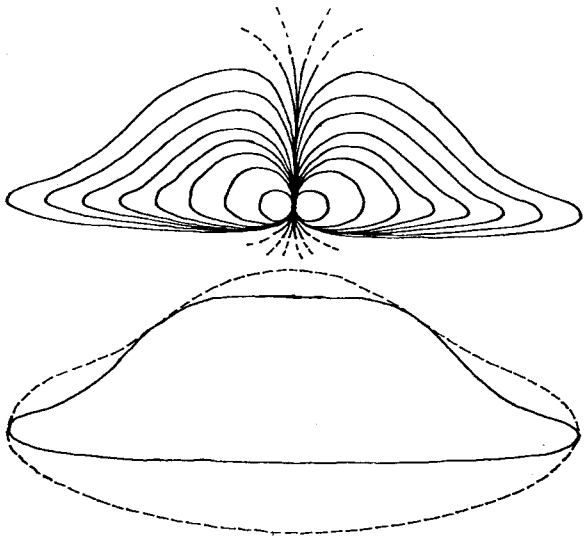
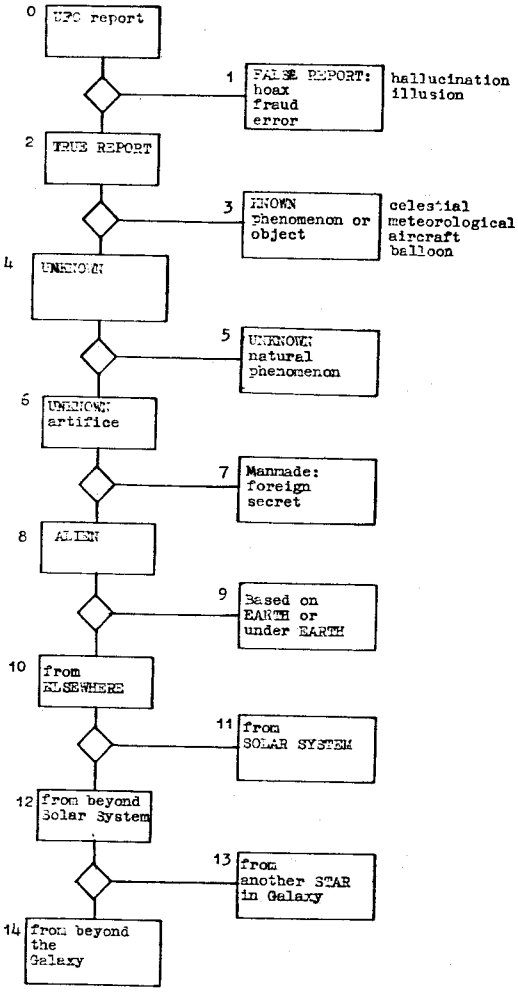
Journal of TRANSIENT AERIAL PHENOMENA





CONTENTS

Vol.1 No 3 JULY – AUG. 1980

Published by -
The Research Department of the
British UFO Research Association (BUFORA LTD.)

Books and Leaflets

Title	Members	Non-Members
An Engineer's Look at UFOs *Leonard Cramp, ARAeS, MSIA*	30p	50p
Close Encounters of the Third Kind *Ted Bloecher (ed C F Lockwood & A R Pace)*	60p	70p
Guide to the UFO Phenomenon	45p	65p
Investigation Procedures *Trevor Whitaker*	30p	50p
The Use of Analytical Instruments in the Search for Extra-terrestrial Spacecraft *David Viewing*	30p	50p
Investigators Handbook	£3·00	£4·00
1976 Conference Proceedings	£2·50	£3·50
Vehicle Interference Project	£2·50	£3·50
Bufora Journal (specimen copy—our choice)	50p	70p

All the above publications post free from:

Tony Pace, Newchapel Observatory, Newchapel, Stoke-on-Trent, Staffs.

Editorial

FASHION OR FACTS?

Recently I received a letter from a reader in which he took issue over the Livingston case summary "Close Encounter in Scotland" by Stuart Campbell published in Journal TAP Vol 1 No 2.

The reader stated that the investigation was **incomplete** and suggested the inves--tigator should have asked the witness if he had "experienced ghosts, knockings and odd sounds in his home".

The event you will recall is alleged to have taken place in the open air, in broad daylight, and some 1,600 metres from the witness's house!

My first thought was that our critic had written to the wrong magazine and that his letter should be redirected to the Society for Psychical Research. But then it struck me that he was simply being fashionable! The letter in fact epitomised one of the greatest drawbacks which has dogged serious UFO research for years and is nothing more than the wild, unsubstantiated speculation which naively follows the latest trends in UFO theory, created and perpetuated by the self styled experts of pseudoscience.

Our critic goes on to say that only two publications - Strange Phenomena and Fortean Times treat UFO phenomena in a "non-special" way ie, these are considered alongside other paranormal phenomena.

But are the two magazines in question scientific journals, that we can set so much store by what they say? I understand that Strange Phenomena is now defunct. In science the term Fortean, to describe thousands of unrelated phenomena, is to say the least, misleading. Usually the only common denominator applying to the phenomena related in this publication is that they are often alleged to be unex--plained (which is not always true) and the accounts of these were originally collected and published in books written by Charles Fort.

Science is gradually recognising and studying several forms of psychic phenomena and there are too many accounts of the fall of 'strange' substances and organisms from the sky, for these events to be ignored. John Armitage covers four accounts of this type in the current Atmospheric Phenomena Log. But let's stick to the facts as he does and not simply follow current fashions!

If you feel you would like to make a contribution to the greater understanding of these little known phenomena - just collect the data by objective investigat--ion and careful observation.

I think you will find it far more interesting and ultimately more rewarding.

Anthony Pace.

A NATURAL THEORY OF UFOs

BY STUART CAMPBELL

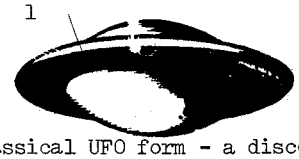
SUMMARY

In a previous article [1] I proposed that what we call a UFO is probably a meteor--ological phenomenon, and that it is re--lated to, if not identical with, ball lightning. Here I develop that theme into a full natural theory to account for both phenomena. An error has been made in associating anomalous discoid objects with the popular belief in aliens; the shape of UFO's is a natural consequence of the electromagnetic forces responsible for the phenomenon. The choice of the discoid shape for UFO's arose from the existence in our skies of real discoid shapes, and does not derive from imagination. The relationship of the natural theory to other UFO hypotheses is discussed, and its scientific nature revealed.

UFO SHAPE EVIDENCE OF ITS OBJECTIVITY

The shape of the conventional UFO has remained remarkably consistent over the years since 1947, when it was first called a 'flying saucer', and this consistency can even be seen in reports made before that date. Typically, it is a discoid, a flattish disc with a central hub or dome, even two domes, one upper and one lower. I will take the shape of the UFO which used to decorate the cover of BUFORA Journal (see Figure 1) as an example of this form; I take it that the illustration was thought to be typical. But of course not all UFO's are such a shape; they vary from the sphere to the cigar shape.

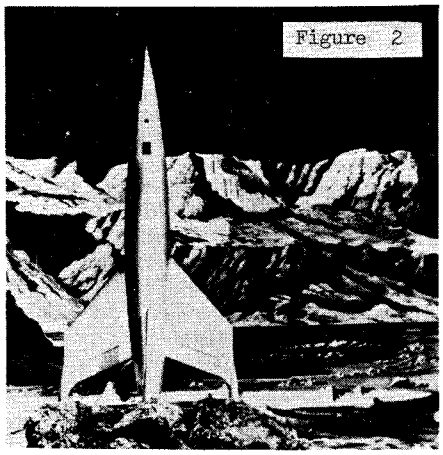
Figure 1



The classical UFO form - a discoid having symmetry about both a vertical axis and a horizontal plane, and suggesting development by rotation.

If, as some claim, UFO's are a subjective phenomenon, then we must conclude that human imagination, requiring a visualization of an alien space vehicle, constructed the discoid; that mankind, when it heard about aliens and that they might come to Earth, concluded that they would travel in a flying dish! But how do the advocates of this psychological theory of UFO's ex--plain the choice of shape? And how do they explain the fact that people all over the world, from very many diverse cultures, report the same shape? Where on earth did the concept of this discoid come from? Even Jung only made a half-hearted suggestion that the circular shape (he did not deal with the discoid shape) arose from deep-seated psychological associations [2], and totally ignored the fact that in 1947 mankind already had a concept of the shape of future space vehicles. From 1934 the Flash Gordon films and strip cartoons had shown rocket-powered spacecraft, and nearly all visualizations upto 1951 showed a bullet-shaped rocket with stabilizing fins (see Figure 2).

Figure 2



Mankind's concept of an interplanetary vehicle prior to 1951 - the rocket from the film Destination Moon (1950). (National Film Archive)

Clearly mankind saw both human and alien spacecraft as long cylindrical rocket ships. But by 1951 in the film The Day the Earth Stood Still, an alien spacecraft had appeared as a 'flying saucer', and since that time alien craft have almost always been represented as discoid. Indeed, in the modern enter--tainment media, it is a sine qua non that all alien craft are discoids. Why should alien spacecraft be so different in shape from human ones? Indeed, why should they be at all different?

I conclude that the discoid concept derived from the sensational reports of 'flying saucers', which began in 1947, and that this demonstrates that the objects were real. On the one hand there was, for reasons too complex to go into here, a growing interest in space travel and the possibility of the existence of aliens, especially in hostile aliens; on the other hand there existed reports of an anomalous aerial phenomenon. Perhaps it was the stories told by a few notorious opportunists that caused these two concepts to fuse together; it was concluded that the 'saucers' were the vehicles of the hypothetical aliens, and so by circular logic that the aliens really existed and were visiting Earth. This presumption has since proved difficult

to eradicate. Ufography (the descriptive science of UFO's) tells us only that there exists in the skies of Earth a phenomenon which manifests itself mainly as an anomalous discoid; it does not tell us that this phenomenon is either extraterrestrial or alien. The consistency of the reports and their universality suggests that the phenomenon is both consistent and universal.

UFO HYPOTHESES AND THE NATURAL THEORY

If we now accept that UFO's are a real anomalous phenomenon, which does not necessarily represent the activities of alien civilizations, we should carefully examine the available hypotheses to explain the phenomenon,. Unfortunately, BUFORA's fairly comprehensive list of hypotheses does not relate them to each other, except in some sub-categories. Nor does it discriminate between hypotheses that are controversial and those which are not.

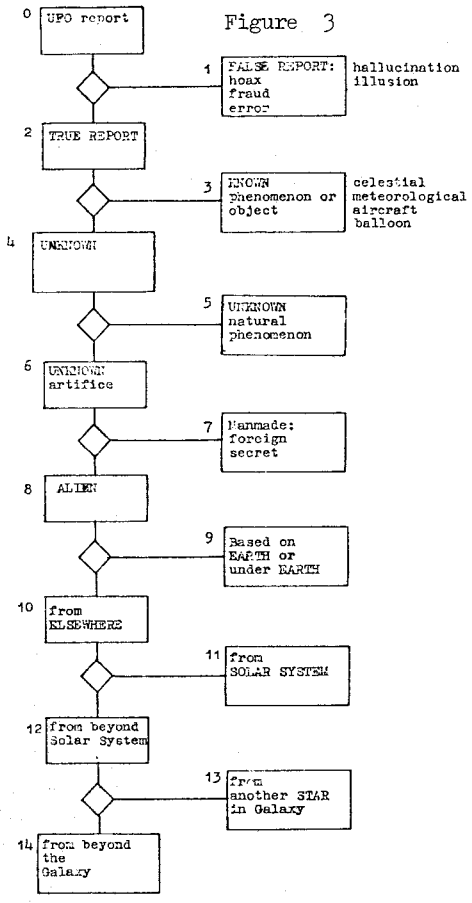


Figure 3

Program for a UFO hypothesis - a rational sequence based on an increasing number of assumptions.

