ne22 consists of either thirteen X subquarks and nine Y subquarks or — if the mirror state $\widetilde{\text{Ne22}}$ — nine X subquarks and thirteen Y subquarks, it is deduced that the N63 must consist of seven neutrons because seven protons, together with the Ne22 or $\widetilde{\text{Ne22}}$ group, require more X subquarks in each arm than are available. The I7 group should consist, not of seven UPAs, but of six (either one X subquark and five Y subquarks or - if an $\widetilde{\text{Ne22}}$ group is present - five X and one Y subquark). This prediction cannot be tested because no disintegration digrams were provided for the argon MPAs.

If the meta-argon MPA is formed from two Ar^{40} nuclei, six too many UPAs were observed in each arm. It is implausible that the cone of six UPAs should not have been observed. More likely, UPAs are absent from the Ne22 and mNe15 groups.

5.18 General discussion

The hypothesis that MPAs, claimed by Besant & Leadbeater in their book *Occult Chemistry* to be atoms, were actually artefacts of clairvoyant observation, formed from pairs of (usually) similar atomic nuclei, has been tested by using all the MPAs that have disintegration diagrams. Interpreting the positivity and negativity of groups of UPAs in terms of the polarity of their predicted electric charges enabled the hypothesis to be tested qualitatively as well as quantitatively by comparing the subquark composition of particles with information about their constituents displayed in these diagrams. A truly remarkable degree of agreement and self-consistency emerged from this analysis. In the case of MPAs whose UPA populations agree exactly with prediction, perfect matching between theory and observation was shown in nearly every example, any difference being so minor as to be plausibly due to mistakes made by Besant & Leadbeater. For MPAs predicted to contain errors of observation, these discrepancies always fell within the limits of accountability. They were neither too large to be due to random errors of counting nor of a magnitude which was incompatible with the shape of the MPA or with the symmetry of distribution of its particles. Predictions of errors made in counting UPAs in some particles were confirmed by other MPAs containing these particles in the sense that the predicted discrepancy in their UPA populations was solely due to the presence of such sources of systematic error, e.g. the silver MPA, whose Cl19 group, having been overcounted by one UPA when the chlorine MPA was examined, explained why its UPA population exceeded the predicted subquark population *also by one UPA*.

Some MPAs provide more explicit evidence than others of the validity of the hypothesis that two atomic nuclei form an MPA and - by implication - that quarks were paranormally described one hundred years ago. These are listed and commented upon below:

a) **deuterium and helium**. Whatever uncertainty has to remain about the correct interpretation of the hydrogen MPA, namely, whether it is a deuteron or (less likely) a diproton whose micro-psi image was unknowingly observed not in real time but as a recording of an instant when the two protons in a selected hydrogen molecule collided, the connection between the compositions of the deuterium and helium MPAs and the quark content of two of their atomic nuclei is so obvious as to constitute convincing evidence that hydrogen triplets are quarks. That Adyarium, the MPA of deuterium, should contain six positive triplets and six negative triplets (these triplets having been independently identified, respectively, as up and down quarks) agrees unequivocally with the hypothesis that it is formed from two deuterons containing six positively charged u quarks and six negatively charged d quarks. The exact one-to-one correlation shown in figure 5.11 between the positive and negative particles in the helium MPA and the quarks making up two He^4 nuclei is equally impressive. This MPA is the only one other than the hydrogen MPA which contains two hydrogen triangles. These hydrogen triangles must be a proton and a neutron because, if they were both protons, seven u quarks and nine d quarks would make up the two Ad24 groups, which means that an Ad6 group in one Ad24 group would have a different composition than the other three Ad6 groups, contrary to what was always observed for Ad24 groups. Analysis of MPAs has shown that an Ad24 consists either of four u-d, four u-u or four d-d diquarks, which would be impossible for one of the Ad24 groups in the helium MPA if both hydrogen triangles were protons. This MPA therefore furnishes evidence confirming the interpretation of the hydrogen MPA as a deuteron.

b) **manganese**. It is remarkable that the predicted 490 X subquarks and the 500 Y subquarks predicted to be in its MPA:

$$MPA = N110 + 14Li63$$

should be compatible with the subquark compositions of the N110 and Li63 groups *independently established* by self-consistent analysis of the MPAs of nitrogen, lithium and many other elements containing these groups. Indeed, the manganese MPA serves to eliminate the possibility that a u quark consists of three identical, positively charged subquarks (let us call them X' subquarks) and that a d quark comprises three identical subquarks with negative charges (let us call them Y' subquarks). If this had been the case, a proton (u-u-d) would contain six X' subquarks and three Y' subquarks, whilst a neutron (d-d-u) would consist of six Y' subquarks and three X' subquarks. Two Mn^{55} nuclei containing fifty protons and sixty neutrons would form an MPA with 480 X' subquarks and 510 Y' subquarks - which numbers, it is easy to show, are irreconcilable with the predetermined subquark compositions (31X, 32Y) and (58X, 52Y) of, respectively, the Li63 and N110 groups, even if one allows for the possibility of mirror states. The manganese MPA thus provides compelling evidence in support of the subquark composition:

$$u = X\text{-}X\text{-}Y, \; d = X\text{-}Y\text{-}Y$$

used throughout the analysis of the MPAs, and it disproves the possibility that u or d quarks are made up of three subquarks of the same electric charge;

c) **rubidium**. Its MPA:

$$MPA = 3N110 + 16Li63 + 16Rb12$$

has a subquark composition which is effectively predetermined because those of the N110 and Li63 groups are fixed by the analysis of the nitrogen, lithium and other MPAs, whilst the

