STRUCTURE OF THE ATOM
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THE STRUCTURE OF THE ATOM

After the many articles that have been written about the structure of the atom, it would seem that another treatise on this subject would be wholly superfluous. It is however the writer's contention that the real atom is completely different from the usual versions of it, and that there is no such thing as an atomic nucleus within any reasonable meaning of that term.

The nuclear theory starts out with protons, electrons and neutrons—a complex array of pointlike particles which the nuclear theory just takes for granted as being "given", although these particles are the very things that call for explanation. These elementary particles form the atomic oscillators which enable the atoms to absorb and emit energy at definite frequencies, and an oscillator must always have a rigid structural framework which cannot be formed of pointlike particles that are themselves devoid of structure. As long as we deal with these particles as structureless points in space, we cannot hope to arrive at the true structures of the atoms because the structure of an atom must depend on the structures of its parts. There is an abundance of evidence that an atom is a rigid structure and not merely a swarm of pointlike electrons hovering about a pointlike nucleus. It would be impossible for atoms to form rigid crystals if the atoms themselves were not equally rigid structures.

For experimental support the nuclear theory depends primarily on the occasional large-angle deflections of alpha particles that have collided with gas atoms, but such large-angle deflections would also be produced by atoms in which all parts are firmly

bound to a tiny central region, although not contained within the same. These deflection experiments only prove that the atom is a centralized structure, but not that it is a nucleated structure.

It seems that what we need here is some new basic concept that is more fundamental and at a lower level than protons, electrons and neutrons. Such a concept is fluid motion, and more specifically vortex motion. During the 19th century such a fluid was called the "ether", but 19th century physicists made certain unnecessary assumptions about the nature of the ether which resulted in the eventual abandonment of the ether theory. They assumed that the ether must be entirely frictionless and without viscosity because, according to their reasoning, if the ether were not perfectly free to move in any direction, then the planets would be retarded in their orbits and the year would become continually longer. What they failed to consider was that in order to exert such a retarding effect on the planets, the ether would have to absorb the kinetic energy of the planets, and absorption of energy can be done only by atomic oscillators which the free ether does not contain.

It has also been argued that the existence of an ether was disproved by the Michelson-Morley experiment, first performed in 1881, but the Michelson-Morley experiment has only disproved the existence of a stagnant ether. The correct explanation for the Michelson-Morley experiment seems to have been given by George Stokes who considered the ether in the neighborhood of the earth as being carried along by the earth's gravitational field. Physicists however refused to accept Stokes' explanation because they thought it was contradicted by astronomical aberration, but a moment's consideration should have made it clear that astronomical aberration would have to

occur with any kind of an ether and that it does not disprove Stokes' theory.

Since the gravitational field of the earth is tied up with that of the sun, it would be more correct to speak of the combined gravitational field of the earth and the sun, and such a combined field would still be stationary relative to the earth as far as its orbital movement is concerned, and would fully account for the Michelson-Morley experiment.

There still remains to be considered the rotation of the earth on its axis. Since the earth's axis is approximately perpendicular to the plane of its orbit about the sun, it necessarily follows that since the earth's gravitational field remains tied up with that of the sun, the ether around the earth cannot partake of the rotation of the earth on its axis, but would produce an ether drift of about one-third of a mile per second at the equator, and less elsewhere. That such an ether drift actually exists was proved by the Michelson-Gale experiment in 1925.

Further evidence of an ether that is stationary relative to the earth was also furnished by the Sagnac experiment first performed in 1913 in France in an effort to disprove Einstein's relativity theory, and with minor variations several times since then, but always with the same positive results. It consisted of splitting a beam of monochromatic light into two component beams which were sent in opposite directions around the periphery of a turntable by means of mirrors and were brought together again so as to produce interference fringes which were recorded on a photographic plate. When the table with all the apparatus on it was slowly rotated the interference fringes were shifted by an amount equal to what the shift would be if the light waves traveled in a medium

that was stationary relative to the earth. The same positive result was obtained regardless of whether the source of light was carried by the turntable or was on a stationary support adjacent the turntable, which rules out any attempted explanation based on the movement of the source of light. The only possible explanation for the shifting of the interference fringes when the table was rotated is that the light waves of the two component beams traveled in a medium, namely an ether, which is stationary relative to the earth's gravitational field.

The finite velocity of light proves that the ether must have mass and inertia, but how is that possible with an ether which is not granular or corpuscular? It seems that this difficulty can be avoided by considering inertia as being primarily a property of motion. In fact, motion without inertia would be a contradiction in terms. Inertia merely means continuity of motion, and without continuity there could not be any motion. Continuity must be either toward and from infinity or around a circle or other closed path, and whenever the motion is in a closed path it will appear as localized inertia which is just another name for mass. With mass thus accounted for, it is not difficult to account for matter, because matter is nothing but a highly concentrated form of localized mass. Less concentrated forms of localized mass are electric and magnetic fields.

Similar considerations are also applicable to the ether. Any ether which actually exists must have mass and inertia, because an ether without mass and inertia is inconceivable. If however we are correct in our interpretation of mass and inertia as properties of motion, then it necessarily follows that the only kind of an ether which can exist is a dynamic or turbulent ether. The perfectly quiescent or stagnant

ether of the 19th century was therefore a theoretical impossibility. The real ether is not a material substance at all, but is something abstract and intangible.

The basic principle of this new ether vortex theory is that ether currents flowing in the same direction attract or are urged toward each other, while ether currents flowing in opposite directions repel each other. Such a behavior is evidenced by the red shift. Although several decades have passed since the red shift was first discovered, the scientific profession is still interpreting it as a Doppler effect and is trying to explain it on the basis of the old doctrine of an expanding universe, which is as fantastic as it is absurd. A more reasonable explanation would seem to be that offered by Einstein when he suggested that light radiation may "get tired" during its long journey from distant nebulae, but even Einstein's explanation is confronted with serious difficulties because the velocity with which any kind of wave motion travels through an intervening medium depends only on the properties of the medium and not on the length of time of travel.

What appears to have been the correct explanation for the red shift was given by the writer in an article on page 428 of the Aug.-Sept., 1931 issue of POPULAR ASTRONOMY, but since the scientific profession seems to have completely overlooked that article, it has now been reprinted as follows:

An Alternative Explanation for the Red Shift

There has been much speculation during recent years as to the significance of the "red shift" of the spectra of distant celestial bodies. It seems to be the prevailing opinion that the red shift indicates that all distant bodies move away from the earth, and that the speeds with which they move away are pro-

portional to their respective distances from the earth. This conclusion is, however, so preposterous that its final acceptance should be withheld until careful consideration has been given to all alternative explanations.

