

SPACE REVIEW



SPACE REVIEW

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Editorial address:-
2 Station Road,
Frimley, Nr. Aldershot,
Hants, England.

Editor: Miss S. R. Stebbing, address as above.

Associate Editor: J. G. Roberts, Blackpool, Lancs.

Foreign Editors: Gene Duplantier (Canada) and Peter Hédervári (Hungary)

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EDITORIAL

One of our readers was a little perturbed by the "announcement" on the back page of the last issue of the review and it was suggested that I give a brief account of the expenses involved in producing a magazine of this type.

Brief details of receipts and expenditure are given below:-

Sales of magazine to date(2/8/62)	£18. 13. 6d	Duplicating	£12. 11. 10.
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The expenditure over receipts is therefore £4. 8. 11., so in order to avoid further losses in respect of too low a subscription fee, it has been decided to increase the rates to 14/6d (or £2.00) for 6 issues or 2/6 plus 4d postage for single issues. If enough support is received with the new rates, it is planned to print a better class magazine by photo-offset methods which will include some interesting (and perhaps amusing) designs of space scenes.

The last two issues of Volume I have been combined in order to reduce costs in double postage etc. If subscribers who originally paid 4/- would kindly send the other 2/6d to make up the 6/6d rate for Vol.I, this would be greatly appreciated. In any case, we do hope to receive the full support of all our readers in the coming months.

Readers will note the designs and observations of the planet Venus accompanying the article written by Colin Pither. Unfortunately, the shading on figures d, e, and f has been over-exposed during the printing process, but the points mentioned in the article are just about discernable. One copy and the original was sent to Patrick Moore for his comments. In reply, he stated that Venus is always a very difficult object in this respect and that he has never yet hit on a proper solution to the problem. We can, therefore, do nothing more than to apologise to our readers - especially the astronomers whose work is dependent on the greatest accuracy.

Original articles, news items, letters for publication and constructive criticisms should be sent to the Editor. Mail cannot normally be answered unless a stamp for return postage is enclosed, but letters are indeed welcome in that we are able to determine exactly the type of news and features generally enjoyed by our readers.

News items for the "Panorama" and the "Late News" features are also very welcome and although our associate and foreign editors do supply a number of articles and newspaper cuttings, the general reader^s can also help by sending reports on space news observed in their local or daily newspapers. Reports of events and unusual data connected with the various sciences should be sent to the editorial address as soon as possible after publication. Reports from science journals are also requested and should state clearly the name of publication and date.

Project West Ford....

Perhaps one of the most controversial of the American space projects to date is project West Ford, in which over 300 million tiny copper needles will be placed in earth orbit.

Project West Ford was proposed late in 1959 by W.E. Morrow and D.C. Maclellan of the Massachusetts Institute of Technology's Lincoln Laboratory as a communications experiment in which 75 lbs of copper dipoles measuring 1.77 centimetres long and 0.00286 centimetres in diameter would be placed into a circular polar orbit about the earth, to be employed in an experiment to determine the feasibility of using orbiting dipoles as passive reflectors for long range communications and to assess the effect of such a belt on space activities near the earth.

The Director of the Lincoln Laboratory informed the Space Science Board of the United States' National Academy of Sciences of the proposed experiment and undertook an intensive investigation into the possible effects on radio and optical astronomy. In June 1960, the findings of the Space Science Board indicated that the West Ford belt of needles would not have any adverse effect on any branch of science.

The primary experiment with the belt of needles was (and will be with West Ford 2) the transmission and reception of radio signals from points on earth by the reflection of radio waves from the 8,000mc tuned dipoles. A world-wide communications system using conventional satellites would require at least three, but more probably, four vehicles in orbit around the earth. Any fault developing in any one satellite could not be rectified from the ground and the communications system would be imperfect. A continuous belt of needles in the area of space surrounding the earth has the advantage that only one launching is needed for the experiment; the belt of needles is virtually unjammable, but the supply of needles would need to be replenished after a certain period of time. To determine the feasibility of the use of this system with an aircraft, a manoeuvrable microwave antenna system designed by the Boeing Company was to be flown in a KC-135 jet tanker after the launching. The Space Science Board requested that radio and optical astronomers make observations of the belt of needles to ascertain the effect of the dipoles in both the optical and radio frequencies of the spectrum.

At 13.53 U.T. on October 21, 1961, an Atlas D. Agena B. rocket configuration launched from Point Arguello, California, put into orbit the Midas 4 payload, inside of which, but unrelated to it functionally, was the canister containing the Project West Ford needles. The 130-ton Atlas lifted off the pad with a total thrust of 360,000 lbs. After the Agena B stage had separated from the booster, the second stage fired, developing 15,000 lbs of thrust to acquire a highly elliptical orbit for the payload. On the first orbit of the earth, the Agena fired for the second time to place itself into a nearly circular orbit. The inclination of Midas 4 to the Earth's equator was 95.9 degrees and the satellite took 166 minutes to complete one orbit. Shortly after orbital injection, the naphthalene cylindrical package in which was embedded parallel to the longitudinal axis of the satellite, the 350 million tuned copper dipoles constituting Project West Ford, was ejected into space.

The Naphthalene was intended to vaporize gradually in space, liberating the dipoles. As the dispenser was to rotate at 400 r.p.m during this phase of the operation, the dipoles would be deployed at a velocity of approximately 10 feet per second. The needles were expected to form a 5-mile-wide band around the earth at a rate of 1,200 miles per day within two months of the launch. Telemetry signals from Midas 4 indicated that the canister containing the West Ford needles had been ejected from the main payload soon after a circular orbit had been attained on October 21. However, subsequent radar and radio investigations of the belt proved negative. The Millstone Hill radar antenna in Westford, Massachusetts, which was to have been used in extensive tests with the belt of needles, detected an object at an altitude of 2,100 miles on November 3, 13, 15 and 22, 1961, which was determined to be the right size and in the correct orbit for the West Ford belt. Although the signal returned from the object was of insufficient strength to enable a positive identification of the West Ford package to be made, it was assumed that, as no reflection had been received from the belt of dipoles, the copper needles, had, in fact, failed to disperse.

Further investigation of the object since that time by the MIT Lincoln Laboratory has revealed that the failure of West Ford I was due to the dipole's naphthalene package receiving insufficient rotational velocity upon ejection from the Midas 4 satellite and the consequent inability of the needles to spread into a belt around the earth. Low temperature conditions also contributed to the failure, according to elaborate radar analysis and laboratory measurements at the Lincoln Laboratory. At the present time, West Ford I is circling the earth as 1961 alpha delta 2, the parent satellite Midas 4 being 1961 alpha delta 1 and accompanied by two undisclosed objects, 1961 alpha delta 3 and 4.