Figure 3 shows the hypotheses set out in a logical and progressive sequence, each step being an either/or choice. More and more assumptions have to be made as the chart proceeds, but they are assumptions that many scientists would accept. It is not controversial that ILE (Intelligent Life Elsewhere) exists, although few scientists would accept that aliens are capable of crossing interstellar space. The chart does not deal with more contro--versial hypotheses (which require even more assumptions), such as those involving time travel or parallel universes. And not even BUFORA's list includes the hypo--thesis that UFO's represent the activities of divine or demonic agencies!

No rational ufologist should be in a hurry to pass over the initial hypotheses; there are many adequate explanations for UFO's in boxes 1 to 3. But if a UFO cannot be placed in box 3, then we must proceed through box 4 to boxes 5 and 6. Generally, the odd-numbered boxes involve fewer assumptions and are thus simpler explanations than those in even-numbered boxes. So box 5 is preferred to box 6, and before we conclude that a UFO is artificial, we should consider whether it could be caused by an unknown natural phenomenon. It cannot be assumed that all natural phenomena are known and fully documented.

Selection of hypotheses can also be made on the basis of whether or not they are scientific. The latest philosophy of science decrees that for a statement to be scientific it must be capable of refutation. Thus a theory must produce predictions which can themselves be tested, although verification of the predictions would mean only that the theory had been corroborated. Falsification of the pre--dictions would mean that the theory had been contradicted, and that it was probably false, but not certainly so. Nothing is certain in science.

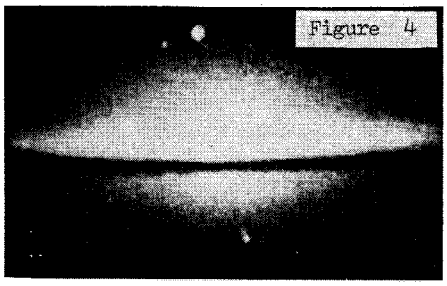
Consideration of the hypotheses shown in Figure 3 leads to the conclusion that some of them are unscientific. For instance, the theory (box 12) that UFO's come from beyond the Solar System is not susceptible to testing, let alone refutation. We can think of no predictions, derived from such a theory, that can be subjected to a test. On the other hand, the theory that UFO's are illusions is scientific. The cause of such illusions should be known, and tests could be established to determine whether or not a UFO sighting was caused by an illusion. Clearly it is possible for such tests to falsify this theory.

The theory that UFO's are due to some unknown natural phenomenon is scientific if the phenomenon can be deduced with

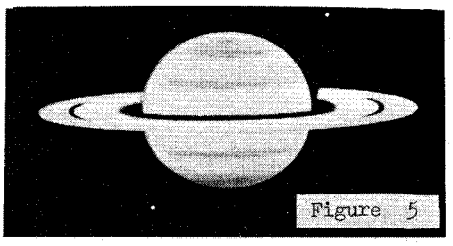
sufficient clarity for predictions to be derived. It will be shown that this is possible, and therefore that the natural theory is the last scientific theory in the chart. Such a natural theory is in fact the last hope for scientific ufology.

UFO SHAPE SUGGESTS A NATURAL ORIGIN

If UFO's are natural forms, we should ask ourselves whether nature already exhibits such discoid forms in manifestat--ions that are known. Curiously, the answer to this question is in the affir--mative, but the examples are all extra--terrestrial!



Discoid develop in deep space - the 'Sombrero' galaxy M 104 (NGC 4594) 40 million light years away. Most galaxies have a discoid form. (PALOMAR OBSERVATORY CALIFORNIA INSTITUTE OF TECHNOLOGY)



Discoid development in the Solar System - the rings of Saturn may be evidence of a primordial discoid from which the satellites and the rings condensed. (Drawing by D A Hardy from an observation by Patrick Moore.)

Such discoid form is seen in the galax--ies (Figure 4), and in the rings of Saturn (Figure 5). Indeed, many UFO's have been described as looking like the planet Saturn. According to Sir Fred Hoyle, the Solar System itself has conden--sed from a disc of plasma thrown out by the protosun [3], and at that primordial stage the Sun must have looked just like the discoid in Figure 1. It is clear that under zero gravity a fluid will form a sphere; water formed such spheres in Sky-lab. If it is rotating, the equator of the sphere will bulge, and if it rotates fast enough an equatorial disc will emerge. This may have been the mechanism by which the galactic, planetary and satellitic discs evolved.

If the form of UFO's is due to the same mechanism, it is anomalous that such a form should be seen in Earth's atmosphere, under the influence of an external gravitational field. Clearly a UFO cannot be a rotating liquid mass; if it were it would immediately fall to the ground. But if its ability to remain suspended in air is due to a density no greater than the air around it, then it can hardly have the necessary mass to pro--duce an equatorial disc. This explanation appears to be on the wrong track, although it might be going in the right direction.

Examination of extraterrestrial discoids led me to the discovery that the magnetic field of the planet Jupiter is intensified near the magnetic equator. This results is a current sheath that has a discoid form [4]. No-one seeing the shape of Jupiter's magnetic field can fail to see the similarity to the UFO discoid and to wonder what lesson this holds for solution of the UFO problem.

Thus while examination of extraterrestrial discoids which resemble UFO's showed that UFO's could not be formed in the same manner, it did reveal an invisible discoid that may be relevant. The magnetic fields of the planets are very much a natural feature as the planets themselves. In fact it would seem that not only the planets, but most stars and the galaxies themselves each have a magnetic field that is essen--tially dipolar and discoid. That such fields can form on such widely different scales indicates that their form is not a function of size, but that it is an inher--ent feature of rotating magnetic dipoles. I conclude that all magnetic dipolar fields have the same discoid form, and that it is this mechanism that produces the discoid form of UFO's.

THE FORMATION OF NATURAL MAGNETIC DIPOLES

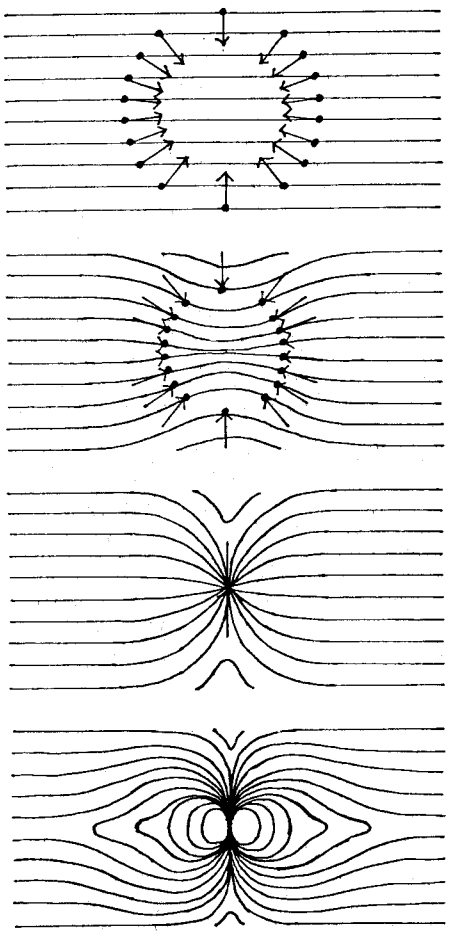
I have previously outlined a mechanism that might produce a contracting and rotat--ing mass of air, and I proposed that the rotation produced ionization. But in fact negative ions occur naturally in the atmos--phere due to radiation and molecular collisions. They are particularly notice--able in rural, mountainous or coastal areas, where the negative **oxygen** ions contribute to the healthy and bracing feeling. If UFO's are due to a concentration of negative ions then that would explain why they are relatively more common in rural areas. Urban areas tend to be deficient in negative ions.

A concentration of air molecules would

increase the local density and result in drop under gravity. Indeed many ball lightnings have been seen to drop suddenly from clouds. But electromagnetic effects might control the movement of the concen--tration in other ways. The concentration of air molecules under cooling contraction would be taking place within the influence of the Earth's magnetic field. The neg--gative nitrogen and oxygen ions would be essentially responsive to this field, and vice versa. If the ions contract with the air, then the local field must contract with them.

Figure 6

Development of an atmospheric dipole



a) The field before contraction; the dots represent the perimeter particles of an assumed spherical body of air, and the arrows show equal contraction distances and the direction each particle must move, bringing the field with it.

b) The particles have now moved the distance of the arrows, causing the field to 'pinch'.

c) The result of such contraction must be collapse of the particles and the field to one point - a singularity - causing the field to turn at right angles to form a dipole, shown by the vertical line.

d) Further contraction results in intensification of the dipolar field, and the creation of closed loop fields, which are then shaped by the surrounding field.

The process, imagined in Figure 6, must lead to a pinch in the field, and then to a singularity with dipolar character--istics. The concentration of air and ions must lead to a concentration and intensification of the field. It is proposed that the energy and radiation pressure of the singularity then expels air molecules creating an evacuated cavity inside the ionized shell 5. Thus the mechanism becomes lighter than the surr--ounding air and is capable of floating or moving independent of gravity.

It will be seen that the full develop--ment of the rotating dipole had a discoid form as the extremeties of the closed loops attempt to accommodate themselves to the surrounding field lines.

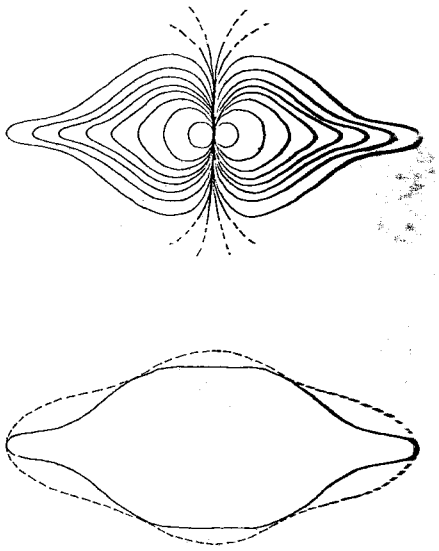


Figure 7

Proposed structure of an electromagnetic UFO based on a rotating magnetic dipole. The lower picture shows its ionised outline (tilted outline shown in broken line).

Figure 7 shows the same dipolar field isolated, and also the outline of the discoid shape as it would appear to the eye, with a more typical angled view shown in a broken line. If the singularity can vary its field strength, then the radiation shell might appear at various positions. Thus at low strength only a small ball-shaped object would be seen. This is called ball-lightning, and its relation--ship to the larger field can be seen in Figure 8.

At the highest strength full discoid would be visible. Any intermediate shape should be possible, and shapes may be observed to change from one to another. One report known to me is of a small red sphere wich suddenly changed into a large shape resembling a rugby football. This would be consistent with an energy jump in such a mechanism.

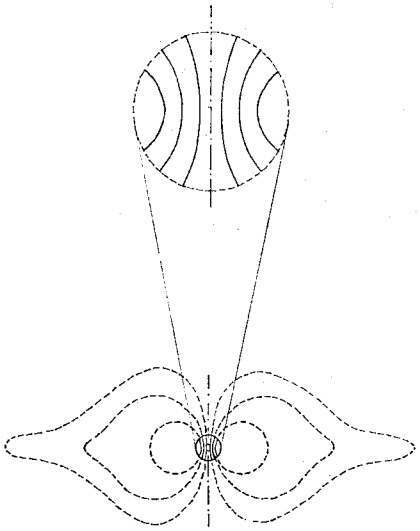
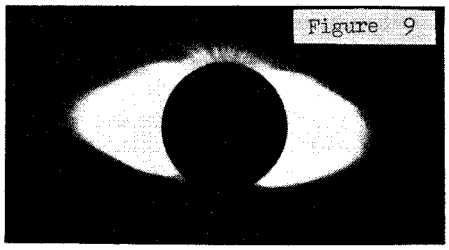


Figure 8

The electromagnetic model of ball lightning and its possible relationship to the greater discoid field.

