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The Origin of the Solar System

Many treatises on physics present the same theories in the same way and do not admit any of the weaknesses in the matter which the student is thus required to accept. Seldom does one see encouragement to compare the accepted theory with those many theories which have neither become accepted nor have really been rejected. We may read of the contributions of the eminent physicists but we are not exposed to the many sound ideas of those of lesser standing. If these lesser contributions have been published they are there in the masses of scientific literature to be found when we go searching. It has to be so, but the modern textbook would have the reader believe that the best has been sifted out and what is hidden is for the historian rather than the forward thinker.

It is not unusual for a scientific theory to be developed over a period of many years after its initial conception. The task is a labour of love for the creator. Few physicists are ready to take an incomplete theory and project it themselves. Thus, by the nature of things there must be in the literature many sound ideas which have been presented in their initial form only and which, for some reason, their originator has been unable to develop in his own remaining lifetime. There is no convincing physical explanation of the creation of the solar system in any modern textbook. The Bible is probably as authoritative as any account of the subject. Therefore, there is all the more reason for exploring the ideas of scientists of the past who had lesser standing than those whose names appear in the textbooks.

In seeking to understand the origin of the solar system, we will begin by extending some recognition to a French astronomer named Véronnet. On December 16, 1929 the French Académie des Sciences conferred the Henry Poincaré medal on Louis de

Broglie for his work on wave mechanics. On the same occasion Alexandre Véronnet (astronome adjoint à l'Observatoire de Strasbourg) was presented with the Prix Lalande for his works in astronomy. Véronnet's work is particularly interesting because he did not turn away from the idea of the aether, and was ready to call it into account in furthering his theories. He wrote prolifically in *Comptes Rendus* for several years but seems to have had little published after the 1929 period when he proposed an electrical structure for the aether medium. His particular concern was the question of the origins of the angular momenta of stellar systems. Angular momentum is the key problem confronting any theorist endeavouring to understand the creation of the solar system.

We note here that one of the consequences of any central law of force such as Coulomb's law of electrostatic interaction and Newton's law of gravitation is that if particles are in motion subject only to their mutual action the sum of their moments of rotation, termed angular momentum, is constant. The planets in the solar system all travel around the sun in the same orbital direction, which is also the direction in which the sun itself rotates about its axis. Therefore, the solar system has quite substantial angular momentum. One would expect that if the planets were produced from substance ejected from the sun, then the sun would rotate oppositely to the planets and their angular momenta would compensate that of the sun, at least partly if not exactly. The solar system has a net angular momentum and it is an important cosmological question to know where it came from.

There are really three primary aspects of the solar system which need explanation. These are:

1. How was the sun itself created?
2. How did the sun acquire angular momentum?
3. What caused the formation of the planets?

Ideas on this are much as they were in 1929. In that year Eddington's book *The Nature of the Physical World* was published. Here are some excerpts:*

* Published by Cambridge University Press, pp. 175–7.

At least one star in three is double—a pair of self-luminous globes both comparable in dimensions with the sun. . . We may probably rule out the possibility of planets in double stars. . . . The most obvious cause of division is excessive rotation. As the gaseous globe contracts it spins faster and faster until a time may come when it can no longer hold together, and some kind of relief must be found. . . . We know of myriads of double stars and of only one planetary system; but in any case it is beyond our power to detect other planetary systems if they exist. We can only appeal to the results of theoretical study of rotating masses of gas; the work presents many complications and the results may not be final; but the researches of Sir J. H. Jeans lead to the conclusion that rotational break-up produces a double star and never a system of planets. The solar system is not the typical product of development of a star; it is not even a common variety of development; it is a freak. By elimination of alternatives it appears that a configuration resembling the solar system would only be formed if at a certain stage of condensation an unusual accident occurred. According to Jeans the accident was the close approach of another star casually pursuing its way through space. . . . By tidal distortion it raised big protuberances on the sun, and caused it to spurt out filaments of matter which have condensed to form the planets.

Eddington goes on to discuss how small the chances are of this occurring. He says that perhaps not one in one hundred million stars can have undergone this experience and then argues that this makes Earth the privileged place in the universe habited by mankind. He writes:

I do not think that the whole purpose of the Creation has been staked on the one planet where we live; and in the long run we cannot deem ourselves the only race that has been or will be gifted with the mystery of consciousness. But I feel inclined to claim at the present time our race is supreme; and not one of the profusion of stars in their myriad clusters looks down on scenes comparable to those which are passing beneath the rays of the sun.