Although Project West Ford had been proposed in late 1959 and the project announced in 1960, protests against the launching of the 350 million dipoles into orbit were not heard until the intention to launch was published. Astronomers all over the world, radio and optical, amateur and professional, complained bitterly in scientific journals and in the press against this "infringement" of their domain. Fred Hoyle described it as "an intellectual crime"; Sir Bernard Lovell said that the launching of a belt of needles was "a stain on the U.S. space programme", whilst Dr. Woolley, the Astronomer Royal, was said to be "worried" and K. A. Thorne, of Denmark, said that it was designed for "military, not scientific purposes." The Soviet Academy of Sciences, in a letter to the Space Science Board, said that the belt "would have dangerous consequences to artificial satellites, especially those with a man aboard." Astronomers made their voices heard at the 11th General Assembly of the International Astronomical Union in Berkeley, California, in August, 1961, when the IAU's Commission on radio astronomy voted unanimously to condemn Project West Ford.

All these protests were made in the face of an assurance by President Kennedy's science adviser, Dr. Jerome B. Wiesner, who said that "no further launches of orbiting dipoles will be planned until after the results of the West Ford experiment have been analysed and evaluated." Astronomers replied to this by saying that even if this experiment was harmless and no effect on radio and optical astronomy was observed, the success of the experiment would create a precedent for the launching of further denser belts in the future.

The failure of the dipoles of West Ford I to form into an Earth-circling belt means that the experiment must be attempted again. For West Ford 2, which is due to be launched in a very short time, the Lincoln Laboratory says that it will incorporate in the package a redesigned ejected device, a command radio link to ensure that the naphthalene pack of needles is ejected only if a correct orbit is attained, a VHF beacon to enable the package to be tracked from earth accurately and internal telemetry in the dipole pack to indicate the position, rate of spin, temperature and extent of dipole deployment. To make room for this additional equipment, the number of copper needles has been reduced to 250 million and the weight to 50 lbs.

Undoubtedly, the protests will again be heard; the astronomers, even those who know nothing about astronomy, will once more complain that "their" heavens are being blotted out by "junk" in space. The fact that this "junk" may save us all from being exterminated by a thermonuclear bomb does not seem to occur to many of them. It is very doubtful whether, in actual fact, the West Ford belt, once it has spread out into its predetermined orbit, will be detectable by optical or photographic means.

The Voyager Spacecraft....

A large proportion of the National Aeronautics and Space Administration's space efforts during the next ten years will be devoted to the unmanned exploration of the moon and nearer planets. The Voyager spacecraft, now under design and development at NASA's Jet Propulsion Laboratory, California, will orbit Mars and Venus during the next few years. The first Venus shot is scheduled for late 1962.

Voyager will be boosted into an interplanetary orbit by the Saturn rocket now undergoing construction at the Marshall Space Flight Center and flight tests at the Atlantic Missile Range, Cape Canaveral. After attaining escape velocity, the spacecraft will make mid-course corrections in order to intercept the target planet. If Voyager succeeds in orbiting the planet, a 700 lb capsule will be ejected from the main 2,400 lb spacecraft to land on the surface of the planet by means of parachutes. The landing capsule will be similar in shape to the present Mercury manned-spaceflight capsule with the necessary heat-shield to overcome resistance of the planet's atmosphere. Data will either be transmitted from the capsule to the orbiting spacecraft where it will be re-transmitted to earth, or will be transmitted directly to earth from the surface of the planet. It is planned to include a television camera aboard the landing capsule.

Advances in the state-of-the-art indicate that Voyager may be equipped with a thermionic solar power conversion system rather than the photo-voltaic solar panels now in use aboard some spacecraft.

The Voyager spacecraft is being tested in JPL's new space simulator, which takes the form of a 25-foot high dome, the inside of which has a totally non-reflecting surface. A beam of solar light is projected onto the test table which holds the test model, while sensors aboard the craft try to obtain fixes on the images of earth, moon and stars projected on the chamber walls in their true relative sizes and colours.

Although Voyager is not the first interplanetary probe to be launched (Soviet scientists injected their Automatic Interplanetary Station 2 into an orbit designed to intercept the planet Venus on 12 February, 1961) it is certain to add a great deal to our knowledge of interplanetary

space, distances in the solar system and long distance communication problems as well as the results from the spacecraft's designed experiments.

ANOMALIES IN NATURE?

by Harry Lord

ICE BLOCK FALLS FROM SKY - MYSTERY BLAST - YELLOW RAIN -
WINDSCREENS SHATTERED - MYSTERY HUMMING HEARD - FREAK
WHIRLWIND HITS TOWN - MYSTERY ILLNESS - HOSEPIPES BURY
THEMSELVES - MYSTERY CYLINDER EXPLODES

These and similar headlines are frequently seen above small news items, usually tucked away at the bottom of the middle pages of our daily papers. Those of us who keep an observant eye open find many things recorded in the press which defy explanation and upset all our preconceived notions. The last line usually states: "The mystery remains unexplained," or "We just don't know what caused it," said an official. Sometimes an "explanation" is given a few days later such as "It fell from a plane," or "It was a jet breaking the sonic barrier," but in general, nothing further is ever printed about the incident and it is hoped that no further enquiries will be made.

For example: on 17/4/59 an object said to be a metal cylinder 14 inches long fell through the roof of a hospital at Moorhaven, South Devon. The newspaper report stated: "It is believed to have been a type of coupling used in drogue towing by aircraft." Nothing further was forthcoming in news reports. Now, I am not suggesting that their explanation was untrue; it is perfectly feasible and rational, but could it not have been proved to be a coupling by simply showing it to an Air Force technician? This sort of "explaining" will not do. It makes us wonder whether something is being withheld from us and why? Whether or not this particular object was positively identified does not alter the fact that many similar objects have mysteriously dropped from the skies and that some have been known to explode in the air. Anyone who has kept records of falling sky objects can verify this.

Other examples of unsatisfactory "explanations" are those which claim that falling ice drops from aircraft and that the mystery sky blasts are the result of jets breaking the sonic barrier. We need only to turn the pages of Charles Fort's formidable records to see at once that "ice" has been falling regularly from the skies and that mystery blasts have occurred in the skies since 1700 and earlier, long before jets were flying or even before the Wright Brothers. What is more, certain statements by people who have found these chunks of "ice" indicate that the substance is not ice at all. Mr. Butcher, for instance, who found a block of "ice" on his front path in Stebbing, Dunmow, Essex, on 27/11/50 said: "I heard no plane pass over my garden, either in the night or during the day. On the path I picked up a substance, weighing one pound, that was no substance known to me. It was not ice, it was not glass, yet it was slightly transparent, but not of crystal formation. I put some pieces of it into my refrigerator; other pieces I left on the path. After many hours, I found that those pieces on the path had not melted, but had remained as they were when I first saw them." Down swooped a police officer, removed the material, and, by orders of the Air Ministry, no photographs were taken of the stuff. In this case, an Air Ministry spokesman stated: "Blocks of ice of the description given would not fall from R.A.F. aircraft."