It appears that the red shift can be accounted for in a more reasonable manner by assuming that each train of light waves during its journey through space will undergo a slight expansion. Since recent experiments have shown that light waves exhibit many of the properties of corpuscles, it would appear to be not unreasonable to assume that one of those properties which are exhibited by waves and corpuscles alike is the tendency to expand. A single train of light waves being always very short as compared with interstellar distances, it would require only an extremely small difference of velocity between the waves at the front and rear ends of the train to produce the observed red shift. (POPULAR ASTRONOMY, Vol. 39, No. 7, p. 428.)

Since each train of light waves is produced by only a single electron jump from one position to another in an atom, there cannot be more than just a limited number of waves in each train. If we now make the reasonable assumption that the radiant pressure which these light waves are capable of exerting will also be exerted between adjacent wave fronts, then the entire wave train will gradually expand during its long journey through space. It is not the universe, but each individual wave train which exhibits the phenomenon of expansion. It is just another manifestation of the second law of thermodynamics—an increase of entropy with a loss of available energy.

The repulsion between adjacent wave fronts which is here invoked to explain the red shift is the result of ether currents flowing in opposite directions. It is the same kind of repulsion that keeps a vortex electron from plunging into an adjacent proton. The red shift

therefore gives direct experimental support to the vortex atom theory.

Before going into the details of atomic structure, we should first understand why the elementary particles of matter exist at all, and why it is reasonable to assume that they are vortex formations. The one distinguishing characteristic of the elementary particles of matter is their localized persistence of individuality, and that is also the distinguishing characteristic of vortex motion of the smoke ring type. When a vortex ring is distorted in any manner, it will of its own accord revert to the circular form. This is not due to any unique property of the material of which it is made, but is inherent in the form of the motion itself. The rotating vortex filament will tend to throw its material out radially in all directions, but it cannot do so as long as the vortex filament has no free end into which material can enter from the outside. Since the total volume of the rotating filament must remain constant, the filament can become thicker only in proportion to its shrinkage to a smaller over-all diameter, and the limit would be reached when the central opening of the vortex ring becomes completely closed. When the ring has reached such a state of equilibrium and cannot shrink any further, it will constitute an ether sink on one side and an ether source on the other side. Such a vortex ring could be considered as a neutrino and could serve as the elementary building block of all matter. Tiny rotating globules of ether could not serve this purpose because they would immediately burst apart by centrifugal force.

Although the ether does not have ordinary frictional viscosity, it may nevertheless have a sort of idealized viscosity or "viscidity" by virtue of which its direction

of flow is controlled without any absorption of energy. Such an ether would still have perfect fluidity and should be capable of both wave motion and vortex motion. Nineteenth century physicists however made the erroneous assumption that vortices in the ether would have no coordinating influence on one another, and that was the reason why no further progress was made with the vortex atom theory. On the other hand if the ether does have viscidity, then adjacent vortex rings would tend to position themselves with rolling contact, which would make possible only a limited number of different structural formations, and it can be shown that these are exactly such structures as would account for protons, electrons and neutrons. Two vortex rings with face-to-face rolling contact can form two different structures depending on whether the motion between them is inward or outward. These may be considered as protons and electrons respectively. Although two rings can form two different structures, a group of three rings in face-to-face rolling contact can form only one structure, which can only be the neutron. Heavier isotopes of these particles could then be formed by bringing two or more of them into alignment with each other with rolling contact between them.

Since the vortex neutron has at one end of it the structure of a proton and at the other end of it the structure of an electron, such neutrons could be substituted for the protons and electrons of a hydrogen molecule. The structure thus produced, consisting of four neutrons in radial formation, would be the helium atom. Free neutrons do not ionize because it is easier for them to rebound than to dissociate, but when a neutron has several other neutrons attached to it, as in the helium atom, then it will not rebound so easily, but will dissociate when sufficiently disturbed.

All the other atoms could then be constructed by joining additional helium and hydrogen groups to the central helium group. Every atom thus constituted would have a rigid framework with a structural center, but no nucleus. Such atoms would adequately explain the large angular deflections of alpha particles observed long ago by Ernest Rutherford, and being rigid structures, they would also provide the necessary atomic oscillators for the absorption and emission of radiation at definite frequencies, on which the entire system of quantum mechanics is based.

The success of quantum mechanics is usually heralded as a victory for the nuclear theory, but actually it is a victory for the vortex theory and a disproof of the nuclear theory. There is nothing in the nucleated atom that could possibly bring about any quantization of energy, but that is exactly what the vortex atom should be capable of doing. Since the vortex electron has a specific structure, it should also have a definite frequency of vibration, and should therefore be able to establish a system of standing waves in the ether currents that interlink the electron with its associated proton. Since the vortex electron must always be at the free end of such a standing wave, it would not be able to occupy any arbitrary position relative to the proton, but only certain particular positions, exactly as quantum mechanics requires. Another difficulty with the nuclear theory is that an orbital electron would radiate its energy away continuously, but that cannot happen in the vortex atom which has no orbital electrons.

That the atoms in nature really are such radial structures as distinguished from nucleated structures is evidenced by the unsymmetrical splitting of the uranium atom. Under the nuclear theory when a

uranium atom splits, it should break into approximately equal halves, but it never does. One fragment is always much larger than the other fragment. This however is exactly what the vortex theory requires, because when splitting occurs the central alpha particle will have to go definitely to one side or the other, and whichever side it goes to will be the heavier of the two fragments.

This new vortex theory explains for the first time why there are just the known chemical elements and no others. Thus in the first two series of the Periodic Table there are eight elements, in the next two series eighteen, and so on. Under the nuclear theory there could just as well have been four, six or twelve elements in these series. In the vortex atom however the radial branches of the lighter atoms must pass through exactly eight stages during their building up process from one inert gas structure to the next one, until we get to argon. Thus it will be seen in the diagrams that the neon atom is formed by adding four peripheral helium groups to the central helium group, while the argon atom is formed by adding four peripheral helium groups to the neon structure. Each helium group however can be added in two stages—first by the addition of a hydrogen group, and then by the conversion of the hydrogen group into a helium group. This adds up to a total of eight stages. The nuclear theory tries to explain these eight stages by conjuring with the mystic word "octet", without however offering one word of explanation as to why such an octet would be more stable than a quadret or a sextet.

The periodic table is made up of two short periods of eight elements, two long periods of eighteen elements, and then a still longer period of thirty-two elements. Logically it would seem that the number

of electrons in the successive shells of the atoms should increase uniformly as the size of the atom increases, but it does not happen that way in nature.