Rb12 group consists of two (+) triplets and two (-) triplets, according to its disintegration diagram (fig. 5.29), which means that it comprises two u quarks and two d quarks. Figure 5.30 shows the remarkably clear way in which the MPA is related to the quark composition of two Rb^{85} nuclei;

d) **gold**. Its MPA is the most populous one having a disintegration diagram, yet its UPA population agrees exactly with the number of subquarks predicted to be in two nuclei of Au^{197} - the only stable isotope of gold and therefore the only one which could have formed the gold MPA. It is nothing less than astounding that theory, severely restrained by the predetermined compositions of many particles in the gold MPA, should agree precisely with the X and Y subquark composition of all its groups of UPAs, as indicated by its three disintegration diagrams;

e) **beryllium**. The (+) and (-) Be10 groups recorded in figure 5.67 are excellent examples of mirror states, differing only in the replacement of X subquarks by Y subquarks and vice versa;

f) **calcium**. Containing the 360 X and 360 Y subquarks supplied by the two parent Ca^{40} nuclei, this MPA is an overt example of the mirror state symmetry of its composition because figure 5.77 shows that to every particle containing u quarks there is a similar one containing d quarks, and vice versa, whilst to every X subquark in one particle there is a Y subquark in a similar particle, and vice versa. Because equal numbers of protons and neutrons form the MPA, this $X \leftrightarrow Y$ symmetry of interchange is possible only if a proton and neutron are mirror states of each other. Letting u = nX-(3-n)Y (n = 1,2,3) and d = mX-(3-m)Y (m = 1,2,3), then

$$\text{proton} = 2u + d = (2n+m)X + (6-2n+3-m)Y = (2n+m)X + (9-2n-m)Y$$

and

$$\text{neutron} = 2d + u = (2m+n)X + (6-2m+3-n)Y = (2m+n)X + (9-2m-n)Y,$$

so that the proton and neutron are mirror states if

$$2n + m = 9 - 2m - n,$$

and

$$9 - 2n - m = 2m + n$$

i.e., m + n = 3, so that d = (3-n)X-nY, proving that, as bound states of three subquarks, each of which is either positively or negatively charged, u and d quarks must be mirror states of each other in order to generate the observed mirror state symmetry of the calcium MPA.

Very explicit evidence for the existence of mirror states in MPAs is provided by figure 5.79, which shows that the seven Be10 groups making up the Ca70 group consist of four positive ones and three negative ones, the positivity and negativity of whose constituents released at the E2 stage agree precisely with analysis. Whilst it may be argued that these groups were assigned just the subquark compositions needed to procure agreement, this criticism misses the point, which is that it would not have been possible to do this as well as achieve perfect agreement between the positivity or negativity of all other particles and their key interpretations unless the theory that MPAs are formed from two atomic nuclei was correct.

g) **magnesium**. As the calcium MPA shows that a u quark is the mirror state of the d quark, these two quarks must together contain three X subquarks and three Y subquarks. This deduction is confirmed by both edition variants of the magnesium MPA, as now explained: in the 3rd edition variant the Mg12 group has the composition:

$$Mg12 = X\text{–}Y + 3X\text{-}4Y + u = 6X + 6Y,$$

and

$$\text{magnesium MPA} = 36Mg12 = 216X + 216Y.$$

But

$$\text{magnesium MPA} = 24 \text{ protons} + 24 \text{ neutrons} = 72\ u + 72\ d.$$

Therefore

$$72u + 72d = 216X + 216Y,$$

so that

$$u + d = 3X + 3Y.$$

In the 1st edition variant the Mg12 group has the composition:

$$Mg12 = X\text{-}X + 6X\text{-}Y + u = 10X + 2Y,$$

Its mirror state Mg12 has the composition:

$$Mg\tilde{12} = Y\text{-}Y + 6Y\text{-}X + d = 2X + 10Y,$$

and

$$\text{magnesium MPA} = 18Mg12 + 18Mg\tilde{12} = 216X + 216Y,$$

which leads to the same conclusion. Either u = 2X-Y and d = X-2y or u = X-X-X and d = Y-Y-Y (u = X-2Y and d = Y-2X are excluded by the fact that (+) hydrogen triplets break up into (+) (X-X) duads and that (-) triplets break up into (-) duads (Y-Y)). Since, according to (b), the composition of the manganese MPA prohibits the u quark consisting of three positively charged X subquarks and the d quark consisting of three negatively charged Y subquarks, it is concluded that the only subquark composition consistent with the MPAs of manganese, calcium and magnesium is the one used throughout this chapter, namely, u = 2X-Y and d = X-2Y.

h) **magnesium and sulphur**. The simple difference between the particles in the funnels of the magnesium and sulphur MPAs (compare figures 5.94 and 5.99) is clearly shown to be due to the two S^{32} nuclei providing in each funnel of the sulphur MPA the subquarks in six extra u quarks and six extra d quarks, for these contain eighteen X subquarks and eighteen Y subquarks, of which two of each type are distributed to each of the nine Mg12 segments, so that their addition to the u quark in each segment simply transforms it into a second I7 group:

$$u\ (= 2X\text{-}Y) + 2X + 2Y \rightarrow 4X\text{-}3Y.$$

i) **aluminium and arsenic**. The difference between the MPAs of aluminium and arsenic - ninety-six N9 groups - plus the fact that this group was identified as a neutron in the analysis of the nitrogen MPA and as a proton in the analysis of the chlorine MPA provide a clear illustration of how MPAs are related to pairs of atomic nuclei, for two As^{75} nuclei contain forty more protons and fifty-six more neutrons than two Al^{27} nuclei, that is, ninety-six more nucleons.

j) **indium and antimony**. It is remarkable that the difference between the indium and antimony MPAs is explainable in terms of the subquarks in the four extra protons and ten extra neutrons contained in two Sb^{121} nuclei, these subquarks comprising just those numbers of X and Y subquarks needed to maintain in the indium MPA the mirror state composition of the type A and type B funnels revealed by analysis of the antimony MPA.