There are many other things happening every day in this strange world which, in my opinion, ought to be studied in relation to each other. Search should be made for affinities which can link up all Fortean phenomena. I think Charles Fort hinted at a common denominator by pointing out that most of the falling objects such as grain, ice, stones, fish, slag, etc., occurred during freak weather conditions - storms, heatwaves, whirlwinds and tornadoes. He probably meant that many of our violent storms and unusually quick tornadoes were unnatural or artificially created by some unknown outside agency and that we fool ourselves if we think otherwise.

Rainwater is naturally clear. Why then do we often read of coloured rain? Yellow rain fell in Bulgaria in March this year. Yellow rain also fell in Huddersfield during April, 1961. Red, blue, purple. It comes down in all colours. Who or what are the rainmakers? Could there be a connection between these coloured rains and exploding sky objects? Keep in mind that coloured rain and sky "quakes" are recorded long before aircraft or artificial satellites.

Strange explosions often occur in buildings. In December 1953, an explosion in a house at East Grinstead was very odd. It occurred immediately above the dining table and was very loud. When it was over, bits of glass weighing in all more than $\frac{1}{2}$ lb were picked up from rugs, carpets and butter dish. The odd thing was that not a single glass object in the room - windows, bottles, tableglasses, dishes etc., was broken. The windows were shut and curtained. No holes were found in the windows. The glass - or whatever the substance was seemed to have materialized out of thin air. There was no gas leakage and no coal fire in the room. What or who caused it? Is it possible to explain such things? Certainly not with our limited understanding of scientific possibilities, but perhaps a vague idea can be formed by associating one phenomena with others. The above incident, for example, has a similar ring about it as the mystery sky blasts and falls of "ice".

Since the coming of aircraft, the jet and satellites, much of Fortean phenomena can be explained away by those who feel its better for us this way, but the mystery of disappearing hosepipes, missing ships and planes, strange fires, holes in the ground, weird creatures etc., will always remain a challenge to those who wish to know the truth.

The latest "explanation" by 5 experts is that the weird creature found on a beach in Tasmania is nothing more than a piece of blubber - part of a whale. Let us read the Australian scientist, Mr. B. C. Mollison's statement after a second inspection: "I think we have discovered something really strange - probably something never seen before by man. Heat makes no impression on it. There is no trace of vertebral structure and the flesh resembles very closely crayfish meat." How then can they have decided it was whalemeat? Are we to believe that Mr. Mollison, after a second inspection, could have mistaken whalemeat for crayfish meat? That heat will not effect whalemeat? Or are the "explainers" hoping that we will just forget it?

Charles Fort laid the foundations for a new science - the study of phenomena which cannot be explained by present knowledge of matter and the Universe we live in. Why then should we forget it? If we are to advance in our understanding of nature, it is up to each one of us who cares to pay attention to things which normally go unheeded.

THE UNIVERSE AS A FINITE ISOLATED SYSTEM

by Dr. Peter F. Browne

The radius of the Universe, R_U , as a constant of Nature, enters physics in the theory of inertia, and in the problem of the cosmological red shift. This note presents, in a simplified form, the results of a theoretical investigation, one of whose aims was to elucidate the real significance of R_U .

(a) Theory of Inertia:

It is usual for descriptions of gravitational phenomena to refer to Einstein's geometrical theory of gravitation, which is founded on the notion that the laws of physics must preserve the same form whatever the four coordinates used for the description (Euclidean distance in three dimensions and time are examples of four coordinates). This implies that there is nothing to choose between frames of reference of different accelerations, and this appears to seal the fate of Mach's principle, according to which privileged inertial frames are determined by distant mass in the Universe. The detailed work reinstates Mach's principle by showing that when Einstein's equations are derived from a stationary action principle (which is a very basic method in all branches of theoretical physics) then the equations as a whole are covariant (preserve their form under arbitrary transformations of coordinates), but individual terms of the equations do not. This means that the concept of general covariance is valid only for a perfectly isolated system, and the smallest such system is the Universe as a whole, as defined by the finite radius, R_U . As far as local mass is concerned, there are preferred inertial frames of reference.

As an alternative to Einstein's approach, it is always possible to fix the geometry to be Euclidean and replace Einstein's space-time curvature by an appropriate distribution of masses. This is the Newtonian approach to gravitation, but the Newtonian theory is not accurate enough; an improvement, suggested originally by Hund (1948), and followed up by Sciama (1953) and others, is to use exactly the same theory that we use in electromagnetism for gravitation. This involves treating mass as gravitational charge, the motion of mass as a gravitational current, which produces gravitational magnetic forces, and so on. Mass need not now vary with velocity, since gravitational magnetic forces produce exactly the same effects as the relativistic variation of mass with velocity. Inertial force now takes on the same character as the well known inductive force in electricity which opposes the acceleration of a charge in the presence of other charges. For example, in the case of a simple transformer, any change in the current in the primary coil induces motion of charges in the secondary coil, and this in turn reacts back to oppose the original change by an inductive force. An exactly analogous situation is supposed to occur in gravitation when we accelerate a mass. Distant mass of the Universe is set into motion, and this reacts back on the accelerated mass with an inductive force, which turns out to be proportional to the acceleration and hence can be identified with Newtonian inertial force. This explanation of inertia

implies that the mean density of mass in the Universe, ρ_0 , (estimated by averaging the masses of galaxies over a representative volume) is given by the relation (G being the gravitational constant)

$$2\pi G \rho_0 \left(\frac{R_u}{c} \right)^2 = 1 \quad (I)$$

Here we see the emergence of R_u , and when R_u is estimated from the Hubble law, this relation can be checked and is found to be in very satisfactory agreement with observation. All the familiar laws of relativistic dynamics can be derived from this Maxwell-Lorentz theory of gravitation. The rest energy of a mass now becomes its potential energy due to all other mass in the Universe out to R_u . The detailed treatment shows that this theory of Hund's can be made very closely, and possibly wholly, equivalent to Einstein's.

Many difficulties in astrophysics may simultaneously be removed by the introduction of gravomagnetic inductive forces. Consider, for example, a rotating fluid body such as a star. This is essentially a number of gravitational currents (rotating shells or rings of the star), and because these are coupled inductively (as in the case of the transformer) the situation is unstable in that non-uniform rotation must develop. If the core of the star suffers a slight angular deceleration, the gravitational magnetic flux linked with the outer gravitational current decreases, causing this shell to be accelerated inductively. After a sufficient time, an appreciable difference in angular velocity between the outer atmosphere and the core of the star develops. Angular momentum is conserved, the outer shell gaining at the expense of the core. The process is limited by the expansion of the outer shell. This shell may be accelerated away from the surface of the star, and may condense to form planets, thus explaining the existence of known stars with detached shells. Alternatively, an oscillation may develop, explaining pulsating stars. In the production of non-uniform rotation there is likely to be more drag on electrons than on protons, leading to the generation of an ordinary electrical current in the star's atmosphere. In this way, gravomagnetic inductive forces can provide the basic motive power for the generation of an ordinary magnetic field, (an outstanding problem) and this field should oscillate. The work of Babcock's shows that this is exactly what we observe.