The vortex theory accounts for the above numbers of elements exactly, provided we adopt the Hilgenberg theory for the structures of the heavier elements. The two short periods of eight elements have never given any special difficulties under the vortex theory, and with the help of Hilgenberg's cyclic structures it is now also possible to account satisfactorily for the longer periods. The two short periods represent successive additions of four helium groups to the core structures, and since four is an even number, it might be expected that subsequent increments would likewise consist of even numbers of added helium groups. The third and fourth periods however consist of eighteen elements, and therefore represent successive additions of *nine* helium groups.

This sudden transition from even numbers to odd numbers of added helium groups cannot be explained under the nuclear theory, but under the vortex theory the explanation is obvious, one extra helium group being required to close each of the two hexagonal rings in the core structures.

After the two rings are thus closed, as in the xenon atom, the resulting core structure will have eight radial branches, ready to take on the sixteen additional helium groups that are necessary to produce the radon atom.

While the peripheral structures of nucleated atoms consist entirely of negative electrons, the peripheral structures of vortex atoms consist of two different kinds of units, namely hydrogen groups and helium groups. This enables us to account for the different melting points of the various elements because the

hydrogen groups serve as valence bonds for anchoring the atoms to one another while the helium groups are chemically inert and keep the atoms away from one another. Hence those atoms or molecules which have the most hydrogen groups and the fewest helium groups in their peripheral structures will have the highest melting points. Thus lithium with only one hydrogen group melts at 459° absolute, beryllium with two hydrogen groups melts at 1550°, boron with three melts at 2300°, and carbon with four softens at 4500°. Nitrogen, oxygen and fluorine form diatomic molecules with only helium groups on their peripheries. Nitrogen with two such peripheral helium groups melts at 63° absolute, oxygen with four helium groups melts at 55°, and fluorine with six helium groups melts at 50°. Neon has no hydrogen groups at all, and melts at 24°. Is this just a series of chance coincidences? A series of eight different melting points can be arranged in factorial 8 or 40,320 different ways, hence the probability of such a combination of coincidences would be only one chance in 40,320—a rather narrow margin for chance. Carbon is unique in this respect because it is the only element (except hydrogen) whose atoms have no exposed helium groups, which explains why carbon is the most refractory of all elements.

Under the nuclear theory among the lighter elements only carbon can have a tetrahedral atomic structure, but under the vortex theory nitrogen and oxygen also have atomic structures that are essentially tetrahedral. Thus the nitrogen vortex atom has one peripheral helium group and three peripheral hydrogen groups, while the oxygen vortex atom has two peripheral helium groups and two peripheral hydrogen groups. This explains why the valence angles of nitrogen and oxygen are 108° and 105° respectively. Since the

helium group is more bulky than the hydrogen group, the three hydrogen groups of the nitrogen atom will not be 109.5° apart as in the carbon atom, but will be crowded together slightly so that the nitrogen atom will have a valence angle of only 108°. In the oxygen atom the two peripheral helium groups will crowd its valence bonds together still more, which explains why the valence angle of the oxygen atom is only 105°.

The vortex theory will also explain why oxygen is chemically active while nitrogen is relatively inert. When two oxygen atoms are joined to each other through their valence bonds to form a diatomic molecule, the peripheral helium groups of the two atoms will bump up against each other so as to oppose the efforts of the valence bonds to hold the two atoms together. In the nitrogen molecule however the two atoms are held together by a triple bond at the center of the molecule while the peripheral helium groups are at opposite ends of the molecule. All of this contributes to the stability of the nitrogen molecule, and molecular stability means chemical inertness.

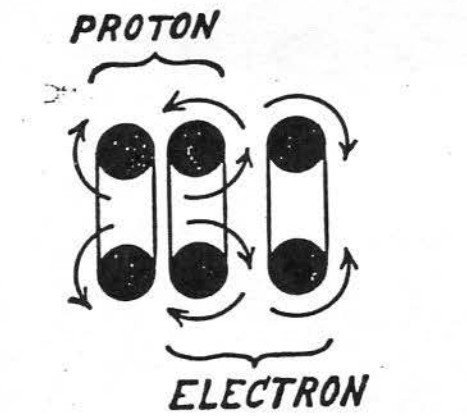
However convincing these arguments may be, there is still another argument that should not be omitted. When subjected to critical analysis, the nuclear theory has never given any really satisfactory explanation of why two atoms will combine chemically with each other at all. Nucleated atoms have only negative electrons in their peripheries, and these repel one another. How then could such electrons possibly hold two atoms chemically joined to each other by well defined valence bonds, especially when the electrons move in orbits around the atoms and the positive charges are at the centers of the atoms, far remote from the peripheries where chemical bonding occurs? Nuclear physicists will probably say that the writer is merely belaboring a man of straw—an extinct

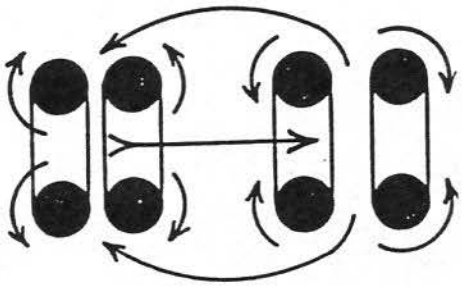
species, and that the physicists of today are no longer dealing with planetary electrons. The taking of such a position is like jumping from the frying pan into the fire. The planetary electron theory at least gave us some tangible concepts to work with, but the modern wave-atom theory only tells us what we do not know about the structures of the atoms. The planetary electron theory may have had its difficulties, but the modern wave-atom theory has its impossibilities. Every schoolboy knows that waves are not localized in space like the elementary particles of matter.

We do not need to delve further into the structures of the heavier elements to prove that the nuclear theory is wrong. At the very beginning of the Periodic Table we find the element helium which according to the nuclear theory has a lower isotope of mass 3, but although this is called an "isotope", its properties are entirely different from those of ordinary helium. It is indeed an inert gas, but it is more different from ordinary helium than neon is different from argon, or than sodium is different from potassium. Under the nuclear theory however its properties should be substantially the same as those of ordinary helium because, under the nuclear theory, each of them consists of a tiny central nucleus with a charge of + 2, and an outer shell of two electrons. It is only the vortex theory which can account for the anomalous properties of helium–3. As the subsequent diagram shows, the vortex atom of helium–3 consists of a cluster of three neutrons which obviously cannot have the same properties as a cluster of four neutrons if properties depend in any manner on structure, as indeed they must.

Since the hydrogen groups of a vortex atom are at the ends of radial branches, it should be possible for

them to form chemical bonds with each other, and these may assume two different forms. They may completely neutralize each other, or they may only partially neutralize each other in such a manner that in combination they function as a single valence bond. It is therefore difficult from chemical evidence alone to determine the number of hydrogen groups on an atom, and yet that is what we must know if we are to determine the structure of the atom. Unless some new principle of atom-building can be discovered, it will probably be a long time before the structures of the heavier atoms are ascertained with certainty. Melting points must always be given careful consideration in making a choice between two or more possible atomic structures, and a complete list of melting points has therefore been presented. For convenience in making comparisons, they have been expressed on the absolute temperature scale. Since many of the elements exist as diatomic molecules, their melting points are indicative of the structures of the molecules rather than of the structures of the constituent atoms.