In conclusion, the remarkable degree of correlation between theory and the huge body of observational details recorded for the fifty-three MPAs analysed in this chapter can have only one sensible, inescapable explanation: MPAs are *real* objects formed from two atomic nuclei. The sole alternative explanations: fortuitous agreement between theory and hallucinations or fabricated observations, demands a vast catalogue of unbelievable coincidences, the accumulated odds against which assume astronomical proportions. The reader has therefore to choose between accepting a statistically miraculous series of events and what seems an equally miraculous human faculty, namely micro-psi. If he believes only what science declares is possible, he will have to accept the former, absurdly improbable though it is. But, if he recognizes the ever provisional and evolving nature of science, he may decide that micro-psi is the more credible alternative.

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18. Ibid., p. 351.
19. *Extra-Sensory Perception of Quarks*, pp. 45, 72.
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21. Ibid., p. 143.
22. Ibid., p. 173.

23. *Occult Chemistry*, 1st ed., p. 77.
24. *Occult Chemistry*, 3rd ed., p. 30.
25. *Extra-Sensory Perception of Quarks*, p. 173.
26. Ibid., p. 180.
27. *Occult Chemistry*, 3rd ed., p. 199.
28. *Extra-Sensory Perception of Quarks*, p. 171.
29. Ibid., p. 109 et seq.
30. *Occult Chemistry*, 3rd ed., p. 207.
31. Ibid., pp. 211, 213.
32. Ibid., p. 239.
33. *Extra-Sensory Perception of Quarks*, p. 192.
34. *Occult Chemistry*, 3rd ed., p. 253.

CHAPTER 6

CONCLUSION

"... when you have eliminated the impossible, whatever remains, *however improbable,* must be the truth."

Sherlock Holmes

6.1 Harari's rishon model

We saw in chapter 5 that the micro-psi descriptions by Besant & Leadbeater of the particles making up fifty-three MPAs indicate that u and d quarks have the subquark composition:

$$u = X\text{-}X\text{-}Y, \qquad d = X\text{-}Y\text{-}Y,$$

where X is a positively charged subquark and Y is a negatively charged subquark. How does this composition compare with predictions of preon models of quarks and leptons? As was emphasized in chapter 5, *any* composite quark model predicting the above preon structure for u and d quarks is compatible with the details of MPAs, although not necessarily with Leadbeater's description of the UPA. Only the latter will likely determine unambiguously which subquark model will turn out to be correct. Comparison of micro-psi observations with other composite quark models will be restricted to the preon model that is perhaps best known among particle physicists: Harari's rishon model.[1]

Two types of fermions are postulated in the rishon model: the T-rishon with electric charge ⅓ in a $(3,3)_{1/3}$ representation of $SU(3) \times SU(3)_C \times U(1)_{EM}$ and the electrically neutral V-rishon in a $(3,\bar{3})_0$ representation. The T- and V-rishon composition of u and d quarks is:

$$u = TTV, \; d = \overline{TVV},$$

where $\bar{T}$ and $\bar{V}$ are the antiparticles of, respectively, T and V. By comparing the particles in fifty-three MPAs with the quark composition of two atomic nuclei of their corresponding elements, it was shown beyond reasonable doubt in chapter 5 that positive triplets are u quarks and that negative triplets are d quarks. The hydrogen MPA contains two positive triplets containing one (-) and two (+) UPAs, one positive triplet with one (+) and two (-) UPAs, two negative triplets with one (+) and two (-) UPAs and one triplet of indeterminate polarity with one (-) and two (+) UPAs. This means that u = (+,+,-) and (+,-,-) and that d = (+,-,-) and possibly (+,+,-). Let us consider all possible identifications of (+) and (-) UPAs in terms of T- and V-rishons which are consistent with both the UPA and rishon composition of u and d quarks. It is not clear a priori whether, if a T-rishon (or V-rishon) is a (+) or a (-) UPA, its antiparticle $\bar{T}$ (or $\bar{V}$) has the same or the opposite internal chirality and therefore resembles, respectively, a (+) or a (-) UPA in the former case and a (-) or (+) in the latter case. Both possibilities, separated by the word 'or,' are considered below:

CASE	(+) UPA	(−) UPA	u quark	d quark
A	T	V	(+,+,−)	(+,−,−) or (−,+,+)
B	$\overline{T}$	$\overline{V}$	(+,+,−) or (−,−,+)	(+,−,−)
C	V	T	(−,−,+)	(−,+,+) or (+,−,−)
D	$\overline{V}$	$\overline{T}$	(−,−,−) or (+,+,−)	(−,+,+)

Comment

1) Case A is wrong because one positive triplet (u quark) in the lower hydrogen triangle of the hydrogen MPA consists of one (+) and two (−) UPAs;
2) Case B is right. The (+) UPA may be a T- or V-rishon; similarly for the (−) UPA. But the d quark has only the composition (+,−,−), which means that the triplet of indeterminate polarity must be a u quark, i.e. the rishon model implies that the upper hydrogen triangle is a proton, so that the hydrogen MPA must be a diproton, which is less plausible than a deuteron;
3) Case C is wrong because one positive triplet in the hydrogen MPA has one (−) and two (+) UPAs;
4) Case D is wrong because there are no positive triplets with three (−) UPAs, whereas, as well as the positive triplet (+,+,−), there is the positive triplet (−,−,+).

Although the rishon model *is* consistent with the pattern of (+) and (−) UPAs in the hydrogen triplets/quarks making up the hydrogen MPA, its implication that the hydrogen MPA is the less plausible diproton than the deuteron counts as an argument against the model. No unambiguous identification of (+) and (−) UPAs in terms of rishons is possible if the latter can exist in two states of opposite internal chirality. But the rishon model is incompatible with the subquark model:

$$u = X\text{–}X\text{–}Y, \quad d = X\text{–}Y\text{–}Y,$$

whose validity was proved beyond reasonable doubt in chapter 5 by analysing fifty-three MPAs. Moreover, it is incompatible with the difference between the two edition variants of the oxygen MPA for the following reason: disintegration diagrams indicate that a (+) triplet (u quark) breaks up into a (+) duad of UPAs, which is positively charged, i.e.

(+) duad = TT or TV,

and that a (−) triplet (d quark) breaks up into a (−) duad, which is negatively charged, i.e.