Hence, we are told that the solar system is unique. Man on earth has the privileged place in the universe today and life as we know it cannot exist anywhere else in the whole of the cosmos. Such are the questions at issue. Such are the answers if we exist because of the chance close passage of another star.

At page 550 of the first semester issue of *Comptes Rendus* in 1929, Véronnet presents a paper entitled: 'On the origin of planets and the formation of the earth'. On the origin of the moment of rotation of the solar system he says:

> Tous les auteurs de cosmogonie depuis Laplace ont pris ce moment comme donné. Ils sont partis d'une nebuleuse qui tournait déjà. C'était supposer le problème resolu.

Then he asserts a theorem according to which, the kinematic moment of an isolated system, being invariable, the moment of rotation of the solar system can only be explained by the perturbing action of exterior systems. External action of some kind was the inevitable conclusion, whether in the form of the wandering star or some other influence. The earlier ideas of Laplace about the solar system being formed from the condensation of a swirling gaseous medium lacked something because we are left to explain how this medium acquires its own angular momentum in the first place.

Dauvillier* writing in 1963 emphasized the same point. After referring to the ideas of several contemporary writers he said:

> Mais ces auteurs ont éludé l'une des principales difficultés du problème, en se donnant, à l'avance, le moment orbital du système.

Considering all possible theories, there seemed no way of avoiding the basic idea that the planets were formed by a stellar approach. Dauvillier notes how Poincaré, Arrhenius and Jeans all were aware of the very small likelihood of the stellar approach. It seems that a stellar approach within the distance of Mars is only likely in 10^{15} years, a chance which makes the sun quasi-unique. Star collisions, the basis of rival theories, seem even less likely. Several authors have used the notion of the expanding universe to argue that collisions were much more likely when the universe was more concentrated. The result is, however, an impasse. There seems no satisfactory theory by which to explain with some assurance the origins of our solar system.

Véronnet, in examining these questions appears to have studied some of the dynamics of a dispersed medium. His analysis led him to consider criteria of stability and apportionment of energy in its different forms. At page 894 of the first

* Les Hypothèses Cosmogoniques', A. Dauvillier, Chapter 8, *Collection Evolution des Sciences*, Masson et Cie., Paris, 1963.

semester issue of *Comptes Rendus* he was writing about the limited possibilities of forms of space, Euclidean, Riemann and Cartesian. By page 1143 he was commenting on the dynamics of these spaces and deducing that the laws of physics have to be expressed by tensors. Then, by page 1380 he was presenting an 'Electronic Theory of Aether and Light'. He sought to extend electron theory to the aether with a view to explaining the aether, not mechanically, but electrically. He spoke of an aether composed of electrons or sub-electrons, which he called 'etherons'. He envisaged displacement against a restoring force proportional to displacement, which we were led to in discussing the universality of time. He pictures the etherons moving in synchronism. An electric field is their displacement; a magnetic field their motion. He argues that these particles are in a turbulent motion and that there is equipartition of energy and conservation of moments. The common value of their moments determines the Planck constant, which is also related to the energy stored by these elements of the aether medium. In a later paper at page 1488 he goes on to say how he derives Maxwell's laws and the law of Laplace. His ideas are essentially the ones which we came to in Chapter 4. In the paper just mentioned he writes:

> Si notre charge électrique, un électron par exemple, se déplace, toutes les particules d'éther environnantes décrivent des trajectoires fermées, toutes en phase sur le mouvement de la charge. Ces tourbillons des particules d'éther possèdent chacun un moment magnétique parfaitement défini par la surface décrite et la vitesse du déplacement.

We have used such an aether to explain the earth's magnetism, but it seems that Véronnet saw the same model as an explanation for magnetism generally. Hence we should be encouraged to take our aether studies further. It is surprising that Véronnet does not appear to have invoked this aether medium as the external agency which could explain his problem of the angular momentum of the solar system. It seems so obvious. Yet, that is the way of things. We will embark upon this task here to see whether the fundamental cosmological question about our unique existence can be probed further.