(b) Hubble's Law and Matter Creation:

Our derivation of Einstein's equations by a method which yields the energy-momentum tensor as an integral part of the equations not only connects local and distant parts of the Universe, but removes difficulties in applying the conservation of energy to gravitational phenomena. If we choose an arbitrary closed surface in a gravitational field, and allow radiation to pass in at one boundary where the gravitational potential has one value and out again at the opposite boundary where the gravitational potential is different, the radiation is gravitationally red shifted and loses energy in passing through the volume. To conserve energy, the total energy inside the volume must increase, or else some undetected flux of energy must pass across the surface.

We consider this energy flux to take the form of gravitational radiation.

In quantum theory, the electromagnetic field is treated as a field of photons, which are quanta of energy representing the separation of equally spaced energy states of hypothetical radiation oscillators. We quantise the gravitational field analogously, but whereas oscillators of all possible energies are introduced in electromagnetism, (hence photons of all frequencies) our gravitational quanta (gravitons) will all belong to the same gravitational oscillator of constant energy, $\hbar \bar{\nu}_0$. This energy is assumed to represent the energy of a neutrino pair, and at the same time to be a basic uncertainty in all energy due to the impossibility of measuring times greater than the age of the Universe, R_u/c . This procedure is justified mainly on the empirical grounds that it is the only satisfactory mechanism by which the photon might decay in a gradual manner with a rate proportional to ν , but it turns out to lead to many other simplifications.

The graviton field of the Universe forms what is effectively an ether. Basically, only one type of motion develops in the graviton field - a vortex type of motion. We regard vortices of opposite polarity as electrons and positrons, and all matter is built up from electrons and positrons. Disturbances in the graviton field propagate as waves, and since the field of electrons and positrons extends to the radius of the Universe, these wave disturbances which we identify with radiation occur in the electron-positron field. In other words, the electromagnetic field has a gravitational sub-structure.

The Einstein gravitational red shift can now be regarded as the successive scattering of gravitons from the graviton field of the photon to the graviton field of matter. As well as this process, we expect the scattering of gravitons from a photon field to the gravitational radiation field, and it is this which provides an explanation of the cosmological red shift. Both processes may be represented by

$$n \hbar \bar{\nu}_0 \rightarrow (n-1) \hbar \bar{\nu}_0 + \hbar \bar{\nu} \quad (2)$$

where n is an integer. Thus in the cosmological red shift we would observe the gradual transformation of electromagnetic into gravitational radiation, the latter forming a sink of radiation in the Universe out of which matter will be created. All photons have decayed after travelling a distance of the order of R_u , for which a time of $R_u/c = 0.4 \times 10^{17}$ sec is required.

Any absorption or photon decay process must lead to a strictly exponential connection between red shift and distance of the source, r ,

$$\frac{\nu}{\nu_0} = e^{-r/R_u} \quad (3)$$

where ν and ν_0 are the frequencies of the photon at emission and reception respectively. The familiar form of the Hubble law will now be valid only as a good approximation when $r \ll R_u$. It is in the prediction of an exponential law that an experimental check becomes possible. Consider, for example, number-intensity counts of point sources. If the distribution of point sources of light or radio waves in the Universe is uniform, then one expects that the number of sources which we observe with

intensity greater than S^* will be proportional to $S^{*-3/2}$. As we go to lower intensities, the number of point sources goes up because we see further into the Universe. But because the radiation reaching us from the farther away sources is more red shifted, it is necessary to apply a correction to what we actually observe in order to obtain S^* . If the present theory is correct, this correction will be exponential. So far, results for both optical and radio sources bear this out.

Returning to the question of matter creation, we see that all that is necessary is that vortex-type motion should develop in the graviton field of the Universe (without vortex motion a graviton field is a gravitational radiation field). The graviton field will be replenished, not only by the red shift, but probably also by gravitational radiation emitted by interacting masses (white dwarf stars may radiate gravitons intensely).

Macroscopically, the Universe will be in a steady state due to the matter \rightarrow radiation \rightarrow matter evolutionary cycle. Local features will be in continuous evolution on a time scale of the order of R_u/c . Since all photons require a distance of the order of R_u to decay, we see from a different point of view that R_u again defines an isolated system. The connection between these two significances for R_u is very elegantly brought out by Wheeler and Feynman's (1945) absorber theory of radiation. These authors show that the force of radiative reaction (this can be regarded as a correction to inertia force on an accelerated charge) can be calculated solely with the assumption that the Universe absorbs all radiation emitted by an accelerated charge.

The suggestion made in a previous article (Browne, 1962) that the Universe, the electron, and the neutrino may be three consecutive members of an infinite series of isolated systems of similar structure on vastly different scales of magnitude, was based not merely on the self-contained nature of the Universe, but more particularly on a means of unifying gravitational and electromagnetic theories. Accepting that all matter is built up from electrons and positrons (the explanation of the inertia of the electron as an electromagnetic force removes certain difficulties to this hypothesis), then all fields will reduce to electromagnetic or gravitational fields, and the need for a unified field theory becomes particularly urgent. The proposed one was suggested by two features of the relationship between electromagnetism and gravitation: (a) the rather striking analogy in the mathematical form of the electromagnetic and gravitational fields in the weak field approximation, and: (b) the necessity to define all mass as electromagnetic mass (that is, as I/c^2 times the external electromagnetic energy of a system of pure charges due to other charges of the Universe), this together with the evidence for a gravitational sub-structure for electromagnetic energies, suggests that the Cosmos may reveal an alternately gravitational and electromagnetic structure ad infinitum in both the upward and downward direction; these structures being complementary and analogous. We use the term Cosmos to denote the whole, which is infinite; the Universe will be merely an elementary particle in a super-universe.

The asymmetry which we observe between gravitational and electromagnetic phenomena stems basically from limits imposed on our measurements by the finite dimensions of two of the isolated systems; we live

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Very sincerely yours,

Susan R. Stalbing

The Editor

inside a gravitational charge unit (the Universe) and outside an electromagnetic charge unit (the electron), and we are unaware of phenomena outside these limits. The unified field theory predicts that the classical physical world will be a wave continuum (with coupled longitudinal and transverse wave systems) all physical quantities entering as densities in 4-dimensional space-time. To obtain measurable quantities, it is necessary to average the densities over a finite volume of space-time defined by the natural boundary conditions imposed by the isolated systems, and the mathematical formalism necessary for carrying out this averaging procedure turns out to be just quantum theory (now restricted to quantum electrodynamics). Only at this stage does the particle concept arise. Thus we can have a situation where gravitation and electromagnetism are complementary (in the sense that one corresponds to attraction and the other to repulsion between like charges) and perfectly analogous in the real physical world, but we are compelled in our measurements to detect different aspects of the fields.