(−) duad = $\overline{T}\,\overline{V}$.

The third common type of duad appearing in disintegration diagrams (the '(0) duad') may carry positive charge (TV or TT if the (+) duad is, respectively, TT or TV), negative charge ($\overline{TT}$ or $\overline{T}$V) or no charge ($T\overline{T}$ or $V\overline{V}$), i.e.

(0) duad = (TV or TT), $T\overline{V}$, $\overline{T}V$, $T\overline{T}$, $V\overline{V}$.

It is obvious that none of these possible compositions for the three types of duads can satisfy the equivalence:

(+) duad + (−) duad ≡ 2(0) duads

necessary for the two edition variants of the oxygen MPA to have the *same* subquark composition (this is required because their identical UPA populations indicate that they were formed from nuclei of the same isotope (O16) of oxygen). This is possible only if the rishons in the (+) duad are the same, i.e. it is a TT bound state, and if the rishons in the (-) duad are identical as well. But this is impossible because a negatively charged (–) duad must be a $\bar{T}\bar{V}$ bound state. As a (–) duad originates in a d quark, one made up of two identical rishons can be only a $\bar{V}\bar{V}$ bound state. But this is neutral, not negatively charged. The rishon model is therefore incompatible with the two edition variants of the oxygen MPA having the same rishon composition. It is concluded that the rishon model is wrong because it is incompatible with the micro-psi observations of the hydrogen and oxygen MPAs.

Preon models like Harari's rishon model predicts that electrons are bound states of more fundamental particles. *Occult Chemistry* does not answer decisively the issue of whether the electron is a composite particle, as these models require (though not the author's unified theory,[2] according to which leptons and subquarks are equally elementary). Its third edition records, however, that on October 13, 1933, in what was his last micro-psi investigation before his death the following year, Leadbeater looked for electrons emanating from the filament in the valve of a radio — a task guided by his colleague Jinarajadasa, who had acted as recorder during many of their early, investigative sessions with Besant. All he noticed was a current 'sweeping the ordinary Anu before it.'[3] This is consistent with the latter being free conduction electrons propelled by the electromagnetic field running through the filament. But Leadbeater's other observations, unfortunately, were no more evidential than this one, and his brief, sometimes confused remarks do not make it clear whether his reference to 'ordinary Anu' was based upon observation of either actual UPAs or particles which looked like UPAs at the level of magnification he was operating. Leadbeater did not expect to see UPA-like particles when he encountered an electron because, earlier on in the session whilst he searched for electrons, he remarked: 'What is the electron like? How will we know it?'[4] It was probably Jinarajadasa's and Leadbeater's expectation that electrons would look very different that made them ignore the obvious possibility that the free 'ordinary Anu' were just what they has been looking for, namely electrons! If electrons resembling UPAs were, indeed, observed (it is difficult to know what other types of freely moving particles could have been seen in such circumstances, for the 'ordinary Anu' should have been confined, not free, if they were subquarks), this would indicate that the electron is not composite, as preon models like the rishon model predict. Instead, as predicted by the author's theory, the electron is a *single* particle whose 3-dimensional form (though not necessarily size) is sufficiently similar to that of a UPA to make Leadbeater believe mistakenly that he was observing free UPAs.

This conclusion is consistent with the identification in chapter 4 of the UPA as a subquark state of the superstring and with subquarks and leptons being equally elementary because the latter are also states of the superstring. An electron should superficially present to micro-psi vision a similar appearance to that of a subquark because both are different states of the same entity - the superstring. Any structural differences (if they exist) would become visible only when an electron is highly magnified and scrutinized closely. Any difference in size would be difficult (if not impossible) to notice because electrons and subquarks would not be present simultaneously in the field of vision to allow their comparison. Leadbeater did not bother to examine the 'ordinary Anu' in detail because, being under the false impression that he was looking at UPAs, he would have had no reason to do so during his search for electrons. These considerations make it therefore quite likely that he examined electrons on this occasion without realizing it.

6.2 Alternatives to micro-psi

There are no rational, conventional explanations for why *Occult Chemistry* displays so many connections with facts of nuclear and particle physics. Nor are there viable, alternative, paranormal interpretations of micro-psi. To realize this, let us first explore all possible ways of evaluating the micro-psi observations of Besant & Leadbeater:

1. **coincidence**. This is ruled out as the reason why the UPA populations of MPAs are directly proportional to mass numbers of (usually) the most abundant isotope of their corresponding element because the data are so well fitted by graph 3.2 that there is less than 5% probability that this excellent fit could have arisen by chance (see section 3.4). Can all the remarkable correlations established in chapter 5 between the theory of MPAs and the observational details concerning their constituents be nothing more than a vast set of coincidences? Are the striking parallels between the description of the force binding UPAs together and features of the string model of the colour force between quarks nothing other than the product of lucky invention? That such extensive correlations could have arisen *by chance* from hallucinations or from a fabricated description of subatomic particles is at least as miraculous and as difficult for anyone to believe as the very reality of micro-psi itself! For this reason coincidence is emphatically discredited as a plausible alternative;

2. **fabrication**. We saw in section 3.1 that fabrication of the UPA populations (Y) of MPAs from scientific values of atomic weights (X) is ruled out because they are so badly fitted by the relationship Y = 18X that there is less than one chance in ten thousand that they were concocted with the aid of this equation. In other words, if Besant & Leadbeater had made up the UPA populations, they could have achieved a far better agreement between number weights Y/18 and atomic weights than that which really exists. UPA populations are more accurately proportional to mass numbers. But they could not have been fabricated from the latter because these nuclear parameters only became known to physicists at least twenty-four years after the majority of MPAs were published. Neither can fabrication account for why variations in the MPAs of neon and other inert gases were recorded six years before scientists began to suspect that elements can have different isotopic species of atoms (see appendix for the chronology of the Theosophists' micro-psi publications). If the descriptions of MPAs had been made up, their thousands of details would not have been explainable in terms of just one simple idea: the hypothesis that MPAs are formed from two atomic nuclei, which relates them to known properties of atomic nuclei and to the experimentally well-established theory of quarks. This point is so obvious that it hardly needs to be emphasized;