The sun itself has a rotating dipolar magnetic field, as can sometimes be seen at the time of an eclipse, when the field lines at the poles are clearly visible (See Figure 9).



The dipolar magnetic field of the Sun seen in the eclipse of 1954. (Royal Greenwich Observatory.)

Such radiating field lines are often re--ported in association with UFO's and ball lightning, indicating that they too are rotating dipolar fields.

The Earth field lines in Figure 6 are shown as horizontal, but in fact the in--clination of the field varies with lati--tude, being horizontal only at the equator. But the inclination also varies with geoma--gnetic influences, and is not necessarily straight. An inclined field could produce an inclined discoid, or even one on its edge.

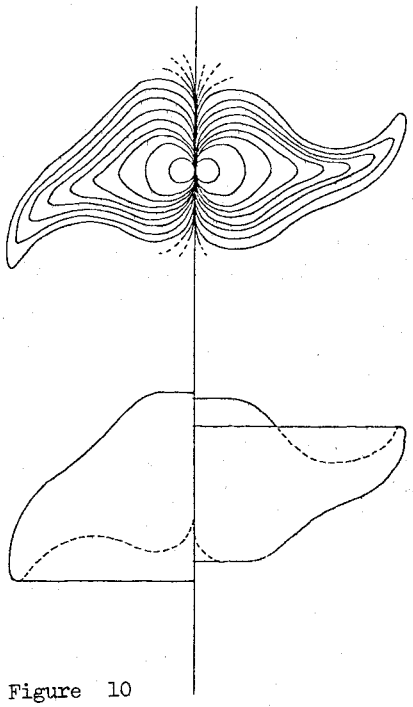


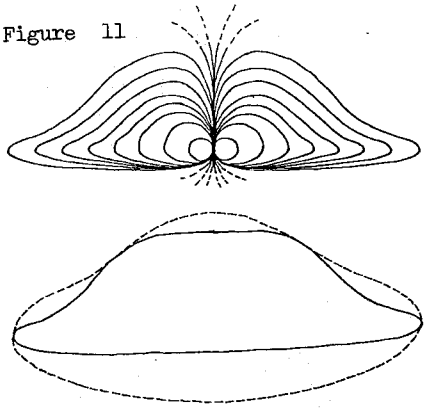
Figure 10

Two UFO shapes that may be created by distortion of the field extremities.

In fact both have been reported. Bends in the field could influence the overall shape of the discoid, distorting the extremeties as shown in Figure 10, and if for some reason the lower field lines of the dipole are compressed, say due to proximity to the ground, then its profile would be altered as shown in Figure 11. This latter resembles the classical 'upside-down soup plate' of so many UFO reports. It will be seen that such a mechanism can account for a great variety of UFO forms. Bends in the Earth's field could also explain the curved path of some UFO's and ball lightning.

There are grounds for believing that ball lightning is an electromagnetic phenomenon centred on a rotating magnetic dipole. Ball lightning created at the site of and immediately after a lightning stroke might now be seen as a result of the sudden pinching of field lines by contracting ions created by the stroke. That some ball lightnings roll on a horizontal axis might be due to for--mation in a vertical rather than a hor--izontal field.

Figure 11



The natural theory sees ball lightning as a manifestation of one end of a BL-UFO spectrum, and it follows that spherical UFO's are ball lightning and that they are smaller than the discoids.

The phenomenon is essentially protean; it can change shape within a limited framework, although misperception may result in reports of shapes outside the framework.

CHARACTERISTICS OF NATURAL UFO's

Many characteristics of both ball lightning and UFO's can be explained by this natural electromagnetic theory. In fact it can explain features and behaviour that are otherwise impossible to understand.

Firstly it explains why the phenomenon is world-wide and consistent, and above all predominantly discoid. Secondly it explains why the phenomenon has been reported throughout recorded history without, apparently, any change in the form. It may be presumed that Ezekiel could have seen such an object by the banks of the Khabour, and that it had been a feature of the atmosphere well before man himself appeared.

Having a powerful electromotive force and very little mass, it is natural that such objects can move in a manner impossible for mechanisms with inertia. They may hover or drift, or move very rapidly and execute sudden manoeuvres as they feel the influence of surrounding magnetic fields. They will be very sensitive to man-made electromagnetic fields, such as those created by high voltage power cables, and may react to metal objects, particularly metal vehicles and aircraft. The 'falling leaf' movement, commonly reported, is a characteristic of a very lightweight object with a large surface area, and may be an expected movement when the object is not under magnetic influences. The mechanism's rapid rotation may not always be perceptible, but occasionally nutation may be observed as it changes course or position. Reports of a UFO breaking into several parts, while they are inconsistent with the notion that UFO's are vehicles, are consistent with the natural theory. Ball lightning is known to fragment occasionally.

Since the phenomenon is essentially a vacuum bubble in air with interface defined by a tenuous plasma layer (according to one theory by Dawson/Jones 5), it is likely that this discontinuity will appear opaque and reflective, just as does that of an air bubble in water or glass. Because the discontinuity will reflect light in much the same way as polished or 'white' metal, it will tend to look exactly like metal in daylight, and will have a silvery, metallic lustre (see Figure 12). At some low energy levels it may appear translucent or transparent.

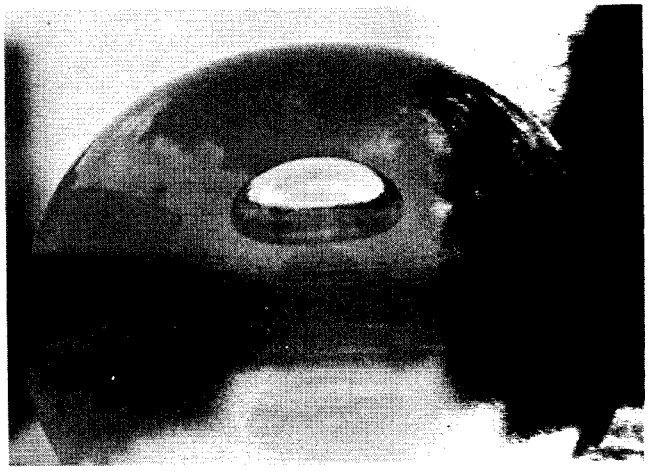


Figure 12

The appearance of an air bubble in a glass paper weight, the bubble is opaque and reflective like metal.
(Stuart Campbell)

In addition, since conditions within the shell of the mechanism are similar to those in a gas-discharge tube (ie. very low pressure and a strong electric field), the bubble may emit electromagnetic radiation, including visible light. It is well-known that under appropriate conditions gases can be stimulated to emit light; they are particularly prone to do so at very low pressure, as in the neon tube used for so many advertising signs. Air contains many different gases, which, as McCampbell has pointed out, will be excited at different energy levels [6]. Even without ionization, which can produce a great deal of radiation, neutral atoms can be excited into emission at particular wavelengths. Thus at low energy levels, it is possible that pure and individual colours will be emitted by some of the noble gases in the air. In particular, neon may be responsible for the frequent red-orange colour of the phenomenon. Other colours can be produced from other gases, while ionization of all the

atmospheric gases (although perhaps to different ionization levels) will produce a brilliant white light, perhaps tending to a blue. As McCampbell has suggested, such different colours indicate different energy levels; the lowest level might appear simply as metallic, while the highest level would produce the most brilliant light. While McCampbell imagines that this process takes place on the surface of a metallic craft, it is a more appropriate explanation for colour changes within natural UFO's.

It has often been suggested that 'day--light discs' and 'nocturnal lights' are one and the same mechanism seen under different conditions. The natural theory now explains how this can be shown to be true. In daylight there is more light outside the plasma shell, and its reflec--tivity obscures any internal light. At night, without the reflection, the inter--nal light emission can be seen through the plasma shell.

Discussing ball lightning, which he understands as a rarefied gas ball ex--cited by microwaves, McCampbell points out that the excited gases do not have to be very hot. While the electron temperature may be as high as 10000K, the sensible temperature may be only 700K; the gases may radiate energy over a wide spectrum while having sensible temperatures only in the range 400 to 750°C. Apart from visible lilght, their radiation will include infra-red, ultra-violet, microwaves, radio waves, and, at very high energy levels, X-rays.

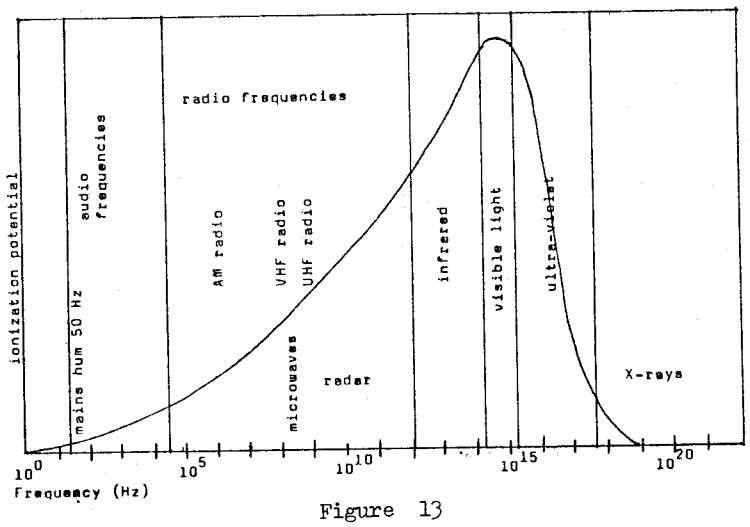


Figure 13

A normal distribution related to part of the electromagnetic spectrum

Figure 13 shows the lower part of the electromagnetic spectrum, on which is superimposed a normal distribution curve for natural atomic emission. While at low energy levels only selective frequen--cies will be involved in the emission (eg,spectral lines of noble gases),at higher levels a broad-band radiation would result, even extending into the audio frequencies. Therefore the sounds produced by UFO's are a natural resonance produced as part of the overall emission, and it is easy to see why UFO's produce a lot of light and very little sound. Some of the audio frequencies produced may be near the lower limit of human hearing, down to 26Hz, or even lower, and change from one pitch to another can be expected as energy levels vary. A sound like the beating of wings probably indicates a frequency at or even just below the lower threshold of hearing.

While ultra-violet light is emitted, and while this can be the cause of skin burns and irritated eyes, two often re--ported effects upon witnesses, McCampbell draws attention to the possibility that microwaves may be the cause of such irri--tations. He also sees microwaves as the cause of interference with automobiles, radio and TV transmissions, disruption of electrical power supplies, dessication of plants and the ground, heating of road-ways, and induced paralysis, overheating and shock in witnesses. McCampbell explains many UFO effects as an incidental result of the broad-band radiation from what he imagines is the propulsion system of mech--anical craft. But his explanations more easily apply to the effects of natural UFO's.

Light emitted in the presence of a strong magnetic or electromagnetic field will be polarized. I have seen at least one report that indicated that this was so, and efforts should be made to try to find more such reports. But only witnesses wearing polarized sunglasses will detect such polarization.

Other features of UFO discoids, such as rings of lights and 'windows' are more difficult to explain, but it is hoped that the theory may be developed to account for all characteristics which are reliably reported.

The natural theory has no room for aliens, humanoid or otherwise. Reports of occupants, abductions, and the like, are incompatible and must be assumed to be false. The small proportion of all reports, which such reports represent, may well be the result of hallucination, wishful thinking or even fraud. No acceptable evidence exists in favour of the existence of aliens. Nor does the natural theory accept reports of time lapse or other apparant suspensions of the laws of physics.