Department of Physics,
National Physical Laboratory,
Teddington, Middx., England.

1962, May.

References: Browne, P. F., 1962, Nature, 193, 1019. Hund, F., 1948, Z. Physik, 124, 724. Sciama, D. W., 1953, M.N. Roy. Ast. Soc., 113, 34. Wheeler, J. A. and Feynman, R. P., 1945, Rev. Mod. Phys., 17, 157.

----THE APPEARANCE OF VENUS 1959 - 1961 ----

by C. M. Pither

Venus is a particularly difficult object to observe and study; the main reasons being: (1) the thick dense carbon dioxide layers which surround the planet, (2) its extreme brilliance, (3) the fact that when the phase of Venus is large there is a gap of some 159 million miles between us and the image seen in the field of view is quite small - approximately 9.5 seconds of arc. On the other hand, when closest, the sunlit portion is rather small, so that the large apparent diameter of 65 seconds of arc during this time is of little help. Some of these difficulties can be overcome, and with careful consistent observations of the type carried out by the Mercury and Venus Section of the British Astronomical Association, much can be learnt.

The following is an account of the appearance of the planet Venus based on observations made by the author during the period 1959, March 25 to 1961, August 12. The observations made between 1959, March 25 and 1961 March 23 were in ordinary white light; those after the latter date were of a type made with the use of special filters.¹

Based on the known fact that the red end of the spectrum is of a longer wavelength than the blue - thus red light is more penetrating. The colour of the filters used were red, green and blue. It is assumed that the image seen in red light is at a lower level in the Cytherean atmosphere, while the blue is at a higher level.

As Venus revolves around the sun, it exhibits phases as seen from earth, (see fig a). It has been found that the phase varies with the filter used even though the observations were made within minutes of each other. For example, if the phase in white light was recorded as slightly concave, the red image would appear nearer straight; the blue image would be rather more concave than observed in white. Thus at a point deeper in the atmosphere, the image is seen slightly smaller, therefore the sun illuminates more of the disc. At a higher point, the reverse happens. (See fig b. The size of the images in the diagram are not to scale, for the variation in size is very small).

Theoretical dichotomy for Venus can be predicted quite accurately. This is the exact time when the phase of the planet should be half, but if Venus is observed on the date of theoretical dichotomy, it will be found that the terminator is not straight. In other words, there is a discrepancy between theoretical and observed dichotomy. This discrepancy is known as the Schröter Effect and can be as much as four days between the two. During an eastern elongation, when Venus appears in the evening sky, dichotomy occurs early. While during a western elongation, (in the morning sky) dichotomy occurs late. The exact reason for the discrepancy is still being worked out, but it is certain that the answer is linked with the thick cloud layers - most likely due to the scattering of sunlight. When the Schröter Effect is studied with the aid of filters, it is found to be taken a step further. During a western elongation, dichotomy occurs first in red, then white, followed by blue. Although the author has not (as yet) observed dichotomy with the aid of filters during an eastern elongation, J. H. Robinson, who is a colleague filter researcher, has stated that the order is reversed during an eastern elongation, which is what one would expect. (See fig. c). Fig. c shows the terminator of Venus around the period of dichotomy in the various filters; "X" marks the approx. date of dichotomy in each colour. Theoretical dichotomy was June 20th.

In white light, it is sometimes found that the cusps of Venus are extended or rounded. When using filters, the cusps are always sharper in red light and always truncated in blue, although there is a certain amount of variation of how much sharpness or truncation within each colour. Thus it appears that the deeper we penetrate into the atmosphere, the clearer the cusps become - which is to be expected.

The most prominent, and one of the most interesting features of Venus, are the cusp caps.³ These are bright areas situated at the cusps of the planet, (see fig d) and are, at times, associated with cusp extensions. When cusp caps are recorded, they are never seen quite the same on each occasion. They are found to vary in size, shape and brightness. Sometimes they are recorded at both North and South cusps at the same time; when this happens, it will nearly always be found that the two caps are not identical. With the use of filters, a cap decreases in size from blue to red; i.e., most of the material of which the cap comprises, lies at the higher atmospheric level. From a number of cusp cap observations made with filters, it appears that there is a constant between the size of the cap in each colour. A cap recorded in white light will

appear 2 or 3 times larger than its appearance in red; while in blue, the cap is found to be 5 or 6 times larger than was observed in red. This constant can be known as the "size - colour law." It is believed by some observers (including the author) that the cusp caps are due to solar activity - in other words, ionised particles from solar outbursts are attracted by a magnetic field surrounding Venus causing "aurora" in the atmosphere.

Another feature which appears in the higher latitudes of the planet are lightish areas which are observed slightly away from the cusps; these are known as Offset cusp caps. Although at first sight these features look the same as the true cusp caps; from a more detailed study, this does not seem to be the case. The main difference with these caps is that they do not follow the "size - colour law". When seen, they appear in green or blue light, indicating the origin in the upper layers; also, the size in the two lights varies very little.

Occasionally, a dark collar is observed surrounding the true cusp caps. This type of feature has only been recorded by the author 3 times during the present series of observations; once in red light, once in white and once in blue. Thus it is hard to say at what height in the atmosphere, collars mostly occur. Although the recordings in white and blue were only suspected, the one in red was definitely seen.

Around the limb of Venus, there can be detected at times, a feature known as Limb brightening. This is a brightening of the general hue of the disc at the limb and has been mostly recorded in white light.

Quite often it has been found that the terminator takes on a dusky appearance. These dusky shadings are known as Terminator shadings, and of the shadings that can be observed on Venus, these are about the most illusive. Terminator shadings were recorded in white and red light, indicating that they appear between the medium and lower levels. Another feature which occurs in this region are Disc shadings. These are shadings which appear on the visible disc and in general are rather darker than Terminator shadings, although the difference is only very slight. From checking back through past observations, it seems that Disc shadings more often than not are either longitudinal or latitudinal; this is to say that their longest part of the shading lies either in a North - South direction (i.e. longitudinal) or in an East - west direction (latitudinal). One must not think that these shadings are hard and sharp; their boundaries are often hard to detect. Darkest of all the shadings are the Dark Markings. These are referred to as markings rather than shadings due to the fact that the difference between these and Disc shadings is found to be slightly greater than the difference between Disc and Terminator shadings. Dark markings are observed in red and white light as do the shadings already mentioned, but this time, the order is reversed. Thus the markings appear mostly at the lower levels. The most prominent of this type of feature (the darkest) often forms large "bays" - at times close to the terminator. These bays are sometimes joined together, while at other times occur singly. (See fig e).