3. **hallucinations**. Among the well-known causes of hallucinations are mental illness, such as schizophrenia, physical illnesses like Alzheimer's disease, brain tumours and temporal lobe epilepsy, alcohol and drug intoxication, and extreme fatigue, none of which were applicable to the two very sane, healthy and temperate Theosophists, Besant & Leadbeater. Moreover, the notion of jointly and simultaneously experienced hallucinations is problematic in the context of bizarre images unfamiliar to every-day experience. Whilst it may be suggested that *similar* hallucinatory visions of the Virgin Mary can be occasionally experienced at the same time by a group of Roman Catholics because of psychological conditioning by their exposure

to a widely prevalent, stereotypical image of this woman, it is impossible to understand in rational terms how two human brains could simultaneously experience *exactly the same* plethora of complex images if the latter were nothing more than hallucinations unrelated to the identical, sensory information fed to each brain by the chemical sample being studied (they obviously *had* to be similar images, for otherwise Besant & Leadbeater would have discovered that they did not see the same things when they examined the same chemical compound, and they could never have agreed on the encyclopaedic volume of details about MPAs contained in their book *Occult Chemistry*). Only telepathy could account for the similarity of jointly experienced micro-psi images. But this would have meant that one or other of the Theosophists could only have experienced the images simultaneously transmitted telepathically by his or her colleague, a situation which they surely would have detected at an early stage of their collaboration since it would have stopped the one who depended upon this telepathic communication from being able to study an MPA alone. So even telepathic transmission of hallucinations fails as an explanation of how two people could experience the same, very complex hallucinations.

A more serious (in fact fatal) problem facing an interpretation of micro-psi images as hallucinations is the same as that facing the idea that they were fabricated, namely, that, if these images were not *causally* connected to atoms in the chemical samples examined by Besant & Leadbeater, how could there exist a relationship of proportionality between UPA populations and the mass numbers of (usually) the most abundant isotope of each element? Let us repeat the historical context of their work: these nuclear parameters were unknown to the two Theosophists throughout their investigations because the concept of mass number was formulated only after 1932, when the English physicist, James Chadwick, discovered the neutron and Werner Heisenburg, one of the founders of quantum mechanics, proposed that atomic nuclei are composed of protons and neutrons. How, therefore, could the brains of Besant & Leadbeater (and *only* their brains uninformed by any pertinent, sensory or scientific information) generate a vast body of complex hallucinations embodying this mathematical correlation with scientific facts unknown to them at the time unless these images were caused by *physically real objects* in existence when the images were experienced? If the ultimate source of micro-psi images was situated only within the brain and not in the external world, this correlation between UPA populations and mass numbers could have come about only by mere chance. Yet we pointed out in section 3.5 that there is less than five per cent probability that the population data fit a linear graph by pure chance. Moreover, that thousands of purely hallucinatory images recorded for the fifty-three MPAs discussed in chapter 5 could - just by chance - be completely consistent with the theory that MPAs are formed from two atomic nuclei is implausible in the extreme, requiring a vast, miraculous series of fortuitous agreements and exhibitions of self-consistency that no reasonable mind could ever accept! For these and other reasons[7] discussed in the author's book ESPQ, it is incontestable that hallucinations causally unconnected to the elements that Besant & Leadbeater examined cannot be the correct interpretation of the micro-psi images recorded in *Occult Chemistry*.

4. **alternative, paranormal abilities**. The scientist is taught to be sparing in his use of hypotheses and not to regard a phenomenon as new unless facts make this necessary. The parapsychologist may therefore be tempted to avoid admitting a new form of ESP to his field of study by interpreting the micro-psi experience as a paranormal ability that is already familiar to him (micro-psi is *not* actually a *new* type of ESP. It is merely clairvoyance of the

physical world at the microscopic level). Only three forms of ESP can be relevant in the historical context of the paranormal observations of Besant & Leadbeater: telepathy, precognition and precognitive telepathy. Telepathy is unfeasible in principle for the obvious reason that no one living between 1895 and 1908 (the year most of the investigations were completed) could have had requisite knowledge of the quark composition of nucleons and the nucleonic composition of atomic nuclei to communicate micro-psi images to Besant & Leadbeater even by *conventional* means, let alone telepathically.

But could Besant & Leadbeater, instead, have exercised a precognitive faculty that, unknowingly, gave them access to ideas formulated by scientists between six years (isotopes) and sixty odd years (quarks and strings) into the future? Table 6.1 lists observations whose features anticipate later scientific discoveries. Such an interpretation is discredited by the fact that their micro-psi descriptions do not refer to *atoms and atomic nuclei,* the type of objects to which any prescience of atomic, nuclear or particle physics should have surely pertained. Precognition also poses the problem of why they should have foreseen the quark and string models of present-day particle physics but not have anticipated even the Bohr model of the hydrogen atom, proposed five years after the first edition of *Occult Chemistry* was published, nor the basic idea proposed later that nuclei are composed of nucleons. For few MPAs display bound states of three quarks - the quark model of a nucleon. Even if they *did* have precognitive visions of only some of the fundamental ideas of modern physics, this cannot explain why UPA populations are proportional to mass numbers - why as many as one-third of all MPAs have exactly the number of UPAs they would have if formed from two atomic nuclei made up of nucleons composed of nine UPAs/subquarks. What individual thoughts of later generations of particle physicists could have telepathically influenced Besant & Leadbeater over half a century earlier to have visions incorporating such a regularity in so remarkable a way? This hypothetical event *still* cannot yet have happened, as subquarks has

Table 6.1 Some micro-psi anticipations of scientific discoveries and ideas.