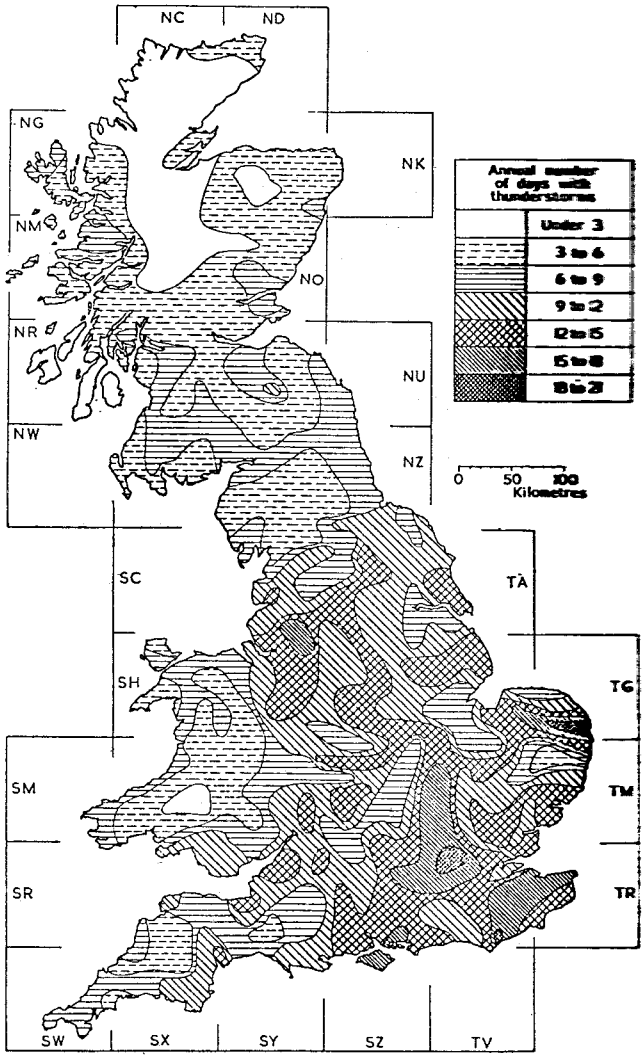
TESTING THE NATURAL THEORY

If, as I have claimed, the natural theory is truly scientific, it can produce testable predictions. I have already re--ferred to the prediction that such natural UFO's will be more prevalent incold, calm weather, especially at the onset of such

meteorological conditions[1]. It may be added that the incidence of such UFO's will be proportional to the rate of cool--ing; sudden and rapid cooling should produce more UFO's than other conditions. Considering the annual incidence of UFO reports, it can be expected that numbers of reports will increase in autumn, when the atmosphere is more often cooling than warming. This means that there should be more than the average number of UFO reports in October- December in the Northern Hemisphere, while in the Southern Hemisphere the increase should be in April- June. If the mechanism is a natural product of the atmosphere, then the direction of its rotation should be determined by the Coriolis Force. When rotation is observed, therefore, it should be seen to be counter clockwise in the Northern Hemisphere, and clockwise in the Southern Hemisphere. In order to test both the above predictions, world reports should be divided between the Hemispheres.

The theory already explains what is known, that UFO reports are more frequent in rural than urban areas, but in addition we can predict that reports should be more common in areas where the Earth's natural field is of higher potential than average. Magnetic maps, showing such areas, are available. Some areas are also more prone to thunderstorm activity than others, indicating a higher than normal amount of electrical activity in the atmosphere. More UFO's should be seen in such areas. Figure 14 shows the location of such areas in Great Britain; likely places seem to include Pevensey Bay near Eastbourne, and Great Yarmouth. It does not seem likely that the high incidence of thunderstorms in central London is related to a similar incidence of UFO's; urban areas are un--fruitful territory. Variation in the frequency of thunderstorms is also notice--able on a worldwide scale, and Figure 15 shows the various isokeraunic levels. The Natural Theory predicts that the frequency of UFO occurrence will be proportional to thunderstorm frequency, although the number of UFO reports will be influenced also by the number of available observers and the efficiency of local communications. Many UFO's may occur in sparsely populated and/or inaccessible areas of the world, or where there is no organization interested in the collection and investigation of such reports.

On a longer time-scale, it would not be surprising if it were found that UFO incidence was directly related to Sun-spot activity, since at times of high activity the Earth's field is stimulated by an increase in the strength of the solar wind. Readers more technically-minded than I am may be able to think of further tests.



Map showing annual number of thunderstorm days in England, Scotland and Wales

Figure 14

From British Standard Code of Practice CP 326: 1965 'The Protection of Structures Against Lightning'.

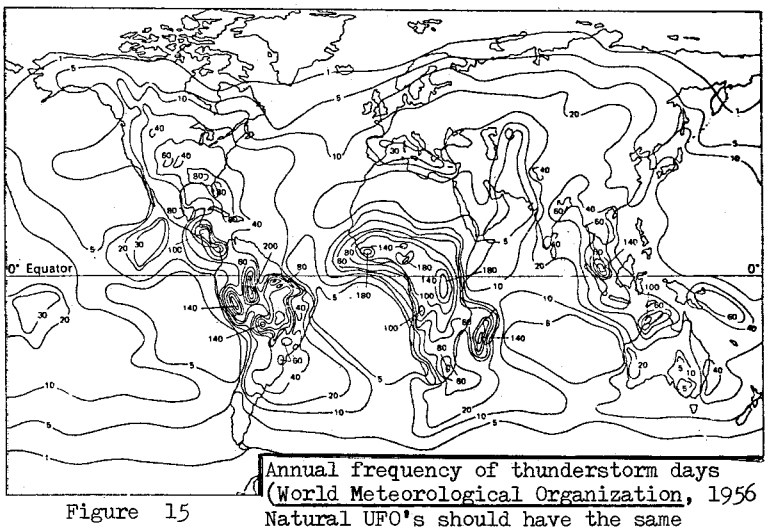


Figure 15

Annual frequency of thunderstorm days (World Meteorological Organization, 1956 Natural UFO's should have the same frequency distribution.

REFERENCES

1. 'Are UFO's an atmospheric phenomenon?' in Journal TAP,Vol 1 No 2, March 1980.

2. Jung C G, Flying Saucers/A Modern Myth of Things Seen in the Skies; 1959.

3. Hoyle, Sir Fred; Frontiers of Astronomy (1955), p 88.

4. Scientific American; special issue on the Solar System; Sept 1975; Section on Jupiter by John H. Wolfe.

5. See models of ball lightning proposed by Dawson, G A and Jones, R C. (Ball Lightning as aRadiation Bubble' in Pure and Applied Geophysics 75 (1969) pp 247-262) and Endean, V G. (Ball lightning as electromagnetic energy' in Nature Vol 263, Oct 28, 1976, pp 753-755).

6. McCampbell, James M. Ufology, 1976 (Celestrial Arts.)

NEW PRESIDENT

The British UFO Research Association (BUFORA) is very pleased to announce that the Lord Kings Norton has consented to accept the presidency of the Association.

Lord Kings Norton, Engineer and Scientist has had a long association with flying machines. He has held many distinguished appointments in industry and government including, Deputy Director of Scientific Research, Ministry of Aircraft Production during the War, Chief Scientist, Ministry of Fuel and Power from 1948 to 1954, and Chairman of the Council for Scientific and Industrial Research from 1961 to 1965.

Leslie Bayer, Chairman of BUFORA, stated, " We are proud to have Lord Kings Norton as our President. Apart from the honour he has done the Association, his scientific, and sceptical approach to the UFO phenomenon is exactly in tune with BUFORA's attitude."

"JOURNAL TAP VERSUS BUFORA JOURNAL"

In Journal TAP Vol. 1. No. 2. in the article " Why Journal of Transient Aerial Phenomena? " the authors stated that Journal TAP was equivalent to 96 pages of the BUFORA Journal. This is incorrect, infact there is very little difference in the total number of words in each magazine!

INTERNATIONAL CO-OPERATION

by S.J. Gamble.

Following on from the work of the International Working Party (1) last year, further discussions were held about international co-operation. These talks were held in London on April 11th, 12th and 13th.

A meeting took place on April 11th between Per Anderson (of SUFOI, Denmark) and members of BUFORA's computer committee, to discuss the possibility of exchanging computerised case reports. The discussion emphasised the desirability to establish an International UFO Data Standard (IUDS) (2).

The following day the talks were widened to cover such common problems as training investigators, the question of witness reliability and co-operation with the established scientific community. The group was joined by Leslie Bayer (BUFORA Chairman), Peter Hill (Secretary, Edinburgh Branch, BUFORA), Tony Pace (BUFORA Research Director) and Bjorn Hakansson (Project URD, Sweden). It was agreed that investigator training was most important and that correspondence should continue on this subject.

Data processing and the design of investigation questionnaires were on the agenda for the third meeting. Present were Peter Hill, Per Anderson, Malcolm Bull, Robert Digby, Lionel Beer and myself. Peter Hill told the meeting about his experiences with the BUFORA punched card system. Per Anderson spoke about the control of information stored on computer by Danish law. It was the opinion of those present that some form of standardised international questionnaire might make exchange of information easier.

The April meetings helped to keep alive the international dialogue which began at the First London International Congress and all those taking part hope it will be possible in the future to build further on the foundations already laid.

References:-

(1) Haisell, D.A. "Working Party Report" JTAP 1, 2, pp 36 - 40.

(2) Bull, M., Gamble S., Digby R., "Application of Low Cost Computing and Data Processing to UFO Reports and Related Problems" JTAP 1, 2, pp 47 - 49.

THE ZETA RETICULANS

COMPILED BY ANTHONY PACE

INTRODUCTION - THE UFO EXPERIENCE.

The UFO experience involving Betty and Barney Hill is a classic one- especially when we compare and consider the details of this case with the growing number of more recent abduction cases reported from many parts of the world. I am sure that most of you are familiar with the series of events on the evening of I9th September I96I, when the Hills were driving home from a short holiday in Canada. However, a short summary of the incident will help to provide the necessary setting for a more detailed survey of the intriguing developments which culminated several years later.

The Hills were driving South on U.S. Route 3 in Central New Hampshire U.S.A. The sky was dark and clear and the moon and stars illuminated the wooded landscape through whichthey were travelling. They had left a restaurant at Colebrook just after I0,00pm. Near Lancaster they became puzzled by a bright star which continually changed its course erratically. First Barney suggested it was a satellite and then a Piper Cub light aircraft. As the star moved closer Barney grabbed his binoculars , stopped the car and stepped out. He found himself moving across the road on to a field. The star had now become a large glowing pancake-shaped object and on either side of the enormous disc were fin-like projections carrying a red light on each. (FIG.I).

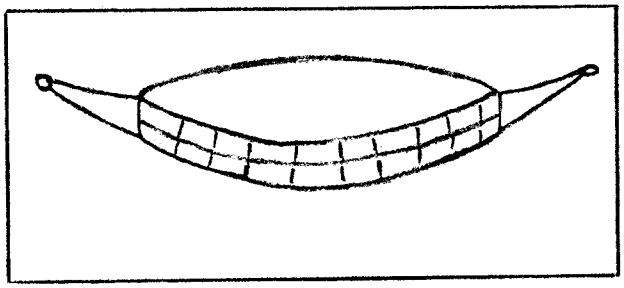


FIG. 1.

There were windows that curved around the object. It was completely silent and glowed with a brilliant white light. Barney continued across the field, coming to within about 50 feet of the UFO which had now descended to the height of the tall trees in the vicinity. Through the binoculars he could see at least five figures who appeared to be bracing themselves against the windows and staring directly at him. They appeared to be wearing some kind of dark uniform. Suddenly all but one of the figures stepped back and the object began to descend further. An extension was then lowered from the underside. Barney concentrated on the face of the remaining figure at the window. He had never seen eyes like that before. They were slanted but not Chinese. Almost hysterical and overcome by fear he raced back to the car, selected first gear and sped off down the road. Betty was ordered to look out for the object, but for some reason, beyond his control, Barney turned down a side road, and the car halted. They were confronted by five or six figures all wearing black jackets. There was a red glow beyond the group of figures and the Hills wondered if there had been an accident;

Once more Barney was aware of the strange eyes staring at him. He was afraid, but searching for some explanation suggested the eyes were those of a wild cat in a tree. He thought to himself-no, I know what it is, it's the Cheshire cat in "Alice in Wonderland", I don't have to be afraid of that. It disappeared too, and only the eyes remained; (FIG 2)..