Occuring at higher levels, (i.e. in blue light) we find very large light areas, sometimes covering between 1/4 to 1/2 of the disc, and although seen mainly in blue light, are frequently observed in green. These areas form large portions of circles and normally project from some position on the limb, (see fig f). Occasionally, an odd thing happens in the higher levels; the image of the planet in blue light becomes very diffused, and it becomes very hard to estimate the shape of the phase, let alone any features that might be on the disc. When this occurs, the images seen in red and white light are quite normal - thus the disturbance has its origin high up. Other filter workers have recorded this phenomena, notably, J.H. Robinson and A.W. Heath. Robinson believes that the cause is scattering in the upper levels.

On rare occasions, special features are recorded; these only occur every once in a while. One of these is a bright oval "cloud-like" feature; the author has only ever observed two of these. The first was recorded on 1961, March 5; the other on 1961, May 18. Both were only seen in white light and appeared to extend from Limb brightening. The reason these features appear in this position might well be that when they are right on the limb, they are too small to detect, and when near the centre of the visible portion, they immerse into the general hue. When they are seen in a position between the two, the sun's rays strike at just the right angle. Another of these special features, are bright spots. These are rare, circular in shape, and are about the brightest feature to be seen. The author has only once observed one of these, 1961, June 24, in white light. It was recorded while making a routine observation with an 8.4. inch refractor.

Summary

Let us now make a quick summary. High in the atmosphere we have large white areas, at times covering quite a percentage of the visible portion of the planet. Also, these high levels can, at times, become subject to the scattering of light. Further down at the medium level, we have a brightening of the limb, some Terminator shading, Long., and Lat., Disc shading, Cloud features and some dark markings. Between these levels and higher up, occur the Offset cusp caps. Down in the lower regions, we find more terminator shadings, less defined disc shadings, dark markings and the dark collars which boarder the cusp caps at times. Cusp caps, we find, appear at all levels, although the size will vary at each level (size - colour law). Finally, occuring somewhere in the atmosphere, we have the very bright white spots. It might be as well to mention here that these spots appear to be only short lived.

From the above account, it will be seen that, in general, the darker the feature, the lower will be the level at which it occurs - while the lighter and brighter features are found in the higher regions.

References: (1) A.W. Heath, J.H. Robinson, F.C. Wykes and V.A. Firsoff: J.B.A.A. Vol. 71, page 242. (2) J.H. Robinson: J.B.A.A. Vol. 66, page 261. (3) C.M. Pither: J.B.A.A. Vol. 72, page 14.

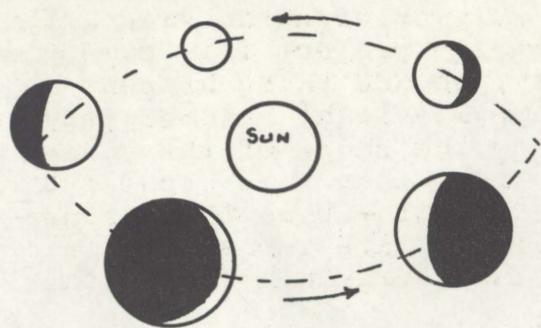


FIG. a THE PHASES OF VENUS.

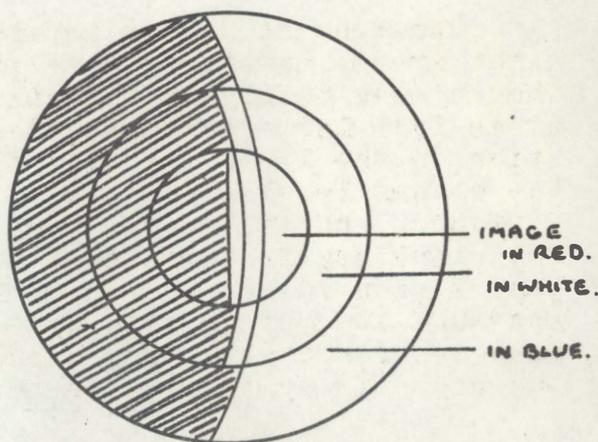


FIG. b PHASE OF VENUS IN VARIOUS FILTERS.

	JUNE 19	23	24	27	JULY 3
WHITE					
RED					
BLUE			NO OBS.		

FIG. c TERMINATOR OF VENUS NR DICHTOMY.

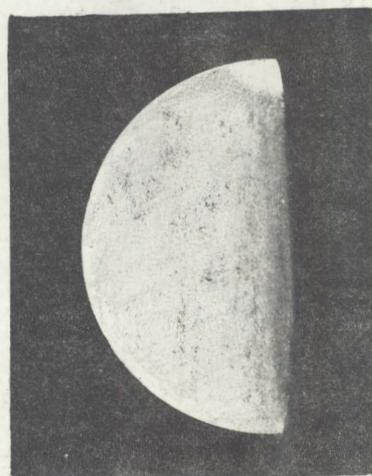


FIG. d VENUS, 1961 JAN 15. (WHITE).



FIG. e. VENUS 1960 DEC 24 (WHITE).



FIG. f. VENUS 1961 MAY 23 (BLUE)

NEW BOOKS

The Fascinating World of Astronomy, by Robert S. Richardson. (London: Faber & Faber Ltd., 1962). Pp 274 with 106 plates. Net price 25s.

The new events in space travel have recently caused many people to turn their interests from ordinary mundane subjects to astronomy in general.

There are many questions to be asked, and Dr. Richardson has taken on the role of presenting the ordinary layman with an overall picture of the facts behind serious astronomical study.

The author has written in terms suitable to the ordinary layman and the material is set out in the form of a question and answer session. The chapters are devoted to subjects such as: Use of Telescopes; the Moon and its Surface Features; Spectroscopy; Planetary Motions; the Conditions on Other Planets; Star Formation; the Galaxies and Cosmology; Recognising the Constellations and many others.

Unfortunately, due to the general rapid progress in astrosience, some of the answers given to questions are subject to revision - even though the book is just off the press. This applies particularly to the conditions on other planets as well as the exact measurements of surface temperature. With the latter, it is becoming necessary to equip artificial satellites with sensitive instruments in order to obtain a more accurate reading. Venus and Jupiter, for example, are known to be transmitters of radio noise which has recently be attributed to radiation belts similar to the famous Van Allen belts known to encircle our own Earth. These belts would undoubtedly be a drawback to accurate measurements of surface temperature as examined from outside the planetary environment.

Recent analyses of planetary conditions have also been omitted; for example, the discoveries of atomic oxygen and molecular nitrogen in the atmosphere of Venus. The absorption of blue and violet light in the upper layers of the Martian atmosphere suggested by Dr. N. A. Kozyrev indicating greater density, is also a recent theory, unfortunately missed.

The above incidents just go to prove how quickly science books of this type become out of date (which is no fault of the author). However, with regard to the material itself: the quality is generally both fascinating and concise and there is little doubt that many readers will decide to pursue the subject at greater lengths - even to the extent of becoming an active amateur astronomer.