We will start with the belief that the aether can be set in rotation with an astronomical body, such as the sun, and that this aether will then store angular momentum and absorb kinetic energy. In the context of rotation both angular momentum and energy can be exchanged with matter because the rotary motion is superimposed on the motion of elements of this aether. This differs from the case where there is translational motion of aether through surrounding aether. In this case the kinetic energy and angular momentum of the aether itself is merely redeployed and so there is no similar interaction between aether and matter with translational motion.

Our aether is real and not at all like the aether which the modern physicist occasionally mentions in a half-apologetic way. We are not speaking of the aether Watson has in mind when he writes:*

> The aether is an imagined world of atomic connections between the real things and processes that the physicist controls and observes.

Such an aether could hardly have played any role in the creation of our solar system. Our sun exists and did not come from man's imagination; it came before man.

When we come to ask how a star is created from an imagined nothingness, the physicist is confronted with a problem. He has no answer. But he can tell you how a star dies, assuming its pre-existence. His theories enable him to speak about gravitational collapse. The star goes suddenly into a never-ending state of contraction. It shrinks in size into the tiniest point imaginable and yet it retains much of its mass. It becomes a so-called 'black hole', whatever that is. The physicist does not know how a star gets its angular momentum when it is created, but says he can work out that angular momentum can be dispersed. Thus, when the star collapses he can investigate how it releases its angular momentum. Silk and Wright (1969)† show that the Newtonian angular momentum of a star is dissipated during the final stages of collapse. Presumably, this dissipated angular

* *Understanding Physics Today*, W. H. Watson, Cambridge University Press, 1967, p. 167.

† 'Gravitational Collapse of a Relativistic Star', J. Silk and J. P. Wright, *Mon. Not. Roy. Ast. Soc.*, 143, 1969, p. 55.

momentum is transported away by the imagined aether. The field medium we call the aether can transport energy and angular momentum. If it can convey these away from a star surely it can, by similar token, deliver them when the star is born, and our theories should be adapted accordingly.

Ideally the solar system would have a total angular momentum summing to zero. If this were the case we could be happy in thinking that we do not live in a freak world. We could look out at the millions of stars in the sky and feel reasonably confident that many of them are solar systems like ours, possibly having planets like the earth and, physics being universal, people not too different from us. After all, physics leads us into chemistry and so to biochemistry. If we assert that our ideal self-contained solar system does exist we have to accept that there is something in the solar system which has been ignored in the angular momentum calculations. Newton's laws of mechanics work for complete systems, not partially complete systems. There is rotating aether in the sun itself, and some, of course, in each of the planets. But this is hypothesis and we seek proof. Our task is not difficult, once having started with the idea.

The stars may have condensed out of a uniform distribution of dust-like substance or from a gas. Matter may be created continuously throughout space, or may have been created once when everything began. Matter may be being created from the aether even today and the processes localized, say, at the surfaces of stars. None of this is of much concern provided we accept the creation of matter which condenses to form stars, thanks to the ever-present forces of gravitation. Given this starting point, as propounded by the philosopher Kant who proposed the accretion of cosmic dust, we are ready to explain the solar system.

When this dust came together the gravitational energy released by its compaction became available for deployment. It did not all go into the thermal excitation of the substance. Had it done so, the kinetic energy of the particles would have been so high as to oppose the gravitational forces and the system formed would have tended to remain a very dispersed gaseous system. Instead, the aether, as we showed in Chapter 4, is ever ready to rotate, and given a liberal source of energy, does exactly that. The magnetic state favours rotation. There has to be balance of angular momentum, and so a sphere of aether rotates one way and a surrounding shell of aether rotates the other way. For maximum acceptance of kinetic energy it works out that the inner sphere and the outer shell must share the kinetic energy equally. They must have equal and opposite angular velocities. This is simple Newtonian dynamics. The maximum kinetic energy condition is imposed by the recognition of minimum potential energy and the fact that one, gravitational energy, is converting into the other. We assume that the inner sphere of aether in rotation has an outer form co-extensive with the matter which has condensed into a spherical form in releasing its gravitational energy and rotates with it. This may sound complicated but it leads directly to a very simple mathematical relationship between the speed of rotation, the Constant of Gravitation, the mass density of the aether and the mass density of the accreted matter, if the latter is assumed uniform.