FIG. 2.

The human -like figures approached the car and without being able to resist, the Hills were escorted back to the UFO. While inside the vehicle both were subjected to a series of physical examinations by their abductors. They were told they would forget the whole incident and were eventually returned to their car safely. The UFO took off and was seen out of sight. The couple, completely oblivious of the abduction, continued on their journey to their home in Portsmouth, New Hampshire.

At home they discovered that 2 hours of their trip could not be accounted for. Two weeks later Betty Hill was bothered by a series of vivid dreams in which she and Barney were abducted by humanoid beings and given a physical examination aboard a UFO.

More than two years after the incident the Hills were still puzzled by the lost 2 hours and in January I964 a Boston psychiatrist Benjamin Simon; agreed to try regressive hypnosis techniques in order to try to uncover the hidden events locked in the subconscious of the New Hampshire couple.

After several months of weekly sessions many details of the abduction were brought to light - concerning the appearanceof the humanoids, the physical examinations and the communications between Betty Hill and her examiners.

The Star Map.

In one of the hypnosis sessions Betty Hill described how she had asked where the humanoids came from. She was then shown a star map and asked if she knew where she was located on it. As she did not have this knowledge the humanoids said they were unable therefore to throw light on their origin;. By post hypnotic suggestion Betty drew the star map she had alledgedly seen which apparently indicated the home star of the extra terrestrial visitors. (FIG.3).

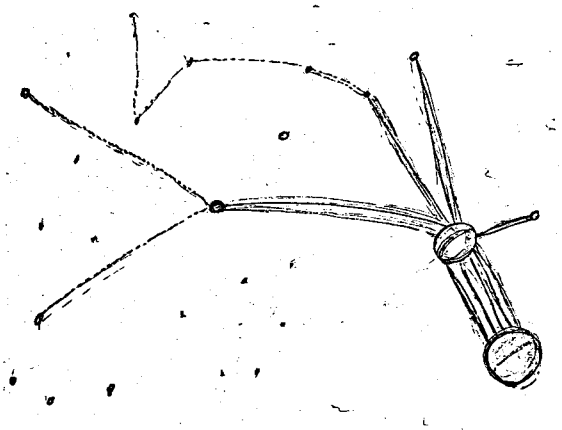


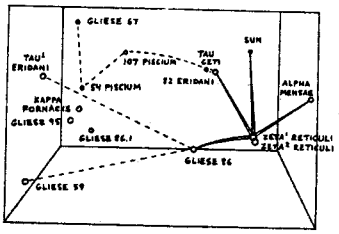
FIG. 3.

Betty Hill's Star Map

The much enlarged stars in the foreground represented the home star and its close companion. Other smaller circles are points where allegedly stars visited - the lines indicating regular routes and the broken one - exploratory excursions;.

Walter Webb a lecturer at the Hayden Planetarium and investigator of the Hill case, was most intrigued by the star map. He felt that the pattern should be tested and that if it were a genuine portrayal - several assumptions would be obvious at the onset. (I) The home star is one of the two large circles. (2) The map was made from a vantage point near the origin star. (3). Our Sun is represented on the map with a line to it, and (4) The map depicted a local stellar neighbourhood;

In I966 Marjorie Fish - a school teacher from Ohio decided to search for the star pattern depicted in Betty Hill's drawing using three dimensional models constructed of beads. Initially she thought the pattern would come easy, but, in fact it was to take 6 years using more than 20 models and thousands of hours of photography before one remarkable set of stars emerged.(FIG 4).



Front view of Fish Model. Compare with Betty Hill's map. From photo by M. E. Fish with lines from Hill map added.

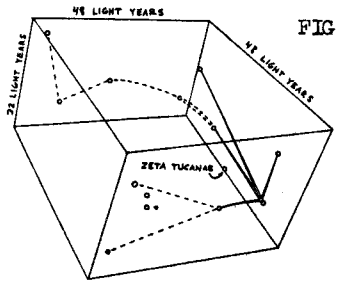


FIG. 4.

Olique view of Fish Model. From photo by M. E. Fish.

M s Fish's work tentatively identifies the largest circle star as Zeta 2. Reticuli and the companion ZetaI Reticuli in the southern constellation of the NET. Zeta 2 Reticuli - the home star is of spectral class GI - very similar to our Sun, and lying at a distance from us of 36.6 light years.

M s Fish had severely restricted her selection of model stars to those in a spectral range between F8 and KI - including the G-type stars like the Sun, She chose only single non-fluctuating main sequence stars which were old enough and stable enough for life to have arisen and evolved on any Earth-like planet revolving around them. Larger shorter-lived stars would be unsuitable and so would close multiple systems which could not support a stable planetary system. (FIG 5)

FIG. 5. CHARACTERISTICS OF MAIN SEQUENCE STARS

Class	% of Total	Temp. °F.	Mass (sun=1)	Luminosity (sun=1)	Life-span (billions of years)
A0	1%	20,000	2.8	60	0.5
A5		15,000	2.2	20	1.0
F0	3%	13,000	1.7	6	2.0
F5		12,000	1.25	3	4.0
G0	9%	11,000	1.06	1.3	10 Sun
G5		10,000	0.92	0.8	15
K0	14%	9,000	0.80.	0.4.	20
K5		8,000	0.69	0.1	30
M0	73%	7,000	0.48	0.02	75
M5		5,000	0.20	0.001	200

From the Fish/Hill pattern Stars; II out of the I6 are Sunlike stars including Zeta I + Zeta 2 Reticuli. (FIG.6).

PROBABLE STARS IDENTIFIED BY FISH IN THE HILL MAP

Name	SAO Catalog Number	Gliese Catalog Number	Constellation	Spectral Class	Distance From Earth (L. Y.)
Zeta Tucanae	248163	17	Tucana	G2 V	23.3
54 Piscium	074175	27	Pisces	K0 V	34.3
–	167134	59	Cetus	G8 V	52.6
–	037434	67	Andromeda	G2 V	37.5
107 Piscium	074883	68	Pisces	K1 V	24.3
Tau Ceti	147986	71	Cetus	G8 Vp(or VI)	11.8
–	232658	86	Eridanus	K0 V	36.6
–	167613	86.1	Fornax	K2 V	42.3
–	167697	95	Fornax	G5 V	44.7
Kappa Fornacis	167736	97	Fornax	G1 V	42.3
Tau[1] Eridani	148584	111	Eridanus	F6 V	46.6
Zeta[1] Reticuli	248770	136	Reticulum	G2 V	36.6
Zeta[2] Reticuli	248774	138	Reticulum	G1 V	36.6
82 (e) Eridani	216263	139	Eridanus	G5 V	20.2
Alpha Mensae	256274	231	Mensa	G5 V	28.3
Sun	–	–	–	G2 V	–

FIG. 6. The 12 stars connected by lines have the following ranges as a group: spectral classes F6 V to K1 V (sun G2 V), surface temperatures about 4800 to 6500° Kelvin (sun 5800°), masses about 0.7 to 1.2 solar masses (sun 1.0), luminosity about 0.3 to 2.1+ (sun 1.0), radii about 0.7 to 1.2 solar radii (sun 1.0), absolute visual magnitudes +3.7 to +5.9 (sun +4.8), apparent visual magnitudes +3.5 to +7.0 (sun −26.7), distances from earth 11.8 to 52.6 light years, and main-sequence residence times about 7 to 30 or 40 billion years (sun about 13 billion).

Naturally there were, and still are many arguments for and against this apparently remarkable discovery - but it does no harm to develop this painstaking astronomical exercise in order to learn more about the Zeta Reticuli system and perhaps the planetary environment of the hypothetical Zeta Reticulars themselves.

In a copy manuscript I received from APRO in **Tucson** - the **author** Walter Webb states - "from both the star's spectrum and the **Hills'** descriptions of their captors, it may be assumed the home planet of the Zeta Reticulans **possesses** a mass, gravity and environment at least somewhat similar to our own. Bieri (1964) argued that extraterrestrial intelligence probably will resemble Homo Sapiens because evolutionary pathways are strictly limited **and** air-breathing, land-roving humanoids offer the optimum adaptive solution to terrestrial environments. He postulated life-supporting planets will evolve bilaterally symmetrical animals with an **anterior** brain and closely associated sense organs, paired appendages and hands for tool making.

Variations in atmospheric density and composition stellar distance, and radiation output and intensity from the star would account for the reported **appearance** of the Hill entities, that is - large slanted eyes, wide nostrils, mouth-slit, grey skin and thick chests".

The two stars that comprise **the Zeta Reticuli** system are almost identical to the Sun and are thought to be **the only** known example of two solar type **stars** apparently linked in a binary **system** of wide separation - something in **the order** of $\frac{1}{3}$ of a light year apart.

Because Zeta 2 Reticuli is **fractionally** less massive than the Sun it would be slightly dimmer. Observational **evidence** strongly suggests that the Zeta **Reticuli** system lies within the category of DISC POPULATION II stars with ages **ranging from** 6 to 8 billion years - considerably **older** than the Sun.

One major drawback to a **planetary** system surrounding either of these **stars** is the **spectroscopic** evidence that they are, to some extent, metal deficent and that the primeval nebula from which they formed was certainly less dense than our own;. It would be interesting to speculate whether any of the planetary systems shown by the computer are possible candidates for the home of our **visitors**. (FIG 7).

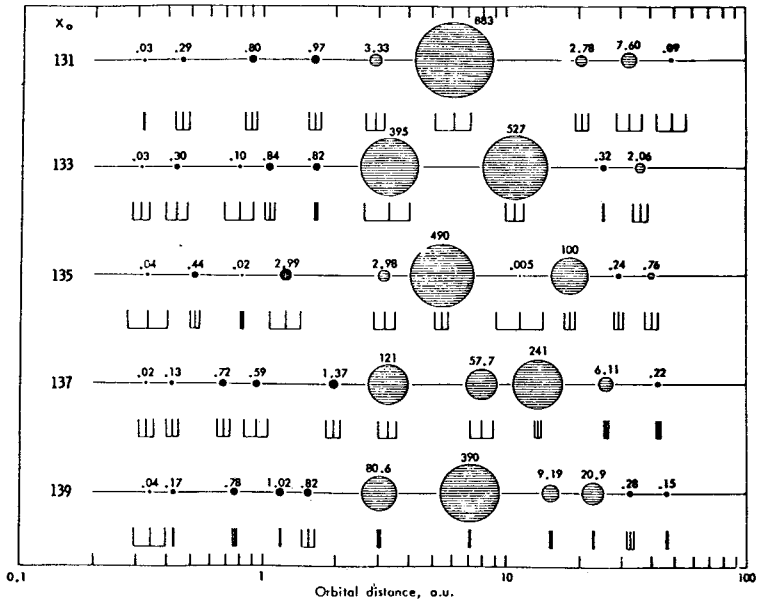


FIG. 7. **Computer generated planetary systems by Stephen Dole.** **(See references.)**

Would their planet be anything like our Earth?- would the atmosphere be more dense or more **rarified**?. Would it have the same composition. Would it be nearer or further from the primary star.

Physiology of the Reticulans.