	MICRO-PSI		SCIENCE
1895:	positive and negative hydrogen triplets observed in MPAs;	1964:	quark model proposes nuclei are made up of positive u quarks and negative d quarks;
1908	meta-neon (number weight = 22.33);	1920:	neon-22 detected;
	axes of UPAs aligned by electric field;	1933:	magnetic monopoles discussed by Dirac;
	UPAs depicted as joined by 'lines of force' of 'a magnetic nature';	1970s:	string model of hadrons;
	some UPAs shown at ends of single lines of force;		quarks regarded as endpoints of strings or flux tubes;
	Y-shaped configurations of lines of force ending on UPAs;	1975:	baryons regarded as Y-shaped strings with quarks at their ends;
	UPA consists of closed curves; 1st-order spirillae wind about six successively smaller circles;	1982:	closed superstrings studied; 6-d torus studied as model of compactified space;
1909:	'illinium' (number weight = 146.66);	1945:	promethium-147 discovered;
	'masurium' (number weight = 100.11);	1937:	technetium-99 discovered;
1924:	precessional motion of "hydrogen triangles" (protons);	1924:	spin of nuclei suggested;
1932:	element '85' (number weight = 221.00);	1940:	astatine-219 discovered;
	element '87' (number weight = 222.55);	1939:	francium-223 discovered

not been experimentally detected so far. Anyway, why should the two Theosophists have picked up thoughts or ideas that are not yet conceived and have transformed them into something that refers to two atomic nuclei, not one? Precognitive telepathy would be a viable, alternative interpetation in principle only if they had described atomic nuclei made up of hydrogen triangles (nucleons). But MPAs are so different from atomic nuclei that this possibility simply does not agree with the facts of the case. Such a scenario is therefore not only far-fetched and at least as hard to believe as micro-psi itself but also inconsistent with what was actually observed. It is therefore not a feasible alternative to micro-psi.

We take the view that, if an interpretation of ostensible psychic pictures of subatomic particles leaves most of their features unexplained, it cannot be the whole answer. Paranormal alternatives to micro-psi are either not viable (telepathy), inconsistent with the facts (precognitive telepathy) or only partial explanations (precognition). Elimination of all possible conventional or alternative, parapsychological interpretations as complete explanations leaves micro-psi as the only comprehensive rationale for the data in *Occult Chemistry*. Whilst the possibility of a combination of micro-psi and either precognition or precognitive telepathy cannot be ruled out, there are no data whose origin can be attributed *solely* to the two lattermost possibilities. Furthermore, the suggestion that Leadbeater in 1895 described the UPA by picking up the thoughts of physicists in 2020 (or whenever this happens) who will be working on the problem of accommodating the (then) recently discovered subquark to superstring theory seems thoroughly bizarre and far-fetched! Because micro-psi must be at least part of the whole explanation of the work of Besant & Leadbeater, neither precognition nor precognitive telepathy being satisfactory in themselves, we believe that entertaining redundant, bizarre possibilities for which there is no exclusive evidence and which can be only minor parts of the total answer is inconsistent with scientific practice, which strives to follow 'Occam's Razor,' the rule that explanations of phenomena should not be based upon more hypotheses than are necessary. For this reason micro-psi is the simplest interpretation.

6.3 Possible reactions to this book

Self-consistent analysis of the micro-psi images recorded by Besant & Leadbeater in their book *Occult Chemistry* has shown conclusively that these pictures refer to quasi- nuclear systems of quarks and subquarks that originated in two atomic nuclei of the relevant element. Unbelievable though this conclusion may seem to the reader, there is no alternative, rational view-point that can avoid accepting the paranormal nature of these observations and at the same time account satisfactorily in a scientific way for the remarkable coherence of their theoretical underpinning in terms of nuclear and particle physics. The die-hard sceptic has no choice other than to offer the disclaimer that Besant & Leadbeater merely concocted all the material that they published, a desperate opinion which to more sensible minds would be just as hard (if not harder) to believe as the very claim of ESP of subatomic particles because it would imply that a vast number of instances of correlation with the author's theory, as well as with facts of nuclear physics and with facts and ideas of particle physics, amounted to nothing more than a series of astounding coincidences, the combined probability of which is infinitesimally small. Such an explanation stretches credulity beyond its breaking point and must be rejected as untenable.

Conditioned to think according to the dogma of scientific materialism that information about the world can be provided only via the channels of the five physical senses, the scientist and layperson are forced by the work of Besant & Leadbeater to face the following dilemma: on the one hand, they will admit - if they are honest and sensible - that there are no plausible normal, scientific explanations for the remarkable coherence and connections with nuclear and particle physics demonstrated in this book by a large volume of data ostensibly obtained by psychic means. They will realize that cheating and guessing are not viable options because there was no scientific knowledge about atomic nuclei and subatomic particles available to enable observations consistent with what is now known about them to be fabricated during the first decade of the twentieth century. They will also admit that the *degree* of agreement of these observations with nuclear physics, the quark and string models, as well as their measure of consistency with the predicted subquark composition of up and down quarks:

$$u = X\text{-}X\text{-}Y,\ d = X\text{-}Y\text{-}Y,$$

is too enormous to have come about by fortuitous guessing. But, on the other hand, their education within the framework of the contemporary scientific paradigm, which defines what is and what is not permissible for them to believe about the universe, allows no room to accommodate anything which does not fit this standard world-view. It is not simply a matter of some experimental anomaly requiring a new theory to replace the currently accepted one; it is far more serious than that. The scientist in particular realizes that, if he accepts them at their face value, he would be admitting that the micro-psi observations of Besant & Leadbeater *transcend the ability of materialistic science to explain.* Ever wary of condemnation by his colleagues in the scientific community, he will be reluctant to confess such a heresy publicly. Yet his intellectual conscience will not permit him to deny the rationally inexplicable links these observations have with nuclear and particle physics. Nor can he ignore their extraordinary, underlying consistency with the author's theory of MPAs. So *Occult Chemistry* puts the impartial, honest scientist in a dilemma: what should his reaction be?