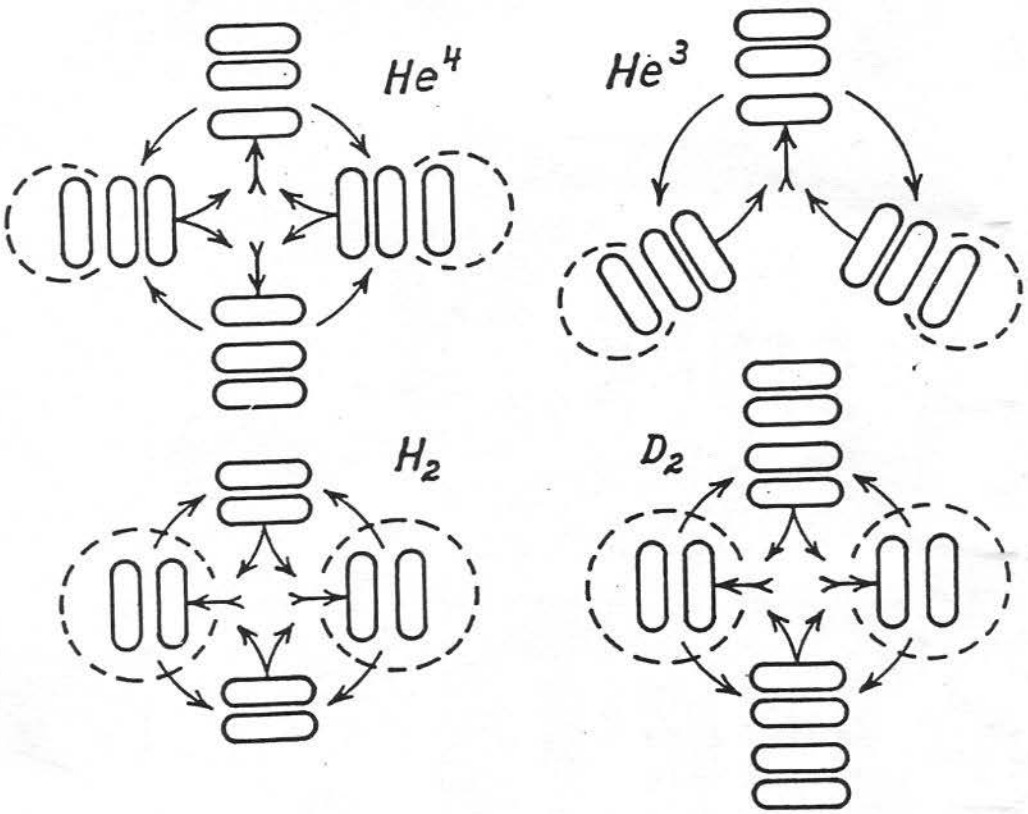




The neutron and the hydrogen atom—two electrically neutral particles of mass 1, but with entirely different properties and incapable of being converted into each other. If any explanation for this were possible under the nuclear theory, then it would have been found long ago.

During unsuccessful efforts to get this vortex theory published in an accredited physics magazine, the writer was told that the vortex theory has not yet reached the quantitative stage, although the fact is that there are few if any quantitative calculations under the nuclear theory which could not be made just as readily under the vortex theory, with only a few changes of nomenclature. On the other hand the nuclear theory has not yet given us even a satisfactory qualitative explanation of why the electron of the hydrogen atom does not plunge into the proton, or why there can be both a hydrogen atom and a neutron.

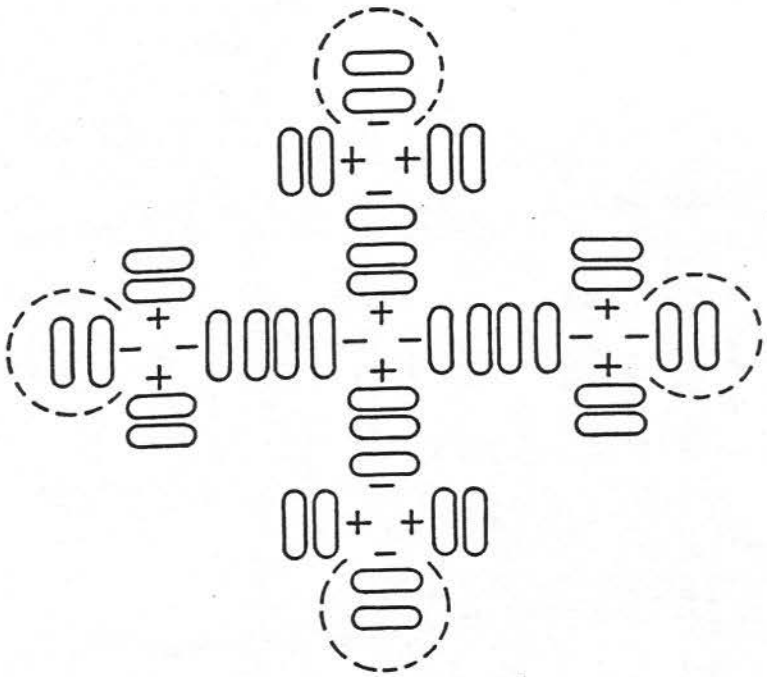
Whatever success can be accredited to the nuclear theory has been due entirely to the arbitrary postulates that have been injected into the nuclear theory to make it succeed, but arbitrary postulates only beg the question and do not really explain anything. What is needed here is a sure-enough explanation and not just a restatement of the problem or the substitution of a greater difficulty for a lesser one.



Ordinary helium and its so-called ''lower isotope'', as compared with true isotopes like those of hydrogen.

Helium-4 is shown here as a polymer of four neutrons, and helium-3 as a polymer of three neutrons. Helium and other inert gases ionize by shedding terminal vortex rings, whereas chemical ionization occurs by the liberation of complete electrons. Helium-4 and helium-3 are both inert gases forming divalent ions, but that is not sufficient to make them isotopes.