The mathematics are just a little more complicated if the accreted matter remains gaseous. The physical size of the system formed is not relevant to this relationship.

We know the density of the sun. It must have been about the same before it ejected the planets, because it still contains nearly 99·9% of the total mass in the solar system. We know the Constant of Gravitation. If we know the density of the aether we can then deduce the angular momentum which the matter in the sun had when it was created. Conversely, since we do know the total angular momentum of the solar system we can, by accepting that this is that possessed by the matter form of the sun when created, deduce the density of the aether. Such a figure might seem to be useless except that the figure obtained happens to check very nicely with a value deduced from other considerations in a full analysis of the aether.* For our purposes here, it is better not to invoke this aether density. An account

* *Physics without Einstein*, H. Aspden, Sabberton Publications, Southampton, 1969.

has been given showing that recognition of the aether medium can explain the initial rotation of the sun when its gravitational energy was absorbed by the aether. By taking the whole angular momentum of the solar system and assuming that it was concentrated in the sun at the time of its creation we may show that the sun probably rotated at one revolution every 12 hours. Now, at the end of Chapter 2, it was argued that the rotation of aether developed an electric charge displacement which effectively developed a uniformly distributed charge within the aether.

Ionization effects occur to cancel the resulting electric fields but the fact remains that displacement or charge is a characteristic of the rotating aether medium. The magnetic fields of astronomical bodies afford an indication of the magnitude of this displaced charge. The observations relating to the Schuster–Wilson hypothesis mentioned in Chapter 4 tell us that the electric charge for a body like the sun is roughly of the order of its mass measured in gravitational units. Thus the sun would have an electrostatic charge of the order of its mass of 2.10^{33} gm multiplied by the square root of G. Since G is $6{\cdot}66.10^{-8}$, we obtain a solar charge of about $5{\cdot}2.10^{29}$ electrostatic units. Its field is partially cancelled by ionization effects and partially by free aether charge, of course, but the fact remains that an electric charge of this magnitude is displaced in the sun to balance the aether induction effects. For example, depending upon the polarity we can imagine a concentration of protons in the body of the sun and the grouping of the electrons they would normally pair with located at the surface of the sun.

Next, let us picture an occasional disruption on the sun which is so energetic that it ejects vast quantities of charged particles in the form we know as cosmic radiation, but the event contemplated is on a much more powerful scale. Heavy positive charges and electrons will be ejected but probably a preponderance of electrons because of the surplus electron form at the solar surface. The sun is left with a positive charge for a period until the electric and gravitational potential gradient can work on the ejected particles to call them back.

The maximum possible residual charge from any such disruption in the early life of the sun would be of the order of $5{\cdot}2.10^{29}$ esu.

Now, following these occasional periods when the sun has its residual charge we have a sun which is not stable. The highly energetic ejected matter in the close vicinity of the sun will find that a transiently stable state can develop by which this matter rotates about the sun with the electrostatic restoring force being in balance with centrifugal force. Collisions will be minimal for plasma charge moving in the same sense.

This transiently stable atmosphere can accumulate angular momentum from the sun during this process totalling to a value of the order given by the relation

$$\frac{(\text{solar charge})^2}{(\text{solar radius})^2} = \frac{(\text{angular momentum})^2}{(\text{mass})\ (\text{solar radius})^3}$$

This is merely the electrostatic attractive force set in balance with centrifugal force corresponding to the angular momentum of the related mass of the transiently stable atmosphere.

Now, this transiently stable state may be followed by a further disruption. Although the ionized state of the atmosphere may become less activated as electrons re-assert their more specific positions to cancel the aether boundary charge, the atmosphere may have by then acquired a much higher velocity than the normal gravitational escape velocity. It will then be ejected from the sun to move to an orbit position around the sun where it is kept in balance by gravitation.

It follows then that the equation above tells us something about the formation of the planets. For example, given the initial solar charge of $5{\cdot}2.10^{29}$ esu and the solar radius of 7.10^{10} cm, we can relate the angular momentum and mass of a planet ejected as a result of the maximum initial disturbance. The quantity angular momentum^2/mass would be $1{\cdot}9.10^{70}$.