Unable for reasons given in chapter 1 to make the kinds of criticisms often levelled at parapsychological experiments, such as inadequate protocols to prevent cheating by the psychic, misreporting or fraudulent manipulation of data on the part of the researcher and his own subjective judgement of what constitutes evidentiality, some scientists will prefer to repress the discomfort of their predicament by simply ignoring the challenge to materialistic science posed by the observations of Besant & Leadbeater. Such an example was Professor F.W. Aston, inventor of the mass spectrograph. When told in 1943 by their colleague Jinarajadasa that they had published in 1908 their discovery by psychic means of the neon-22 isotope six years before Frederick Soddy invented the name of 'isotopes' and twelve years before he himself separated atoms of neon-20 and neon-22 with his mass spectrograph, Aston replied that he was not interested in Theosophy![5] One might have expected more curiosity to be displayed by the scientist, even though he no doubt did not accept Jinarajadasa's claim that Besant & Leadbeater had priority in discovering the neon-22 isotope.

Others, whose intellectual honesty or curiosity makes them unable to maintain such an air of indifference, may latch onto some minor problem or criticism of the research of the Theosophists and/or the author, magnifying any faux pas they find — however minute or irrelevant — into what they delude themselves into believing is a serious error, thereby enabling them to entertain a sincerely held but thoroughly misplaced doubt that justifies either their rejection of the Theosophists' claim or their scientifically respectable stance of neutrality. Still others may argue that the micro-psi evidence is too contingent upon speculative theories and ideas of theoretical physics to amount to proof of the existence of ESP of subatomic particles. Such a view would be a complete misrepresentation of the situation because, unlike in his earlier work, the author has refrained for this very reason from using any subquark model or 'grand, unified theory' in his analysis of the observations. He has employed merely one hypothesis concerning their formation and one assumption about the subquark composition of u and d quarks - a premise which is actually not an assumption at all because it can be independently deduced from certain micro-psi observations, as was shown in chapter 5. His analysis used no untested speculations of particle physics, only facts of nuclear physics and the experimentally well-supported theory of quarks. Admittedly, the concept of mirror states is not one that is familiar to particle physicists, although it will be if the author is right in suspecting that mirror symmetry is just another name for the well-known concept of the isospin invariance of nuclear forces, in which case it should not be unexpected that mirror states - whether single bound states or clusters of such particles - should appear so often in MPAs. This is because, if the X and Y stlbquarks making up u and d quarks, which have opposite values of the isospin quantum number T_3, have themselves isospin $T_3 = \pm \frac{1}{2}$ mirror states would be isospin states with *opposite* values of T_3 and so would occupy quantum states in MPAs for which isospin is a 'good' quantum number, just as pairs of electrons in opposite spin states occupy atomic orbitals because the spin angular momenta of electrons is a 'good,' quantum number characterizing these quantum states. The presence of mirror states in MPAs would then reflect the fact that particles in MPAs occupy quantum states of opposite isospin. As far as the quasi-nuclear force binding mirror states together in MPAs is concerned, such particles would have the same mass and behave identically, just as the two isospin states of the nucleon do in atomic nuclei, ignoring the isospin symmetry-breaking due to their different electromagnetic couplings. Criticism that the evidentiality of the micro-psi observations depends upon unverified ideas or speculations must therefore be rejected as wrong.

Another possible objection which some physicists might have is that MPAs cannot exist because quantum chromodynamics forbids the existence of most of the unknown and 'exotic' bound states of subquarks or quarks that this book has identified to be present in them. This is an intellectually dishonest view because it evades the issue of how a vast number of such particles could be self-consistently related to the hypothetical subquark composition of two atomic nuclei despite, presumably, existing (as far these scientists are concerned) only in the imaginations of two human beings. It also begs the question of whether the micro-psi observer *can* - at least in the microscopic region of space under his observation - psychokinetically disturb the Higgs vacuum, which determines through its mass creating, symmetry-breaking interaction with fundamental particles the nature of the strong and electromagnetic forces creating atoms. If — as this book proves - quarks are not fundamental particles but are bound states of more basic particles, physicists must concede that not enough is known about the latter for any one of them to be able to declare confidently that no physical conditions can exist that allow multi-subquark states other than quarks or baryons to exist. It is anyway not enough for a large body of evidential observations to be dismissed merely because one aspect of them seems incompatible with an experimentally supported theory of particle physics unless another reason for this evidentiality can be offered. But, as we have seen, there exist no tenable, alternative explanations - conventional or paranormal - to micro-psi. The proper scientific attitude to take is not to dismiss summarily much otherwise evidential observations for only this reason but, rather, to study possible ways of reconciling the discrepancy with theoretical ideas. This is what the author has done. If his speculated reason for the presence of exotic particles in MPAs is wrong, perhaps a sounder proposal can be found. Only if one can prove that none exist is one justified in declaring that this aspect of the evidence is, unequivocally, at odds with particle physics.

A more serious reaction to this book would be the argument that, however powerful a theory or idea is, it can only receive support by scientists once it has been successfully tested by experiment. This means in effect that, however impressed he may be by the explanatory power of the theory of MPAs presented here, a scientist should accept it only provisionally until direct, experimental evidence is obtained of MPAs having been created by someone claiming micro-psi ability - or at least until some of the theory's predictions of observational errors by Besant & Leadbeater are tested by double-blind experiments. The author finds no fault with such an attitude. The ultimate criterion for acceptance or rejection of a scientific theory is not its self-consistency or explanatory power but whether it is supported by experimental data. In 1991 the author commenced a series of blind tests of a clairvoyant professing micro-psi ability.[6] These preliminary trials yielded sufficiently significant results to warrant more extensive testing of the objective nature of the psychic's micro-psi vision, as well as the author's theory of MPAs, hopefully in a double-blind way that eliminates the possibility of telepathy.