Physics and Astronomy of the Moon, edited by Prof. Zdeněk Kopal (London: Academic Press Inc. (London) Ltd., 1962). Pp 538 with 24 plates. Net price 118s.

This is an excellent book written by a group of internationally known scientists - each a specialist in his own particular field.

The methods used for detecting the nature of the lunar surface are discussed, and it is interesting to see whether confirmation of the conclusions drawn will match the empirical research in astronautics. The chapter on Topography includes a number of interesting plates of lunar maps compiled and drawn by observers in the 17th century.

Dr. N. A. Kozyrev is one of the contributors who writes up about the physical observations of the lunar surface, including a spectroscopic analysis of the Alphonsus eruption which took place on 3rd November, 1958. Dr. Kozyrev must be highly regarded for his outstanding contributions in understanding the physical nature of the Moon and nearby planets.

Dr. A. Dollfus of the Paris Observatory discusses the polarization of moonlight and the means of detecting a lunar atmosphere; an estimate of density for the latter is given at 0.5×10^{-9} to that of the Earth at ground level - which is considerably low.

In conclusion, it is perhaps as well that as much knowledge pertaining to lunar conditions is being attained by astronomers right now before any attempt is made to land a man (or woman) on the Moon. If our satellite is really totally hostile to all forms of life, why waste rocket fuel and money to land there at all?

SPACE LOG

by Brian S. Dean

May 23rd: U. S. Air Force launched Blue Scout booster with classified satellite from Point Arguello... May 31st: Blue Scout launched from Point Arguello. No other details given... June 1st: the 10 lb. Oscar II satellite was successfully launched by the U. S. Air Force on behalf of the American Radio Relay League. It was launched "piggy-back" on a classified Discoverer satellite by a Thor-Agena B from Vandenberg... June 17th: the U. S. Air Force launched a Thor-Agena booster with a classified satellite from Point Arguello... June 18th: the U. S. Air Force launched a second classified satellite; this time aboard an Atlas Agena from Vandenberg... June 19th: NASA's 285 lb. weather satellite Tiros V was successfully launched from Cape Canaveral by a Thor-Delta booster. It is being used to provide information on the growth of hurricanes and the break-up of ice in the northern latitudes. It is in an elliptical orbit with apogee of 604 miles and perigee 367 miles. Its planned orbit was a 400 mile circular orbit, but the error has not affected its performance... June 30: Cosmos VI was successfully launched by the Soviet Union. This is the 6th in the current Cosmos series, and all systems were said to be operating normally... July 3rd: the 651 ft - high balloon Stratoscope II failed to reach the desired altitude of 80,000 ft. in what should have been its final test flight. The balloon is designed to carry a 36 inch telescope to photograph the stars and planets... July 8th: the U. S. A. exploded a thermonuclear bomb of over one megaton at an altitude of 200 miles which was launched by a Thor booster. This was the third attempt, the previous attempts on June 4th and 20th, having failed. The explosion has been severely criticised by scientists throughout the world... July 10th: the Telstar satellite was launched from Cape Canaveral by a Thor-Delta booster. It has been used for trans-atlantic television and telephone experiments and has received widespread publicity. It is in a highly elliptical orbit with apogee 3,502 miles and perigee of 593 miles, and is expected to stay in orbit for two years.

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LETTERS

Dear Miss Stebbing,

I would like to comment upon P. Heselton's article (Vol: I No. 4 issue dated July/August, 1962). Generally speaking I think this is much to do about nothing. I have a little book by Alfred Watkins who Mr. Heselton mentions; it is called, The Ley Hunter's Manual, and it was published in 1927. Of course there are significances in ley courses, but there is nothing mysterious about them and they seem to be adequately accounted for by common sense. I fail to see what Mr. Heselton is trying to tell us or what he finds so significant about ley tracks with reference to the UFO problem. The first three pages of The Ley Hunter's Manual give the obvious explanation for churches, castles, mounds and moats etc., lying on straight lines and unlike Michel's orthoteny theory, the explanation solves any mystery which once might have existed.

To claim that orthoteny is a great archaeological discovery strikes me as very funny and so far its apparent significance in the UFO mystery remains to be exploited, for in its present form, it does no more than complement the existing weight of evidence to show - or attempt to show - that UFOs are intelligently controlled objects from another world/s. There is one point of criticism which must be levelled at the orthoteny theory too: for an observation to be truly valid, and for it to be included in a plot on a map, it (the observation) should have taken place at the observer's zenith or the object cannot be accurately placed over any spot on the earth's surface. Either this, or some other method of accurately establishing its location over the surface of the earth, must be applicable.

While we are on orthoteny, let me mention an article on the migration of sand martins which appeared in a recent issue of the New Scientist. Plots of the flight patterns of these birds produced straight lines and intersections which looked just as impressive on a map as do the ley courses and Michel's UFO plots and Dr. Fontes' also. It would be ludicrous, of course, to suggest that UFOs are sand martins or that UFO pilots have only the intelligence of sand martins, or that of pre-historic man looking for a supply of salt. So now we have three orthoteny's!

I wish I could be satisfied that UFOs are extra-terrestrial space ships, that they are interested in the history of our planet, its past inhabitants - not its present ones, but I am not satisfied about any of these things and no one has so far advanced beyond speculating about the motive, propulsion force or source of UFOs.

Form a Ley Hunter's Club? Sure, it would be quite a good idea and everyone would gain knowledge on a variety of subjects - but it wouldn't be very original, or help to solve the UFO mystery.

Yours etc.,

David Lightman (Editor: URANUS)
'Vimana'

Sandy Lane,
Hindley, Lancs.

Dear Miss Stebbing,

Thank you for sending me a copy of your first-rate magazine "Space Review". My congratulations to you on the production; it really is a workmanlike job. The art work is excellent and you have certainly attracted the right people as your contributing authors. The reading material is very interesting and should attract a large following. Keep up the good work.

Concerning this business of a Federation; personally I have long advocated the setting up of a national association to investigate UFO phenomena, having in mind an organisation on the lines of the B. A. I realize this would entail considerable amount of work and it would be necessary to attract the right people, and to have a dynamic figure at the head. With the lack of UFO activity it seems unlikely that such a person will come along, so things will continue pretty much the same.

With the apparent stale-mate in the UFO field you can find more of interest in the field of space research.

Scott Carpenter seems to have explained the 'space particles' as frost on the outside of the capsule; these passed the window after the side of the capsule was rapped. A similar explanation was given for the 'objects' seen by Joe Walker the X-15 pilot who reported having photographed "disc shaped or perhaps cylindrical objects". A spokesman for NASA revealed that the strange objects were flakes of ice breaking away from the outside of the liquid oxygen fuel tank.

Yours etc.,

David C. Jones, Cheltenham, Glos.

Dear Miss Stebbing,

May I be allowed to make a few comments on the article by Henry Gallard entitled "Atmospheric Pressure and Aeronautics". I would be very interested to know how Mr. Gallard has obtained this inside information on the operation of space ships, especially since I, for one, am unable to follow much of his reasoning.