In Ted Bloechers paper "Encounters of the third kind" presented at BUFORA Nov '76 Conference, the second basic category

of humanoids are described as "normals" of standard height or slightly under; Betty Hill estimated the height of her abductors at between 5' and 5' 4". Bloecher states that the "normal" humanoids tend to appear in groups of three or more and resemble humans closely - but at times, have wide set (wrap-around)eyes, rudimentary noses and ears, and slit-like mouths.

In the BUFORA Journal - Winter 1973 Vol 4 No I Page 14/15, Margaret Wilton from Greenock, Renfrewshire discussed the facial features of the entities described in the AVB case of 1958 and the Hills of 1961. (FIG 8).

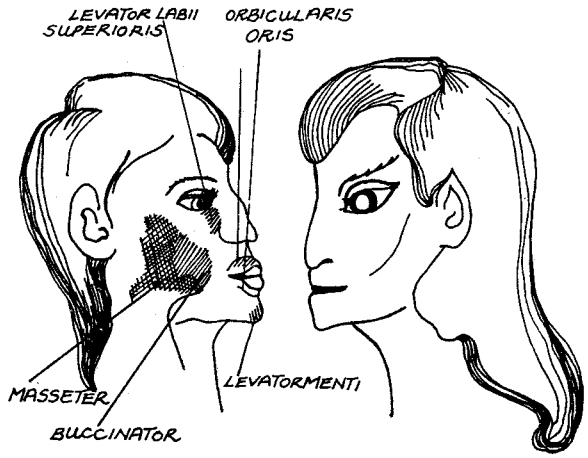


FIG. 8. Some of the muscles that determine the basic shape of the face.

"I suppose to most ufologists the AVB case of 1958 and the Betty & Barney Hill case of 1961 are now " old hat", but as a newcomer to ufology - and having just read these two cases - I am tempted to work on the theory that the humanoids featured in both cases are actually "Modified Humans". The reason for my thinking along these lines lies in the description of the humanoid's face and lips in both cases, which, generally describe broad, flat faces, high cheek bones, flat noses, slanted eyes and very thin lips. To take the AVB case first; Boas described her as having white-blond hair, large blue slanted eyes, straight nose very high prominent cheek-bones - under which her face suddenly narrowed, ending in a pointed chin - and she had thin, almost invisible, lips. In the Hill case the humanoid was described as having large slanted eyes, flat nose and his mouth was just a horizontal slit-with two vertical lines at each side. I feel the Hills' description is hazy but similarity exists in both cases.

I think the shape of our faces can be attributed to our diet and environment; e.g. in prehistoric times man had to have extremely strong teeth and jaws to enable him to eat the raw meat that was his diet, and consequently his face had a very strong muscular appearance (FIG9). As time went by, our diet became more refined, and consequently so did our facial muscles, though some races still retain - to some extent, the strong facial muscles of a raw "natural" diet; the Eskimo is an example.

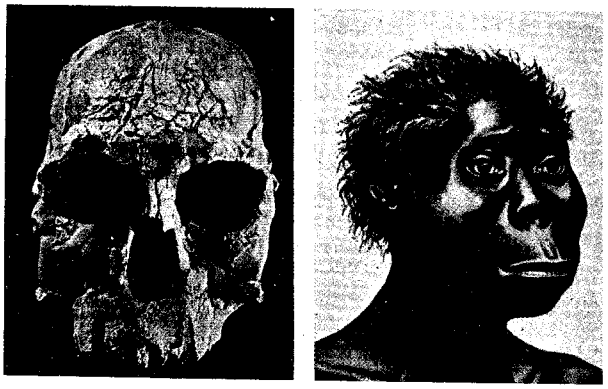


FIG. 9.

This skull, known as "1470 man" was found at Lake Rudolf, Kenya in 1972 and is more than 2 million years old. The reconstruction on the right shows how "1470" might have appeared.

Some of the muscles of the face are concerned with mastication of food - and for moving the lips are; the Buccinator in the cheek which keeps food between the teeth; the Masseter, also in the cheek, which is a "chewing" muscle; the Orbicularis Oris which is the mouth's main muscle and surrounds it; the Levator Menti in the centre of the chin which depresses the lower lip whilst the Levator Labii Superioris elevates the upper lip... there are many more but these five are sufficient to illustrate my point.

Now, take a jump into the far,far, future (not necessarily our own) where the diet consists of just a"gell" - a "gell" that supplies all the proteins, vitamins and minerals needed to sustain life and needs no use of facial muscles. Would it not be possible then for these muscles to fall into disuse?. And through the process of evolution be regarded as "not necessary?" so causing them to become almost non-existent and changing the shape of the face? If the muscles in the cheek area were to recede, the result could be a narrowing of the face below the cheekbones., and the

same goes for the main muscles of the mouth this causing thinner "flatter" lips. Also, if the centre muscle of the chin were to go it could lead to a "pointed chin"effect.

The humanoids in the AVB case uttered grunts and growls as their form of speech, whilst the humanoids in the Hill case uttered 'Mmmmmm' sounds. It seems that if the facia' - and particularly the lip muscles were to become almost non-existent - then a new form of speech would have to evolve, and it could only go two ways; either by emitting grunts and growls from the throat region or by emitting Mmmmmm sounds from the mouth region Of course, a sign language could also be used or by the process of evolution even further - telepathy....."

In John G. Fullers "The Interrupted Journey" (The Dial Press - New York I966). Barney Hill describes an incident at a lecture, where he came face to face' with people who were facially very similar to his abductors'

"Betty and I went to hear a lecture one time by Dr Carleton S. Coon of the Dept. of Anthropology at Harvard, and he showed a slide of a group of people who lived around the Magellan Straits. We both had quite a reaction when we saw it, because this group of Indians, who lived in an extremely cold atmosphere high in the mountains, where there was little oxygen, bore a considerably close resemblance to what I am trying to describe. And the professor was telling us how this group of people had, in the course of many generations, shown considerable physiological changes to adapt to the climate. They had Oriental sort of eyes, but the eye socket gave the appearance of being much larger than it was because nature had developed a roll of fat around the eye and also around the mouth. So it looked as if the mouth had almost no opening and as if they had practically no nose. They were quite similar in a general way, to the men I'm trying to describe."

FIG. 10.

Until I967 no more detailed drawings of the Hills' abductions had been made further than those done by Barney. David Baker a professional artist and member of NICAP made several drawings and paintings from Barney Hill's description, (FIG IO). His comments on the drawings were published in the UFO Investigator in April I972. David Baker wrote to the Hills - "With my knowledge of anatomy I am endeavouring to put your detailed facial descriptions into a possible anatomical arrangement following known laws of bone structure.

I. Eyes, slanted, rounding sides of face indicating peripheral vision. Anatomy for such eyes would indicate bone structure to protect such enlarged eye balls, also would extend cheek bones around curve of front facial plane, giving a look to eyes of not so much oriental as like a cat's eyes.

2. Wide cheeked, weak chinned, Mongoloid suggestion to face. Such extended cheek bones could minimize nose, mouth and chin area of face by association or contrast.

3. Large head. If the head cavity held such enlarged eye balls, a space for a more normal sized brain area could be gained by an enlargement of back or top of head, giving a larger than normal appearing skull area.

4. Immobility of mouth muscle control could give an impression of not registering usual emotions of sadness or joy. You noted., I recall, with great concern, the simulated effort we demonstrated of mouth immobility by pulling a tight silk stocking over face. Lips were pressed close to teeth line, neutralizing all usual lip fullness and character. In fact, the stocking trick gave Mongoloid expression to all bound features.

5. Membrane over mouth-opening when it was opened slightly with no spoken words heard, only grunts. Is it possible a membrane, for protective or other reasons, restricted all normal face movements or even sheathed body of entity?.

6. Nostrils prominent and heavy breathing noticed, also lack of nose cartilage. Even a tight mask could not hide but could minimize nose cartilage, but could press back tip of nose and expose nostrils. No membrane over nostrils was noted so assume breathing was all done there. Breathing could become laboured if mouth aperture was sealed from outside air.

7. Whites of eyes of yellowish cast, could be caused by tonality of mask or membrane.

8. Blinking of eyes was not apparent. Small pupils were,if membrane held eyes open,an effect of smaller pupils could be noticeable, if whites of eyes were bared. Membrane could keep air and impurities out of eyes, making blinking, to relubricate, orbs unnecessary.

9. Lack of ears, only ear holes and lack of hair. Tight membrane could restrict ear cartilage and also hair, producing a rounder, balder appearing head. To theorize presence of a tight, colorless membrane, let's assume it could be for clinical or climatic reasons. Many other conjectures could here be explored

IO. Colour of "men's faces were I) yellowish, 2) aluminium grey. A blue lighted interior (of the vehicle), as described by you, could accentuate a complementary tone of yellowishness to faces.

II. The following missing details could complete picture: I) Were hands sheathed with a membrane that would have minimized finger and finger nail details?2). What textures in the faces were obvious as masculine or feminine;".

Conclusions.

Definite conclusions are very difficult. Many of the features of the Hills' humanoids are strongly indicative of evolutionary development far beyond present day Homo Sapiens.

These are the lack of muscles in the face leading to the pointed and receding chin, the slit-like mouth and the rudimentary nose. Perhaps the larger cranium protected a larger more evolved brain a consequence of which produced the larger eyeballs. However, theidea that a colourless membrane covered the head, could distort the features by smoothing them considerably - thus leading to several incorrect conclusions.

Considering Barney Hill's description of the natives from the Megallen Straits, one cannot help wondering if these visitors inhabit an earth-sized planet circling a less energetic Star than the Sun - and at a greater distance from it - andthat their atmosphere is colder and more rarified leading to enlarged breathing organs giving the thickset chest as described. We could speculate that because their atmosphere was considerably thinner than ours and may not provide the same protective ozone layer that we enjoy, the Zeta Reteculans may have evolved a dark pigmentation to the skin possibly akin to dark skinned races of our own planet. A low light intensity may also have had considerable effect on the evolution of the eyes which were described by Betty and Barney Hill as cat-like on several occasions. While the wide set (wrap around) eyes would give the Reticulans considerably better periferal vision (perhaps originally) for hunting, this tendency appears to be the contrary to higher development where the eyes have become closer together at the front of the head to facilitate binocular vision. This then is a very brief and tentative look at the hypothetical Zeta Reticulans. Serious in-depth studies may already have been undertaken by researchers with the professional expertise to tackle the problems.

Students of anatomy and anthropologists would be interested. Astronomers and meteorologists must find this case most intriguing. Above all, it shows how the scientific study of the UFO phenomenon cuts across many sciences and emphasizes clearly that specialisation in research is a major key in unlocking the secrets which have eluded researchers for the past 30 years.

REFERENCES:-

FIG. 7

Events that lead to the build-up of a planetary system from the solar nebula have been simulated on a computer by the American scientist Stephen Dole. He starts with a Sun-sized star surrounded by a disk of gas and dust similar to that which spawned the planets. Inside this cloud he imagines that the dust grains on their orbits round the Sun grow by random collisions until a suitable nucleus for a planet is built up. The computer works out what happens next.

Where two such planetary nuclei come close enough to be gravitationally attracted, or where their paths cross, they coalesce into one larger body. As these growing nuclei orbit within the cloud, they sweep out dust-free lanes. The largest objects so formed can also draw in gas. The process continues until all the dust is swept up and the left-over gas is driven out of the system by the solar wind.

Dole reported this work in Icarus, 13, 494 (1970). This diagram, shows the results of a number of computer runs. The figures on the left indicate different density conditions in the nebula; the figures at the bottom are distances from the Sun in astronomical units; figures above the planets are masses in terms of the Earth's mass; brackets below the planets indicate the eccentricity of each orbit.

Despite varying the conditions slightly between each run, the planet-building process came up with small rocky planets closest to the Sun, large gas planets in the middle of the simulated solar system, and small planets again in the outer orbits. The lower example in this diagram has considerable similarities with our Solar System.