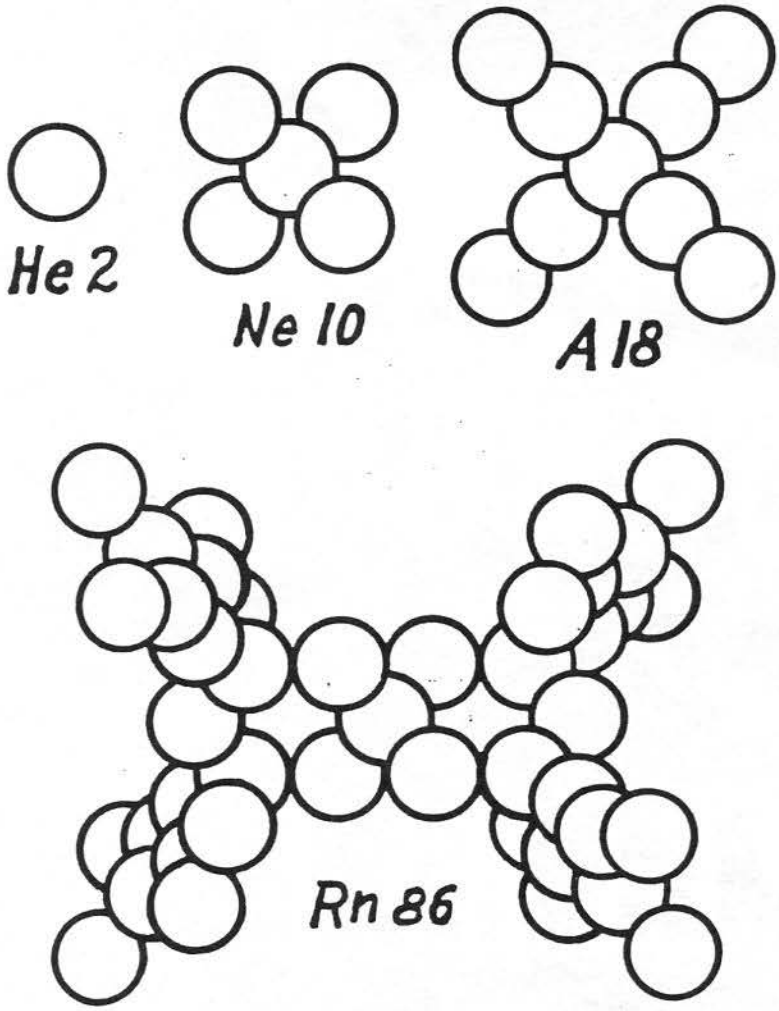
These diagrams also show that inert gas atoms ionize by the elimination of electrons and not by the release of electrons, which explains why they do not form chemical compounds. Since they cannot release electrons, they can also not share electrons so as to form chemical valence bonds.



The carbon atom. Although this is an electrically neutral atom, the number of electrons here is not equal to the number of protons. Electrification however is a surface phenomenon and we do not need to assume that the classical principles of electricity are applicable inside the atoms.

This carbon atom has two antiprotons, one at each side of the center. Since the antiproton contains four vortex rings, it is about twice the size of a proton—a fact which has been established experimentally. The antiproton is actually a heavy isotope of the electron, and was described by the writer in 1933 as a "double electron". Although the antiproton is stable when it forms a structural part of an atom, it can be isolated only with difficulty because at high velocity it tends to lose one of its terminal vortex rings so as to become a neutron.

Unlike the nucleated atom with its free electrons scattered in a melee of confusion throughout the entire interior, the vortex atom has its free electrons arranged in orderly fashion on the ends of its radial branches—exactly where they are needed to form chemical valence bonds.

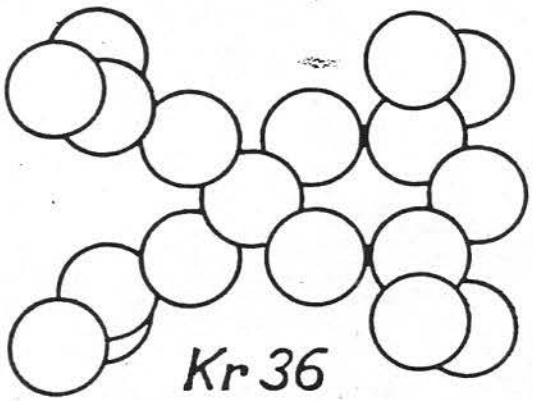


Inert gas atoms. They consist of radial and cyclic clusters of helium groups, each of which adds 2 to the atomic number.

Since inert gas atoms have no peripheral hydrogen groups, they cannot form chemical bonds and therefore remain monatomic and gaseous down to very low temperatures.

When in the liquid state they do not conduct electricity because, unlike the metals, they do not liberate free electrons.

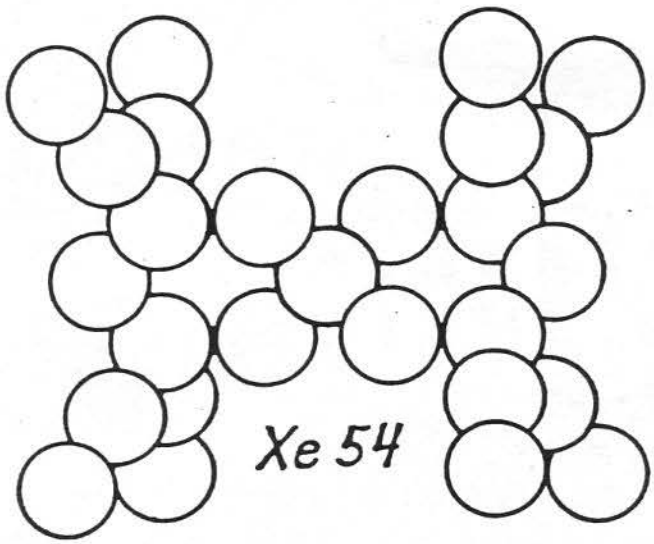
Instead of conjuring with ''magic numbers'' as nuclear physicists have been doing in their futile efforts to account for the inert gas structures, the vortex theory uses science instead of magic, and with far greater success. As these diagrams show, the inert gases can be accounted for under the vortex theory throughout the entire Periodic Table on the basis of an orderly building-up process.



The krypton atom. This new form of atom was introduced by O. C. Hilgenberg in Germany in an effort to avoid certain inherent difficulties in the earlier versions of the vortex theory, and also to bring the vortex theory into better agreement with quantum mechanics.

In the Hilgenberg atom the radial branches formed of helium groups are brought together in pairs so as to form six-atom rings, similar to miniature benzene rings.

Although the argon atom has an even number of radial branches, nine helium groups had to be added to it to convert it into the krypton atom because one helium group was required to close the first ring.