Occult Chemistry has been largely ignored for nearly a hundred years except by a few Theosophists who were scientists, including the distinguished biochemist Ernest Lester Smith, F.R.S. (1904-1992),[8] known for his work on the kinetics of soap making, the wartime production of penicillin and for the isolation of vitamin B12 from liver. The clairvoyant investigations of the structure of atoms by Annie Besant and Charles Leadbeater deserve the attention of anyone who is seeking incontrovertible evidence of ESP, whether or not he or she agrees with all the conclusions of the author. Their observations pose a greater challenge to materialist science than any of the weak, statistical effects revealed by card guessing or psychokinetic experiments in the parapsychology laboratory because - unlike such evidence - the micro-psi data accumulated over thirty-eight years cannot be criticised for any of the usual reasons sceptics of the paranormal give for rejecting the findings of parapsychologists, such as poorly controlled experimental conditions, bad statistics, non-repeatability of the experiment and uncertainty over the experimenter's honesty. These perennial reasons for disbelieving the claims of psychics and parapsychologists are irrelevant in the context of highly evidential descriptions of subatomic particles published in 1908 two years before Rutherford's experiments confirmed the nuclear model of the atom, five years before Bohr presented his theory of the hydrogen atom, twenty-four years before Chadwick discovered the neutron and Heisenberg proposed that it is a constituent of atomic nuclei, and fifty-six years before Gell-Mann and Zweig theorized about quarks. Indeed, it is the scientific or rational inexplicability of psychic observations which are confirmed by discoveries in science many years later that makes the work of Besant & Leadbeater unique in the annals of psychical research. The fact that not even historians of psychical research seem to know about this pioneering forerunner of modern parapsychological experimentation, let alone most contemporary parapsychologists, is not hard to understand, given that what becomes recognized as fact in this subject - as in any branch of conventional science - is sometimes a matter not so much of what is the truth but of how much effort researchers make in bringing their discoveries to the attention of others. In view of this, the following statement, written in 1951 by Jinarajadasa when he compiled the third edition of *Occult Chemistry*, is perhaps a fitting conclusion to this book:

> 'With the information revealed in *Occult Chemistry* a great expansion of our knowledge of Chemistry lies in front of us. It is just because this expansion is inevitable, that our clairvoyant investigators have toiled patiently for thirty years. They have claimed no recognition from chemists or physicists, because truth accepted or rejected is truth still, and any fact of nature seen and stated clearly will sooner or later be woven into the whole fabric of truth. The fact that this generation of scientists hardly knows anything at all of an extraordinary work of research extending for thirty years matters little, when we contemplate the long vistas of scientific investigation which the imagination sees awaiting mankind.'

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4. Ibid.
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7. *Extra-sensory Perception of Quarks*, p. 16.
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A CHRONOLOGY OF MICRO-PSI INVESTIGATIONS

1895 *Lucifer*, London, November: hydrogen, nitrogen, oxygen.

1907 *The Theosophist*, vol. 29, part 1: hydrogen, sodium, chlorine, copper, bromine, silver, gold.

1908 *The Theosophist*, vol. 29, part 2: occultum, lithium, beryllium, boron, carbon, nitrogen, oxygen, fluorine, sodium, magnesium, aluminium, silicon, phosphorus, sulphur, chlorine, potassium, calcium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, gallium, germanium, arsenic, selenium, bromine, rubidium, strontium, yttrium, zirconium, niobium, molybdenum, ruthenium, rhodium, palladium, silver, cadmium, indium, tin, antimony, tellurium, iron, osmium, iridium, platinum, 'platinum B,' gold.

The Theosophist, vol. 30, part 1: lithium, carbon, fluorine, potassium, titanium, manganese, iron, cobalt, nickel, germanium, rubidium, zirconium, ruthenium, rhodium, palladium, tin, osmium, iridium, platinum, radium, helium, neon, meta-neon, argon, meta-argon, krypton, meta-krypton, xenon, meta-xenon, kalon, meta-kalon.

Occult Chemistry, by Annie Besant and C.W. Leadbeater, Theosophical Publishing House (Adyar, Madras, India).

1909 *The Theosophist*, vol. 30, part 2: caesium, barium, lanthanum, cerium, praseodymium, neodymium, promethium (called 'A',' then 'illinium'), meta-illinium, elements 'X,' 'Y,' & 'Z,' samarium, gadolinium, terbium, dysprosium, erbium, thulium, tantalum, tungsten, osmium, iridium, platinum, mercury, thallium, lead, bismuth, actinium (called 'C'), thorium, uranium.

1919 *Occult Chemistry*, 2nd ed., by Annie Besant and C.W. Leadbeater, Theosophical Publishing House (London, England).

1924 *The Theosophist*, vol. 45: uranium, sodium chloride, methane, water, hydroxyl group, hydrogen peroxide, methyl alcohol, acetic acid, benzene, sodium hydroxide, hydrochloric acid, carbon monoxide, carbon dioxide, sodium carbonate, chlorine isotope.

1925 *The Theosophist*, vol. 46: calcium hydroxide, calcium carbide, acetylene, methyl chloride (and isomer), chloroform, carbon tetrachloride, naphthalene, anthracene, ozone, diamond.

1926 *The Theosophist*, vol. 47: graphite, tellurium isotope.

1932 *The Theosophist*, vol. 54: adyarium, occultum, lithium, fluorine, sodium, chlorine, potassium, manganese, iron, cobalt, nickel, copper, bromine, rubidium, technetium (called 'masurium'), ruthenium, rhodium, palladium, elements 'X,' 'Y,' & 'Z,' silver, iodine, caesium, promethium (called 'illinium'), gadolinium, erbium, ytterbium, rhenium, osmium, iridium, platinum, 'platinum B,' gold, astatine (called '85'), francium (called '87').

1933 *The Theosophist*, vol. 54: helium, neon, meta-neon, argon, proto-argon, meta-argon, krypton, meta-krypton, xenon, meta-xenon, kalon, meta-kalon, radon, meta-radon, two varieties of ozone, three varieties of oxygen, two varieties of hydrogen.

1951 *Occult Chemistry*, 3rd ed., by Annie Besant and C.W. Leadbeater, edited by C. Jinarajadasa and E.W. Preston, Theosophical Publishing House (Adyar, Madras, India).

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