STATISTICAL METHOD AND TRANSIENT PHENOMENA

BY PETER HILL

SUMMARY.

Valid conclusions from studying reports of transient aerial phenomena, such as UFO's and ball lightning, can be much assisted by the application of statistical analysis to the data, Correct use of this technique has the potential to reveal new knowledge, leading to better understanding of such elusive subject matter.

INTRODUCTION.

Kuettner [1], and others, maintain that stat--istical analysis of the data from UFO reports is the way forward for UFO research. To give nominal support only to this view would greatly undervalue its importance. Indeed, **it is the only proposition of such** potential for progress in this field of research to have been put forward in over thirty years.

Reporters and investigators have a critical role to play in ensuring that statistical studies are based on a found--ation of reliable data. Improved invest--igation technique and an improved quality of reporting are essential pre-requisites. Reports must be made more accurate, more complete and avoid ambiguity. Investigators should be assisted by better documentation, designed to be suitable as a computer input form without transcription.

The knowledge which can be acquired from descriptions of individual experiences, no matter how well documented, is strictly limited. We have so much evidence of this type that it is apparent that collecting more will not answer the questions which we should be asking. Only by examination of reports in groups according to their attributes and characteristics can we progress. Collection and cataloguing of reports, albeit an essential first step, does not in itself constitute research. It is more akin to a combination of collector's mania and a black hole. For everything goes in and nothing comes out.

By analysis of each parameter of reports, we can learn such matters as the distribution by time and by location the pattern of peaks and many other like facts. Comparison with other time-variable events can indicate whether a correlation is statistically significant.

Hobana and Weverbergh [2] assert that "... ball lightning arises in the vicinity of stormy fronts, mostly in July and August.." Is this correct and is it equally valid in Britain? It is time that such matters were known.

A notable example of a statistical study of the UFO report is that of Delair [3]. Peaks and wave patterns were examined for corr--elations with other events. It was re--ported that the only event showing any sign of a possible oorrelation was the sunspot cycle. To demonstrate that this was so would be of inestimable importance and would lead to the formulation of hypo--theses to attempt to explain the facts. Conversely, to show that such correlation were not present would also be an increase in knowledge. From such additions to our present knowledge, the understanding of these phenomena can gradually be increased.

CORRELATION AND CAUSAL RELATIONSHIP.

Statistically acquired knowledge has to be interpreted with great caution. The wide mistrust of statistical information is not without some validity. It is not, however, a fault of statistical method that it is sometimes used without sufficient care, whether this be deliberate or accidental. It has been well said that 'figures do not lie but liars figure'.

Caution is especially necessary to avoid unconscious misinterpretation of findings by those whose integrity is irreproachable but whose statistical skills are deficient. A number of unconscious errors are sufficie--ntly common to be worth elaboration.

Correlation is sometimes confused with cause and effect. These are not the same. For example, if it were found that a stat--istically significant correlation were present between UFO reports and solar ac--tivity, several possibilities would need consideration, including:

(a) does solar activity cause UFO reports?
(b) does UFO activity cause solar activity?
(c) have solar and UFO activity have a common causative factor?
(d) are solar and UFO activity manifestations of the same phenomena?
(e) is there a concomitant factor which, while not a direct cause, correlates with both solar and UFO activity?

No better illustration could be given that correlation does not necessarily imply cause and effect than that given by Bradford Hill [3]. "..in areas of Scandinavia the level of the birth-rate varies directly with the prevalence of storks.." The hypo--thesis that storks really did bring babies did not make obstetricians lose any sleep. The factor common to stork nests and human reproduction is chimneys. No causal relat--ionship has been demonstrated.

AVERAGE VALUES

The everyday use of the word 'average' is vague and ill-defined. We hear reference

to 'the average person' or 'the average wage'. Unlessit is defined what is meant, this can be highly misleading.

In the language of science, 'average' is a term which has precise meanings. There are several kinds of average value, each being a way of depicting a normal or typical value of a set of figures. The commonly known 'average' as taught in elementary arithmetic, is known as the 'arithmetic mean'. It is calculated by adding a set of numbers and dividing the total by the number of observations. Thus, the set: 2 3 7 9 9 10 10 10 11 12 13 120 totals 216

If we divide this by 12 (the number of observations) we get an arithmetic mean of 18. As this calculation is heavily weighted by the one exceptional value (120) the resulting 'average' does not represent the set in a very meaningful way.

Other types of average can be more appropriate, according to what we wish to show. The median is the middle value of the set, when these are listed in sequence, as above. Thus, the median of the set is 10. Of the 12 observations, the middle values (6th and 7th) are both 10. Therefore, the median is 10. This gives a better picture of a typical value than does 18.

Another type of average, the mode, is calculated by counting the number of times which each number occurs. That which occurs most frequently is the mode. This is again 10 in the set above.

As mean, median and mode are all easily and quickly calculated, it is often worth computing all three. If the results are all close in size, the average value is readily comprehended. Where there is a wide scatter of observations, there are ways of describing this scatter. Reference should be made to any standard statistical text for further detail. Those without statistical knowledge, if working on numer--ical data of this type, should seek advice from a qualified statistician.

MEASURING AND COUNTING PARAMETERS

Before any calculations are made with data, questions have to be resolved.
How reliable is the data?
To what degree of accuracy is it defined?
In what ways do we want to use the results of our calculations?

Working with data which is not known to be of an acceptable level of reliability can produce false results. This can be misleading, rather than helpful. No amount of care in calculations can remedy deficien--cies in the original data.

If the data is judged sufficiently reliable to justify analysis, to what level of accuracy is it defined? If, for example, we are interested in reported elevations of UFO's by observers without the use of measuring instruments, these will be of considerable interest but not of great accuracy. It would give a misleading picture of the level of accuracy to show results to several decimal places. The level of accuracy expected should be borne in mind in deciding on the presentation of results.

Time can be saved and accuracy improved when counting observations by simple means. An effective way of recording and counting data is the '5-bar gate'. Each fifth stroke is represented by a diagonal across the previous four:
1111

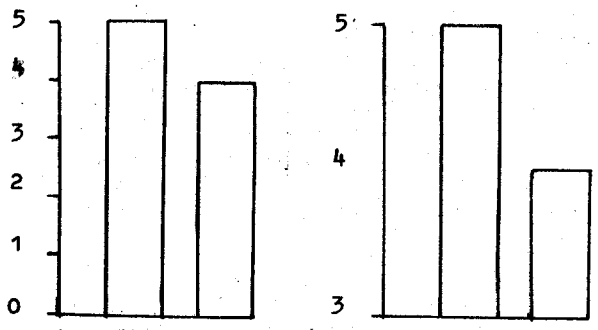
If an additional diagonal is added with alternate sets of five, the final count is very rapid and accurate.
1111 1111 1111 1111.

PRESENTATION OF STATISTICAL INFORMATION

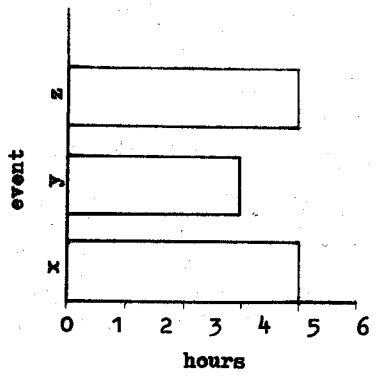
Statistical analysis converts data into information. It is accepted good practice to publish the original data in addition to the information derived from it. This enables the reader both to check the val--idity of conclusions and to carry out any additional analysis of the data. The data can be presented as tables in an appendix.

It is a common assumption that diagra--matic presentation of statistical infor--mation is more acceptable than a purely numerical presentation. This view should not be allowed to make the presentation misleading or difficult to interpret in detail. Provided numerical tables are clearly presented, they can be easier to follow than many diagrams. If diagrams are given, they should be additional to numerical information, not an alternative.

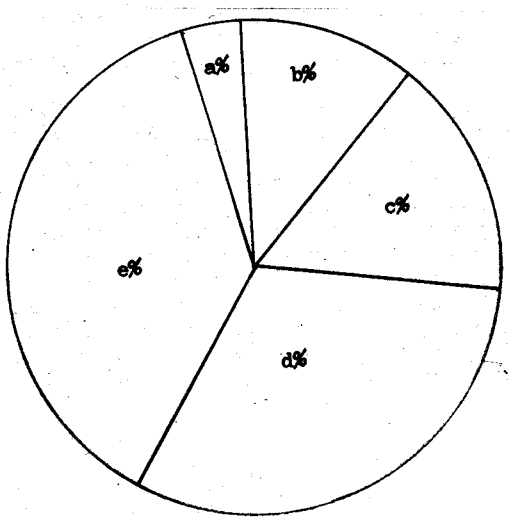
Means of diagrammatic display of figures include the ordinary graph, the histogram, the bar chart and the pie chart. The conventional graph is an excellent way of showing a parameter which changes from one observation to the next through time, such as temperature or humidity. When each observation is discrete, however, and intervening lines are without any specific meaning, the histogram is a more suitable display. This should start at a zero base, as it can be misleading if it does not.



The bar chart is a histogram set on the other axis and can be appropriate for displaying such variables as lengths of time.



Pie charts can be a useful way of depicting proportions, or percentages, of a total, such as the proportion of UFO reports identified following investigation.



PROSPECTIVE AND RETROSPECTIVE STUDIES

Two categories of study which the research worker needs to consider, when planning a project, are the prospective and the retrospective. The latter is a study made from records of past events. On the other hand, the prospective study is set up to examine future events as they occur. This gives the worker control of the data collected and its definitions.

A useful combination is to commence with a retrospective study as a pilot run, to assist in deciding whether a major project is justified and to help to plan the data collection. If it is considered worthwhile, this can be followed by a prospective study, with larger volumes of data and more careful methods.

If we want to study weather conditions during UFO peaks, a retrospective study might suggest that reports were more common in certain types of weather. To obtain more reliable data, a study could be made for a one-year period commencing from an agreed date. This enables additional items of data to be kept if required or a specially designed questionnaire to be used.

SAMPLING

If the items of data which we wish to study are very numerous, a random sample can be used. Within known limits, the characteristics of the sample can represent the total provided the sampling follows the correct procedures strictly. To ensure that the sample is representative, randomness is even more important than sample size.

In the United States, sampling has been used to obtain information on public attitudes to UFO's. Clearly, to ask the total population would not be practicable. Whether the answer is correct depends on the sample randomness and size, how the question is asked and on the response of those asked. The difficulty of political opinion polls results from several factors. One factor is the cost of following up a truly random sample. This cannot be obtained by standing in the street and asking every tenth person. For the results would depend upon such factors as which street was chosen and what time of day. The same answer would not be expected to the question 'who will you vote forin the next Parliamentary election?' if this was done in two constituencies of marked support for different political colours.

Similarly, a question on a scientific or philosophical issue might well give different results if asked at the gates of a factory and at a University.

Those found in the High Street on a Saturday afternoon will not be a random sample of the population. They may exclude those who follow football and the sick and elderly, while the proportion of middle-aged married women may be greater than in the total population.

A properly selected sample may be obtained with the use of random sampling numbers and following the procedures given in statistical textbooks. If we wish to take a randomsample by time, to record a variable such as weather conditions, tables of random times 5 may be used to avoid converting ordinary random numbers into times.

TECHNOLOGY AND INFORMATION

The use of electronic calculators and computing facilities can be a major time saver when analysing numerical data. However, poor data will merely produce the wrong answer more quickly on a computer. No technology or technique will compensate for deficient data. The most fundamental rule of all in statistics is to ensure that the data processed is worth using. To build a study upon shaky data is akin to building a house on flimsy foundations. And equally useless.

CONCLUSIONS

Correct use of statistical analysis is much needed in UFO research. To realise its full potential demands good data, common methods and definitions, careful recording and improved investigation.