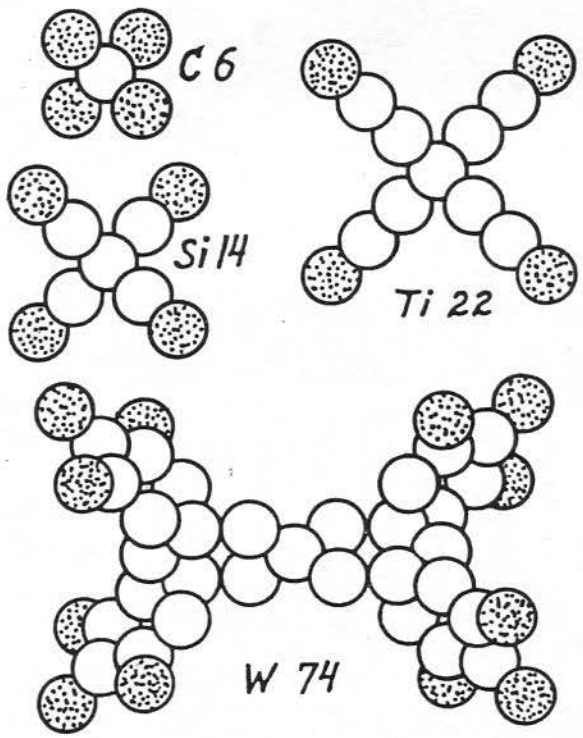


The Hilgenberg xenon atom—a very symmetrical structure with two closed rings which is formed by the addition of nine helium groups to the krypton atom.

Since the xenon atom has eight radial branches, it is not difficult to see how the radon atom could be produced therefrom by the addition of sixteen more helium groups.

The Hilgenberg closed ring system makes possible the building up of all atoms from the same original structural center.

In each of these inert gas atoms the terminal helium groups at the ends of the radial branches are all at the same distance from the center of the atom.



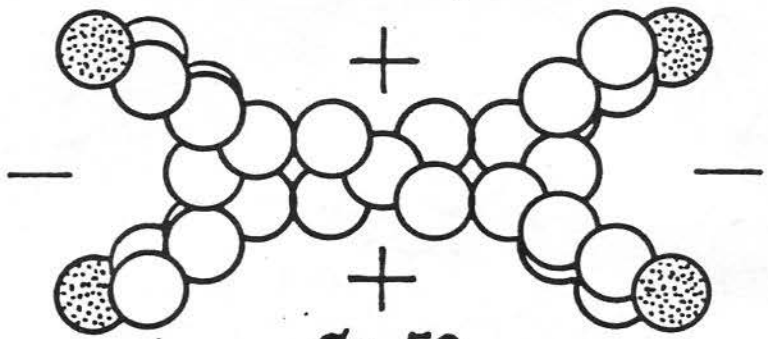
Atoms with peripheral hydrogen groups. The chemical valence of an element is not always equal to the number of hydrogen groups on its atoms because valence bonds may be branched or joined to other bonds of the same atom. Each hydrogen group adds 1 to the atomic number.

Since these atoms have an abundance of hydrogen groups by which they can become anchored to one another, they will resist fusion up to relatively high temperatures.

Unlike the inert gases, these atoms liberate free electrons and will therefore conduct electricity.

Although tungsten has a maximum chemical valence of 6, it is shown here as having twelve hydrogen groups. There are many elements whose chemical valence is less than the number of hydrogen groups because some of the hydrogen groups may already be combined with each other, or the addition of more substituents to the molecule may be prevented by steric hindrance.

The presence of twelve hydrogen groups on the tungsten vortex atom is exactly what it should be to produce the eleven intermediate elements between tungsten 74 and radon 86 by changing these hydrogen groups one-by-one into helium groups. The large number of hydrogen groups on the tungsten atom is evidenced by the high melting point of tungsten.



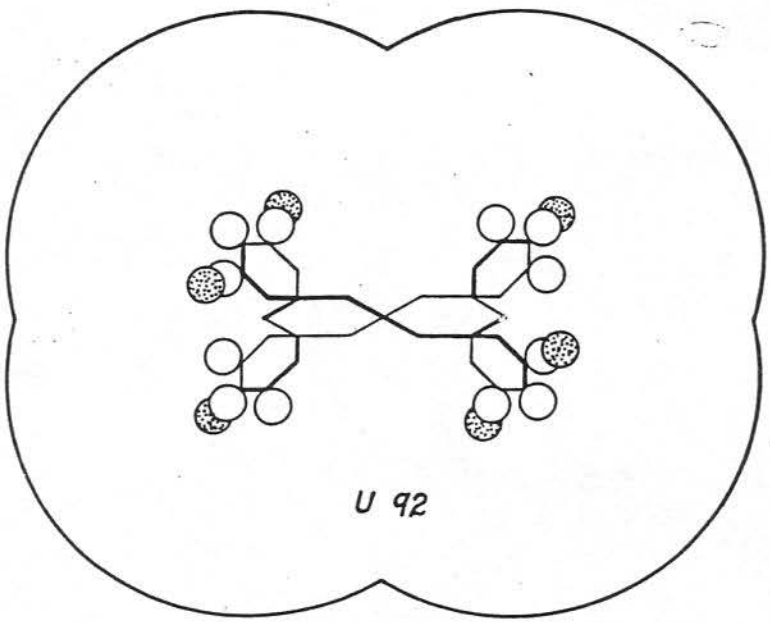
A rare earth atom, and specifically the cerium atom, although similar structural features occur in the atoms of all the rare earths.

The rare earths all have a chemical valence of 3, with almost identical chemical properties. Ordinarily the valence changes from element to element during atom-building processes, but in the rare earths it remains continually 3 until hafnium is reached. The conclusion is therefore inevitable that there must be some unique feature in the peripheral structures of the rare earth atoms that remains the same throughout the entire series.

All the rare earth atoms have the xenon core structure with its two closed rings, joined to each other by a single central helium group. The peripheral hydrogen groups, which would ordinarily serve as valence bonds, are in two spatially separated groups on the outer portions of these rings, and these two regions will therefore be electronegative relative to the equatorially contracted central portion of the atom. The lines of electrostatic force from the electrons of the hydrogen groups will therefore converge from both ends of the atom toward the contracted central portion thereof which will be electropositive relative to the ends.

When another atom such as a halogen with a peripheral valence electron comes into such an electric field, it will position itself with its valence electron drawn in toward the positive center of the atom. Since there is only a single helium group in this central region, the halogen atom will be able to get very close to the center of the rare earth atom, and two more of such atoms are as many as will find room in this restricted central region.

Eventually however the end portions will become sufficiently built up to close off the equatorial space, and the peripheral hydrogen groups of the erstwhile rare earth atoms will then again function as valence bonds. From there on the valence and chemical behavior will again change from element to element.



The complete uranium atom. The structural core occupies only a small portion of the volume of the atom, the greater part of the volume being occupied by circulating ether currents, which have been omitted in the other diagrams. These circulating ether currents are the main source of energy when atomic fission occurs, because they will continue to exert expansive forces long after the core structure is torn apart.