The value of this quantity for Jupiter, the largest planet in the solar system, is, in fact, $1{\cdot}95.10^{70}$.

It may seem remarkable that this result should come out so well. It is all the more surprising to the author because the electric charge induced in rotating aether should, according to his theory, be dependent upon the angular velocity of rotation and the charge envisaged by the Schuster–Wilson hypothesis does not take due account of the higher rotational speed when the sun was formed.

However, it is important to note that if a charge could develop in matter, in excess of that predicted by the above application of the Schuster–Wilson hypothesis, the mutual repulsive effect of the charge would have an action greater than the mutual attractive effect of gravity. This assumes that the density of matter is uniform. Clearly, then, the maximum effective charge which can be developed to act in disrupting matter is that given by the Schuster–Wilson notation and it is most enlightening to see this operate to give with near exactitude the situation in which we find Jupiter in our solar system.

Of course, we should not be misled by the numbers. The angular momentum of the solar atmosphere during the transiently stable period is not all effective in producing the planetary motion. Not all of the motion is at the maximum solar radius. At other positions of solar latitude the angular momentum comes out somewhat higher in relation to the solar electric charge. This is just as well because it seems probable that the planets were created in pairs as atmospheric bulges developed on opposite sides of the sun.

Thus we could expect Saturn to be formed with Jupiter. Thereafter the sun would rotate at a much slower speed. Note that Nature first determined the mass which would come together to form the sun. Then as this mass came together under gravity there came a time when it was possible for the gravitational energy to deploy to cause aether rotation. The basic sun would continue forming in this way until it reached the physical size governed by its gaseous state. In this condition it was little different than it is today save that it rotated rapidly about once every 12 hours. Then at some time thereafter it ejected Jupiter and Saturn, accounting, as indicated above, for the maximum angular momentum it could shed. This was followed at the next eruption by the ejection of very nearly the rest of its angular momentum in forming two planets Uranus and Neptune.

Note that in earth units the total angular momentum of the solar system is about 1200. Jupiter accounts for 722 units and

Saturn for 293, leaving 185 units. Uranus at 64 and Neptune at 94 took 158 units of the whole, leaving 27 units. Note that just as Jupiter and Saturn are of similar physical size (about 10 times the diameter of the earth), Uranus and Neptune are also of similar physical size (about 4 times the diameter of the earth). Then it would seem that the sun, as a creator of planets, was effectively a spent force. Earth and Venus were ejected accounting for 1 unit and 0·7 respectively. Venus has a diameter 0·95 that of Earth. Pluto and Mars probably came next and then Mercury and the moon. Today the sun is left with some 23 earth angular momentum units. This does not take account of the very small planets, the thousands of tiny planets of relatively negligible angular momentum in the system known as the asteroids. Estimations indicate that probably 50,000 such minor planets exist.

Enough has been said to show that the accepted problem of the angular momentum of the solar system can be overcome if only we recognize the existence of the aether. However, we are left with the question of whether the small planets are being created even today. The asteroids move generally in orbits located between the orbits of Mars and Jupiter. Accordingly, the angular momentum about the sun per unit mass is probably about 1·5 times that of the earth for the average asteroid. Thus at the solar surface the asteroid would form from an atmospheric disturbance rotating at a frequency measured on a per year basis as 1·5 times the square of the ratio of the earth's orbital radius and the sun's radius. This is about 70,000 revolutions per year or 8 revolutions per hour. We may therefore expect some kind of solar pulsation at this frequency to be seen if the sun is generating a new planet which will eventually be ejected to add to the collection of asteroids. Then we may read from the February 4, 1971 issue of *New Scientist and Science Journal* at page 231:

> According to a large body of evidence amassed over the past ten years, it is now established that the solar photosphere has a steady vertical oscillation with a period of 300 seconds.

This may well be evidence supporting the theory offered here for the creation of the solar system. Furthermore, when we come to explain why the earth's magnetism reverses in Chapter 16, it may be evident that the electrostatic balance of the solar atmosphere will be disturbed for the same reason. Possibly, therefore, the events of reversing the earth's magnetic field are linked with the creation of a pair of asteroids. Numerically, if the earth's magnetism reverses, say, every 200,000 years, then a solar system dating back 4,000,000,000 years would have produced 40,000 such planets.