Let us start with these "cathodic rays" which create the vacuum. As I have never even heard of cathodic rays, I assume that the writer means cathode rays. While it is true that cathode rays will ionize the atmosphere, I fail to see how this will produce a vacuum. It is also said that colours will be seen on the craft. The writer must realize that fluorescence will only occur if the cathode rays strike the surface (assuming, of course, that the surface is fluorescent), but he states that the rays are leaving the surface of the craft.

We are also told that the current could be controlled by rheostats. Here the writer is either showing his total ignorance of electrical engineering or he has simplified his explanation so much that it has become ridiculous. A rheostat is a large clumsy object used on the experimenting bench; much more refined methods are used in practice.

We are also told that it has been proved, relative to the craft in existence that people inside a vehicle during sudden change (i.e. deceleration and acceleration) are unaffected by the change. A glance at the reports of recent space flights or rocketsledge experiments, will show this to be nonsense. The occupants are severely affected by sudden change! Next we are told that if the vacuum collapsed to give atmospheric pressure on both sides, the vehicle would be crushed. Why then does not everything on earth collapse?

Everything has atmospheric pressure on all sides (and, of course,

on the inside also, as I presume have these space ships).

As I mentioned overleaf, I would be interested to know where Mr. Gallert got his information. I am quite surprised that the space ships ever got off the ground, never mind leave or reach our planet earth!

Yours etc.,

Brian S. Dean, Manchester, Lancs.

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Preston & District Astronomical Society publishes a quarterly journal and holds monthly meetings. Full details from: Mr. C. Lynch, 51, Bishopham Rd., Carlton, Poulton-le-Fylde.

A Convention on astronomy will be held at Ratcliffe College, Leicester - September 7th, 8th & 9th. Speakers will include many well-known professionals. Full details and form from: V. V. Littlejohn, Esq., 19, Southdown Drive, Thurmaston, Leicester.

Soviet Views on Mars & Moon

A Soviet astronomer, Prof. Vsevolod Sharnov of Leningrad University believes that yellow fogs observed on Mars represent only dust, mainly from an iron oxide known as limonite. Another scientist, Vsevolod Troitsky, a doctor of physics and mathematics believes that research by means of radio waves shows the lunar surface to be covered by a deep layer of porous material like hard cotton wool. London (Reuters).

A Hold fizikája is the title of a book written in Hungarian by our Foreign Editor, P. Hédervári. It deals exceptionally with the Moon-using the geophysical viewpoint. This is the first book in the Hungarian language devoted entirely to lunar study.

Radar UFOs--an explanation?

A scientist at the Cambridge Research Laboratories, U.S.A., P. J. Harney has theorized that certain cloud formations and atmospheric wind phenomena can result in dish-like reflecting surfaces being formed in the atmosphere at heights of 5,000 ft or more. A radar beam reflected from such a surface to the ground before being detected by the radar antenna, can result in a "false target" on the radarscope which may be mistaken for a UFO blip.

Rocket Data Upsets Astronomers

Washington--(HTMS)--Astronomers reported recently some startling discoveries about stars which, it was predicted, will set off "a real revolution in the field."

Research by three scientists - two Americans and one Briton, indicate that the stars existed longer than expected. Their temperature is lower and their evolutionary process is probably different than presently theorized. Moreover, the temperature of space between stars should be lower, and the density of matter higher than expected. Stars should be created at a faster rate from space dust, the data suggests.

The report was presented to the International Committee on Space Research (Cospar) which included Dr. D. V. Heddle of University College, London.

Rocket studies of ultraviolet radiation were responsible for determining the new data. (The Gazette: May 15)

Giant Fireball Trails Sky

A huge fireball with a flaming tail cast an eerie in the sky as it passed over British Columbia, Alberta, Washington State and Idaho on Monday, May 28th, 1962. It was identified as a giant meteor by Dr. R. M. Petrie, Head of the Dominion Astrophysical Observatory in Victoria.

Fans at a baseball game at Vancouver's Capilano Stadium panicked as the multi-coloured meteor appeared during the 12th inning. Switchboards were jammed at Vancouver airport, weather office and RCAF headquarters with reports of a flaming airliner, off-course rocket or comet. Research scientist Frank Hughes of nearby North Surrey, (a B.A.A. Meteor Observer) said the meteor was the largest he'd ever seen.

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Canada and U. S. A., Seek Data on Meteors and Fireballs

Fireballs, meteors and any other flaming objects are important to government agencies on both sides of the boarder. They want to find more data on meteors for the National Research Council's committee who are collecting eyewitness accounts to help find meteor material.

(Ref: The Province, June 5th, 1962)

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Two "Robots" Frighten Woman

Buenos Aires (Reuters)--An official Argentine television station, with the assistance of the air force, on Thursday, 24th May, told the story of a woman rancher who saw an unidentified saucer shaped object at close quarters and was taken to hospital suffering from shock. The woman, from the south-central province of La Pampa, claimed to have seen two strange men resembling robots near the unknown object.

Experts confirmed that grass in the area where the object is supposed to have landed was singed in a circle six yards wide.

(Ref: Toronto Daily Star, 25/5/62, and The Manchester Guardian).

Sea Yields 45-foot Monster

Obahiro, Japan, June 6th (AP) - Fisherman Yoshiharu Tsuruga, 35, spotted a snake-like monster on the beach today, discarded his bicycle in fright and ran. Then wondering what the creature might be, he cautiously returned. The newspaper, Asahi said the creature was more than 45 feet

long, had a head about 1 foot in circumference, but had no eyes, nose or mouth. Its body measures 6 inches in circumference. It has no scales and is grey in colour. Fish experts from the nearby Marine Industry Laboratories said, "We've never seen anything like it." (Associated Press, dated 7th June, 1962).

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Solar Atmospheric Oxygen Abundance

Astrophysicists D. F. Faulkner and D. Mugglestone of the Physics Dept., University of Queensland have detected oxygen lines in the solar spectrum. The spectral lines studied were high excitation lines or those of the forbidden class. Where absorption lines are formed, the oxygen element is regarded as completely un-ionized. (Ref: M. N. Roy, Ast. Soc., Vol: 124, No. 1)

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Venus Nears Dichotomy Ahead of Time

For the first time in recorded astronomical history, Venus is nearing dichotomy ahead of time.

In a circular issued by P. Moore of the B.A.A. Venus Section, observers were urged to keep their eyes open to record the phenomena.

Colin Pither, our recently appointed Associate Editor, will be writing an article on this subject in the next issue of the review.

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Two Up - Three Lore to Go?

Major Andrian Nikolayev and Lt. Col. Pavel Popovich have broken every space record in orbiting the Earth in tandem. They are sending back valuable scientific information.

It is speculated that three more launching are expected within the next few days which will wind up the current Vostok series. (Soviet Press Reports, 12/8/62).