With apologies to the nuclear physicists who have said that this vortex theory has not yet reached the quantitative stage, the relative dimensions in the above diagram can be calculated. Since the experimentally determined radii of the largest atoms are only about 1.5 times the radii of the smallest atoms, and since the cores of the largest vortex atoms are about 10 times larger than the cores of the smallest vortex atoms, the ratio of the total radius to the core radius of a helium group can be calculated from the equation

$$1.5\ (r + x) = 10\ r + x$$

where x is the radial extent of the externally circulating ether currents around each helium group, and r is the radius of the core of such helium group.

MELTING POINTS IN DEGREES ABSOLUTE

1 H 14		18 A 84		36 Kr ... 116		54 Xe ... 133				86 Rn ... 202	
2 He 1		19 K 335		37 Rb 312		55 Cs 301				87 Fr	
3 Li 459		20 Ca 1124		38 Sr 1044		56 Ba 977				88 Ra 1230	
4 Be 1550		21 Sc 1470		39 Y 1980						89 Ac	
5 B 2300		22 Ti — 2000		40 Zr 1970		57 La 1100		72 Hf 1970		90 Th 2120	
6 C —— 4500		23 V 1980		41 Cb 2220		58 Ce 913		73 Ta 3280		91 Pa	
7 N 63		24 Cr 1890		42 Mo — 2890		59 Pr 1210		74 W — 3640		92 U 1410	
8 O 55		25 Mn 1530		43 Tc 2500		60 Nd 1110		75 Re 3370		93 Np	
9 F 50		26 Fe — 1806		44 Ru 2720		61 Pm		76 Os 2970		94 Pu	
		27 Co 1750		45 Rh 2230		62 Sm 1570		77 Ir 2720		95 Am	
10 Ne 24		28 Ni 1725		46 Pd 1830		63 Eu		78 Pt 2030		96 Cm	
		29 Cu 1356		47 Ag 1234		64 Gd		79 Au 1336		97 Bk	
11 Na 371		30 Zn 692		48 Cd 594		65 Tb		80 Hg 236		98 Cf	
12 Mg 924		31 Ga 303		49 In 428		66 Dy		81 Tl 577		99 En	
13 Al 932		32 Ge 1230		50 Sn 505		67 Ho		82 Pb 600		100 Fm	
14 Si — 1690		33 As 1088		51 Sb 904		68 Er		83 Bi 544		101 Mv	
15 P (red) 863		34 Se 493		52 Te 726		69 Tm		84 Po		102 Nm	
16 S 386		35 Br 266		53 I 387		70 Yb		85 At			
17 Cl 172		36 Kr ... 116		54 Xe ... 133		71 Lu		86 Rn ... 202			
18 A 84											

If the elementary forces which act at a distance can be explained at all, then their explanation must be based on the different forms of fluid motion because no other basis for their explanation is conceivable. It is indeed possible to describe these elementary forces very accurately with mathematical equations, but description is not explanation. In order to explain these forces, we must express them in terms of something more elementary and at a lower level, which cannot be anything else than fluid motion. The fluid referred to is usually called the "ether". The existence of some medium of that sort for the transmission of light radiation and elementary forces is a logical necessity, but we do not need to call it an "ether", nor do we need to consider it as a material substance of any kind. It may be something abstract rather than something concrete—a form of thought rather than a form of matter. The realm of the psychical over-laps the realm of the physical, and the ether may be that portion of nature which is common to both.

Electric force is polarized, and the poles can be separated from each other. Although magnetic force is also polarized, the magnetic poles cannot be separated from each other. Gravitational force on the other hand is not polarized. No other set of conditions is possible. It appears therefore that there are good theoretical reasons why there can be three and only three different elementary forces which act at a distance.

Electric force is best illustrated by the attractive force between a proton and an electron when the two are not too close together. The electric field here is a simple vortex interlinking the proton with the electron. When the two charges are of the same sign, the force will be repulsion instead of attraction (except at very

close range) because the interlinking will then occur with neighboring particles of opposite sign.

Magnetic force is usually envisioned as the force between the ends of bar magnets, but a simpler form of it is the force of attraction between two electric currents flowing in the same direction. An electric current flows whenever the electrons or the protons are in motion relative to the observer. Such relative movement of the electrons or protons will cause the ether currents which link with them to become oriented in one direction in such a manner that in the case of metallic conduction the external ether circulation is in a direction opposite to the direction of movement of the electrons. This external flow of ether constitutes the true magnetic field. In the case of a bar magnet, the external ether circulation is around the axis of the magnet. North and south magnetic poles are therefore mirror images of each other, as distinguished from positive and negative electric charges which are definitely not mirror images of each other, the "parity" dogma to the contrary notwithstanding.

Ever since the time of Isaac Newton, physicists have been trying to find the *modus operandi* of gravitation. French physicists, following the teachings of Descartes, tried to attribute gravitation to celestial vortices, but without much success. LeSage in 1750 tried to interpret it as the effect of mutual shielding, but such an explanation is inadequate when the gravitating bodies are small as compared with the distance between them. During the late 19th and early 20th century, efforts were made to attribute gravitation to an inward flow of ether toward the gravitating body, but there are several difficulties in the way of such an explanation. Besides the problem of explaining what causes such an inward flow of ether, there is also the

problem of explaining what happens to this ether afterwards, and it would also be difficult on such a basis to account for gravitational acceleration which remains the same, regardless of the velocity of the moving body. Finally Einstein tried to interpret gravitation as a curvature of space, but this was only a mathematical description rather than a physical explanation, and furthermore in his later writings dealing with his unified field theory he tried to show that gravitational force is on a par with electric and magnetic forces, which seems to be closer to the actual truth.

Gravitational forces must be attributed mainly if not entirely to the protons of a body. It seems that an electrically neutral body which is entirely self-contained and isolated from its surroundings should not interact gravitationally with anything outside, but yet it does. The reason is probably because there is no such thing as an entirely self-contained body. Even if a body is electrically neutral, its protons with their outward polar flow may still reach out into external space because if such outward polar flow obeys Newton's first law of motion, then it should continue on indefinitely through interplanetary and interstellar space and would not bring about any accumulation of ether in the space between two such gravitating bodies. Any ether that the bodies lose by this outward flow must however be replaced by a slow inward drift of the ether from the immediate vicinity of each body, and when the two bodies are close to each other, they will be in active competition for the ether between them. The ether pressure in the space between the two bodies will therefore be less than the pressures on their remote sides, and it may be assumed that each body will be forced from the side of high pressure to the side of low pressure.

The outward polar flow from the protons does not need to be in the form of continuous streamlines. When a proton becomes associated with an electron, the entire system will be put into vibration and the polar streams will then assume the form of pulsations, travelling outwardly with the velocity of light. The gravitational field is therefore the fixed frame of reference, relative to which the velocity of light remains constant. At the surface of the earth the velocity of light is therefore constant relative to the gravitational field of the earth, which accounts for the negative result of the Michelson-Morley experiment.