REFERENCES

1. Kuettner, J P. J. Transient Aerial Phenomena. 1979. Vol 1 No 1. 16/21.
2. Hobana, I & Weverbergh, J. UFO's from behind the Iron Curtain. Souvenir Press 1974.
3. Delair, J B. BURORA conference. 1976.
4. Bradford Hill, A. A short textbook of Medical Statistics. Hodder & Stoughton 1977.
5. Hill, I D & Hill, P A. Tables of Random Times. Institute of Management Services 1976.

My acknowledgements to those who have written to me and received no reply. I do my best to respond to letters received, but Journal pressures and deadlines sometimes thwart the best intentions—*Ed.*

ATMOSPHERIC PHENOMENA LOG

By John Armitage

Events involving the fall of unusual substances from the sky have on occasions been the source of considerable puzzle--ment, speculation and debate. In this issue of the Atmospheric Phenomena Log, recent examples of the phenomenon "Pwdre Ser" or 'Star-Slime' will be examined along with other similarly strange falls of 'green-slime' and 'purple-blobs'. In keeping with the practice of this column, in all cases a scientific explanation will be sought rather than falling back on "mysterious" interpretations.

'PWDRE SER'(also called 'Star-Slime' or Star-Rot')

The term 'Pwdr Ser' or 'Pwdre Ser' is a term which has been used to refer to various mysterious jelly-like masses which have been found on rare occasions lying in the open. In some cases these masses have apparently been reported to have fallen from the sky whilst in other cases they have merely been found on the surface in the open. In older literature and in legend such finds of 'star-slime' are equated with meteorite falls,..it seems however most unlikely that material of a jelly-like consistency could survive passage through the earth's atmosphere as an incoming meteorite mass, if a meteorite origin is suggested. More likely is the prospect that the sighting of an apparent meteorite fall, and the subsequent discovery of pwdre-ser masses in the presumed vicinity of such a fall in past cases have been purely co-incidental. Two recent examples of 'Pwdre Ser' type material will now be discussed.

Case 1.; Cambridge (U.K.) Friday 23rd June 1978 at 18-30 GMT.

The Pwdre Ser was observed to fall, gliding or floating down, and alighting on the lawn of Mrs M. Ephgrave of Queen Edith's Way, Cambridge, on the above mentioned date during a heavy rainstorm. The material was apparently white in colour, gloy-like, with a cellular texture and the consis--tency of a marshmallow. The main mass is described as being about the size of a dessert plate, two other pieces being somewhat smaller than this. The substance did not dissintegrate upon reaching the ground, but is reported to have completely dissintegrated by the following morning.

Case 2. Hemel Hempstead Herts. Sunday Feb 3rd, 1980.

On the above mentioned date lumps of a colourless gell approximating to the description of Pwdre Ser were found during the afternoon on the lawn of Mr Philip Butler of Hemel Hempstead. These 'lumps' which were not seen to fall from the sky, were sufficiently close to one another for their common origin to be without reasonable doubt. The total volume of the gel is estimated as being about 75ml. A 10ml., sample of the gel was taken for the purpose of analysis, and was noted to be odourless on discovery, but by Wednesday 6th February it had developed a disagreeable smell (suggestive of bacterial action). The specimen was examined by Mr T.J.Turvey, the Senior Biology Master of Monkton Combe Public School, who listed the contents of the gel as including....

1) A proportion of plant debris
2) Various freshwater algae (living)
3) Three species of roundworms (Nematodes) (living)
4) A few ciliated protozoans characteristic of freshwater.
5) Desmids and Diatoms
6) Numerous bacteria (accounting for odour)
7) A segmented worm,. (dead but not decom - posing)

Mr Turvey tentatively concludes that the gel may basically be of amphibian origin, having been regurgitated by some predator on amphibian gel.

The mass was clearly of biological origin and would seem to be related to a body of freshwater. This case shows many typical features of'pwdre-ser'occurrences despite not having been seen to fall, and is use--ful insofar as samples were taken and an analysis made.

In the Cambridge Case (Case 1), however no samples were taken and the event, rather than being reported immediately, was only communicated later by Mrs Ephgrave to Michael Hunt the "weatherman" of Anglia Television in a letter dated Sunday 25th June 1978. Hilary Belcher of the Culture Centre of Algae and Protozoa, Cambridge has a research interest in the phenomenon of 'Pwdre Ser' and subsequently made enquiries about the Cambridge fall,--- her conclusions are quoted as follows--- "I was reluctantly forced to the conclusion that the Cambridge case did not involve 'true' Pwdre Ser, which may be of various origins, but is always a jelly or slime. The material which fell in Cambridge appeared to be more in the nature of a stable foam, because of its slow gliding descent, and because it retained its globular shape upon landing rather than becoming deformed under its own weight.

We made enquiries with the local fire brigade, laundry etc, but could not dis--cover the source of this foam, which we are convinced was man-made.

It would seem open to some debate to precisely define exactly what does constitute "true" Pwdre Ser, other than to state that it is a slime or gel rather than a foam. The gel has often been equated with the gelatinous secretions from the oviducts of amphibians such as frogs and toads. Often associated with these gels are algae such as the blue-green alga Nostoc Commune, and bacteria. Swelling after heavy rain can make this type of material more consp--icuous then might otherwise be the case, and bacteria can explain the strongly offensive smells often reported in such cases, and even luminosity of some masses. The aerial descent of such material may be related in some cases to prevailing meteoroligical conditions, and perhaps in other cases to having been regurgitated and dropped by birds which had previously ingested the material. The transport of such material over varying distances may also be similarly explained. In this respect it is interesting to note that the Cambridge fall occurred during a rain and thunderstorm, and that on the same day (23rd June 1978) the Tornado and Storm Research Organisation report funnel cloud sightings and tornadoes in parts of Britain (though not in Cambridge).

"Green Slime" on Washington; A fall of 'green-slime' on Washington D.C. is reported to have occurred on the 5th/6th September 1978. The green-slime is said to have caused damage to plants, to have adversely affected animals and to have soiled the windscreens of vehicles. Apart from being green in colour, it is described as sol--uable in water and alcohol, and, though very fluid when it fell, subsequently thickening and turning more black than green. At the time of writing, the column--ist has no further details on this unusual event, though it is hoped to give more information in a subsequent issue of Atmospheric Phenomena Log.

"Purple Blobs" in Texas (August 11th 1979)

This event was reported by Mr and Mrs M.B.Christian of Frisco, Dallas, Texas, to have occurred on 11th August 1979. Three purple blobs were noted, and said to be "about the size of an old box tele--phone", one of which blobs "just faded away". The blobs were not observed to fall from the sky. They were described as being purple in colour and looking like smooth whipped cream. When a stick was thrust into the objects, the inside was seen to be of a similar nature to the exterior appearance. It was warm to touch. The substance absorbed water, resembled frozen gelatin, was apparently very caustic, and contained fragments of Lead. There was considerable press excitement about this occurrence in the U.S. at the time, and suggestions of an extraterrestrial origin, particularly that it might be some very unusual type of meteorite, were made by some sources.

NASA followed its normal policy of following up all unusual claims and took a sample of the 'purple blob' material. At an early stage NASA investigaters became convinced that the 'purple blob' material was not extraterrestrial and seemingly lost interest in the case. Lead they noted, in any case, is an element which is very unlikely to be present in meteorites. To quote Dr Douglas Blanchard of NASA's Geochemistry Branch "The Purple Blobs" turned out to be a false alarm. We became convinced that the material was not extraterrestrial soon after receiving it here at Johnson Space Center. News reporters and officials of the Fort Worth Museum discovered the source of the material, beyond which I know only what the newspapers have reported.

It seems that effective investigative Journalism eventually tracked down the 'blob' material as almost certainly being related to wastes from battery re-processing.

Conclusions; 'Pwdre Ser' whether in strict definition or wider definition, and many arguably similar allied phenom--ena can often be difficult to evaluate. They would seem to be complex and per--haps in most cases multi-cause phenomena. Because such phenomena are uncommon, complex, and potentially due to a number of different causes it has often been temp--ting for some people to adopt "myster--ious" interpretations equating such occurrances with "extraterrestrial explanations or UFO's. The problem is basically that such occurrances being uncommon, are "low probability events", whilst most readily available data relates to common or "high probability events". It remains the view of the columnist that all phenomena can be scientifically explained and quantified given enough data, and that a retreat into "mysterious" interpretations is both practically and scientifically counter-productive, rather we should attempt to obtain more data and extend our observational experience until we are able to explain the events concerned.

References.

J. of Meteorology.Vol 3 No 34 p.312-316 (1978)

J. of Meteorology.Vol 5 No 48 p.117-119. (1980)

Hilary Belcher, Culture Center of Algae and Protozoa (Personal Communcation) (April 1980)

The Washington Post, Mon 11th Sept,(1978)

The Houston Chronicle, Sat 8th Sept (1979)

The Abilene Reporter-News, Sun 9th Sept (1979)

The Houston Post, Sun 9th Sept (1979)

Dr D. Blanchard, NASA, Geochemistry Branch Houston,(Personal Communication) (May 1980)

Post Script;

If any readers should be so fort--unate as to observe the fall of any strange material from the sky, they should attempt to place a sample of the material in a sealed bottle or similar container, taking precise notes on the time, place and other details of the event, and contact the columnist,----

'The Atmospheric Phenomena Log'
c/o Newchapel Observatory,
NEWCHAPEL,
Stoke - on - Trent.

ERROR

Dear Tony,

Just a quick note to say that the Center for UFO Studies Bulletin transposed two captions under the duration graphs in Hynek's article on UFO durations. These were reproduced as such in the March, 1980 Journal of Transient Aerial Phenomena. These were labelled "figure 2" (on p. 27) and "figure 3" (on p. 28). The captions should be reversed. Also, the grey area in figure 3 represents the Air Force's "unspecified" values for IFOs and UFOs; the solid line represents UFOs as in fig. 2 and the dashed line IFOs.

Sincerely yours,
Allan Hendry
Center for UFO Studies, U.S.A.

LETTERS

Dear Mr Pace,

Congratulations on the publication of Journal TAP.

BUFORA Journal is good, but in some respects too light-hearted to be taken seriously by scientists, and the advertisements interspersed with articles do not help its image.

Information on the lines: A teenager sights a UFO over Haywards Heath (this item is actually taken from a local paper) is no news at all to those of us able to identify it immediately as Jupiter!

The new journal deals with "transient aerial" phenomena, including (and rightly so) IFOs. Are planets and stars "transient"?

Again, humanoids(perhaps our most important phenomenon) are hardly "aerial": the Kelly-Hopkinsville apparitions, e.g., are only tenuously related to lights in the sky, and in many such cases humanoids have been reported quite independently of UFO sightings. Such sematic problems could easily be avoided by adopting standard scientific procedure of simply publishing Journals and Proceedings bearing the name of the society only, Proceedings being particularly devoted to full-length studies and theoretical and discursive material.

Manfred Cassirer
M.A., M.Litt.(Oxon), MAAAS., MPA.
Piltdown, East Sussex

Dear Sir,

Thankyou for the magnificent "Journal of Transient Aerial Phenomena", Vol.1, No.2, I received in April, but I have a query: I became a member in February/March/April and have since missed TAP Vol.1, No.1 -- please is there any way I could aquire a copy from you? I enclose a SAE, and please send me a bill if there is anything to pay.

I would be most grateful if you could do this for me, as my collection would not be complete without it.

Thank you,

Yours sincerely,

D. Clarke
Sheffield

Dear Miss Wood,

Having read carefully both issues of JTAP, I am very impressed by the high standard of work therein. I think that an 'academic' publication of this kind is long overdue in this country...in fact the only other one I know of anywhere is produced by WFOS, so congratulations on doubling the level-headed, serious output about UFO (or TAP) research.

Yours sincerely,

Paul Wilson
Acomb, Yorkshire