The reason why it is the protons rather than the electrons that act gravitationally is because the ether which flows through a proton follows a converging path, entering at the equatorial periphery and leaving at the poles, where it will have maximum velocity. In an electron however the ether enters at the poles and follows a diverging path to the equatorial periphery where it will have a minimum velocity. This is sufficient for the electrostatic field, but not for the gravitational field.

There are several reasons for assuming that the vortex rings of a proton are of about the same size as those of an electron, and if that is so, then they will also have about the same inertial mass. Protons and electrons also carry equal electric charges, differing only in sign, and from this we may assume that the electric fields of protons and electrons also have equal inertial masses. The greater total mass of a proton must therefore be attributed to its gravitational field because it is only the protons and not the electrons which can send out high velocity polar streams to establish gravitational fields. Electrons may respond to gravitational fields, but cannot establish them.

Protons, electrons and neutrons and their isotopes are the only particles which form permanent structural parts of the atoms. The antiproton is actually a heavy isotope of the electron, just like the deuteron is a heavy isotope of the proton. There are two antiprotons in the carbon atom, but on account of the peculiar structure of this particle, it is difficulty to isolate it without destroying it. Mesons and the positron are temporary particles containing newly formed protons which have not yet had sufficient time to build up their final mass. Since the gravitational field of a proton reaches out to infinity, it can hardly be expected that a newly formed proton will acquire its entire gravitational mass instantaneously.

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THE CONSTITUTION OF THE SUN AND STARS

by C. F. Krafft

According to the accredited science of today, the sun and stars are hot gaseous bodies with temperatures of millions of degrees inside. The scientific profession is so sure of this that anybody who thinks otherwise is simply not given a chance to be heard, although a simple calculation under the gas laws will show that any celestial body similar to the sun, and with a density approximately equal to that of ocean water, would explode immediately if heated to a temperature of millions of degrees centigrade.

Our sun is just an average star, and a mere glance at it should be sufficient to convince anybody that it cannot be gaseous inside. A ball of gas would not have a sharp circular outline like the periphery of the sun. Gaseous clouds do exist elsewhere in the universe, but they do not appear as suns or stars. The periphery of the sun does, however, bear a remarkable resemblance to a horizon of ocean water. This conclusion is further corroborated by the density of the sun which is just slightly greater than that of ocean water—exactly what would be expected if the sun consists mainly of water, but with a solid core at the center.

If the heat from the sun really came from a hot interior, then as the late Dr. Hermann Fricke of Germany has pointed out, sunspots should be incandescent and not dark. Numerous photographs have been taken of sunspots from all angles, and

these photographs show beyond any possibility of a doubt that sunspots are nothing else than splashes in the luminous layer. The luminous material is thrown to the sides, leaving a wide open hole at the center through which the dark interior of the sun can be viewed—perhaps not absolutely dark, but much darker than the luminuos surface with its temperature of 6000 degrees. According to all authentic science of today, we are supposed to believe that within this dark interior there is raging a temperature of 50,000,000 degrees! It is just too much for the writer to swallow.

The heat of the sun is probably generated by bombardment of its outer atmosphere by cosmic rays consisting of subatomic particles drawn in by the gravitational force of the sun. We have a similar heated layer in the upper atmosphere of our earth where cosmic ray intensity is much greater and the temperature is hundreds of degrees higher than at the surface of the earth. Since the gravitational force at the surface of the sun is thirty times that at the surface of the earth, it is not difficult on this basis to account for the 6000 degree temperature at the surface of the sun, without making any fantastic assumptions of interior temperatures of millions of degrees.

A hot outer atmosphere would not necessarily heat up the interior of the sun, as has often been argued. Heat can travel only by radiation, conduction, or convection. Radiation is stopped immediately by even the thinnest layers of opaque material, and conduction through thousands of miles of poorly conducting material is a very slow process. There remains then only convection, and in a gravitational field the effect of convection is always to produce stratification—the

hotter masses rising to the top and the cooler masses sinking to the bottom. If now we make the reasonable assumption that the effect of convection is greater than the combined effect of radiation and conduction, then any large celestial body with sufficient water on it should act like an automatic refrigerator—its interior remaining cool indefinitely notwithstanding the generation of heat on its surface. Some of the water on the surface of the sun will undoubtedly be evaporated by the intense heat, and may even become dissociated into oxygen and hydrogen, but the reverse of these processes will also occur, until a condition of equilibrium has been established. The ultimate result will be a gigantic turbulence on the surface of the sun, such as can be observed any time, but which will leave the interior of the sun unaffected.

The cosmic rays which are drawn in by gravitational force consist mainly of subatomic particles such as protons, electrons and neutrons. If these are clusters of vortex rings which were produced in the intersteller ether by the turbulence of light and heat waves, then we have here a cyclic process which could go on indefinitely. The energy which leaves the sun and stars in the form of light and heat radiation is again returned to them in the form of cosmic ray particles, and any matter which is annihilated during this process is similarly returned from interstellar space.

Annandale, Virginia February, 1961.

NOTE: Sunspots are not caused by explosions from inside the sun because they would then be covered by hugh clouds similar to the mushroom clouds of atomic explosions.

FURTHER COMMENTS:

Recent photographs taken from a high altitude balloon have shown most clearly that sunspots are definitely splashes, and a well defined splash cannot be produced in a gas but only on the surface of a liquid. The surface of the sun, except for its gaseous atmosphere, must therefore be liquid.

The darkness of sunspots has at times been attributed to large masses of condensate plunging into the hot gaseous surface of the sun and cooling the gases locally. If this were the true explanation, then it would be difficult to explain, not only the splash itself, but also the granular formation of the luminous material which has every appearance of clouds in the sun's atmosphere. If the heat and light of the sun really does come from its interior, then it would be the spaces between the clouds which should be luminous, and not the clouds themselves. Photographs however have clearly shown that whenever adjacent clouds (luminous granules) leave tiny openings between them, the space behind them thus exposed is always relatively dark—never luminous or incandescent.

The luminosity of these cloudlike granules is probably produced by cosmic protons and neutrons drawn into the sun's outer atmosphere by gravitational force and condensing into helium ions or atoms. We do not need to assume that such cosmic protons and neutrons are in every respect identical with the protons and neutrons that have been produced in physical laboratories, and the extreme conditions of temperature, pressure, electrification and neutron concentration that exist on the surface of the sun have never been duplicated simultaneously or even approximated artificially. Let us therefore not be so rash as to say that the formation of helium in the atmosphere of the sun from cosmic protons and neutrons would be impossible.