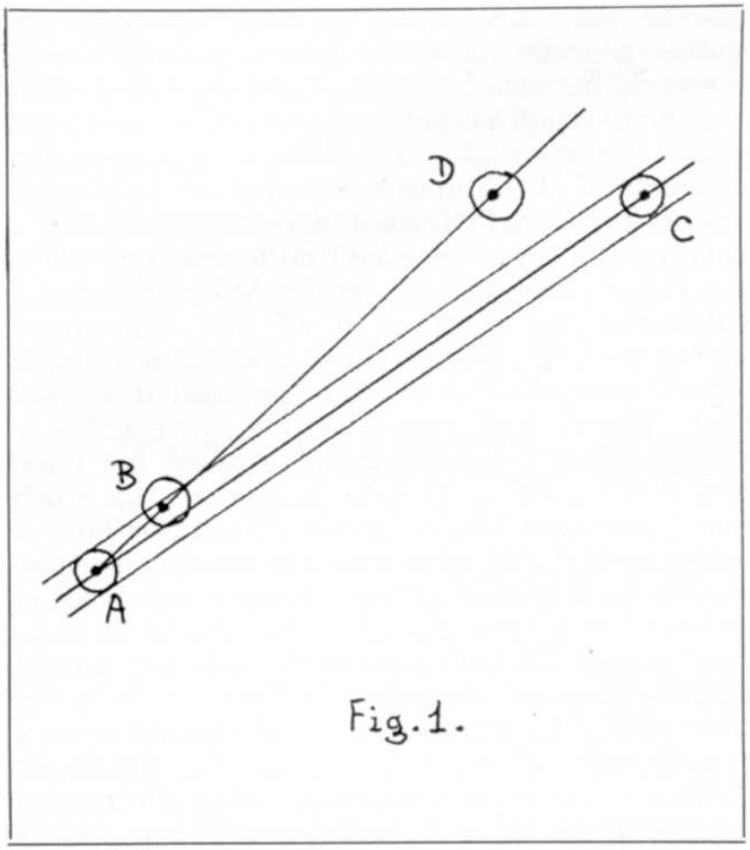

Fig.1.

two can be of the order of what we consider our maximum probable error. This is indeed a topological problem, not a simple statistical question: we have an irregular spherical polyhedron (France) and a distribution of points over it: there is no analytical solution to the problem. The only proper approach is simulation.

Suppose we are able to define the boundaries of the polyhedron with a set of simple equations, and suppose that we generate random numbers and scatter the points defined by these numbers over the simulated area. The answer to our problem is then given by the following sequence of operations:

(*a*) For every pair of points in the distribution, compute the elements of the great circle they define, using the direct trigonometric method.

(*b*) Compute the orthogonal distances of all (N-2) other points in the original distribution and make a list of all points such that their distance is less or equal to a given delta (this is the proper definition of the "corridor").

(*c*) If this list is void, abandon this pair and go back to problem (*a*).

(*d*) If it is not void, but contains m points, recompute the elements of the great circle by Least Squares using the (m+2) points now in the "corridor". Compute their corrected distances and all interesting statistical parameters (standard deviation, etc.).

The results of this analysis, made with the help of a high-speed electronic computer, are given on figure 2, along with the figures given by Mebane's formula, and used by Dr. Menzel and Michel in their discussion. The random networks generated by this process are of the same order of complexity and "harmony" as Michel's network of October 7, 1954. Besides, the method gives the reason for the "subtle difference" found by Mebane between his "pseudo-orthoteny" and the original charts: this difference in regularity is a direct consequence of the topology of the area considered. Using our simulation method, probability areas for the network centres could even be predicted.

These results obviously pave the way for opponents of Orthoteny to claim that everything in Michel's charts is a consequence of pure chance. But the appearance of 5-, 6- and even 7-point lines, realized with good precision, is still to be explained. We would also like to know why a specific quality of sightings (type II) is associated with points like Montlevicq or Poncey. Should we explain the Poncey network as the sum of a pure

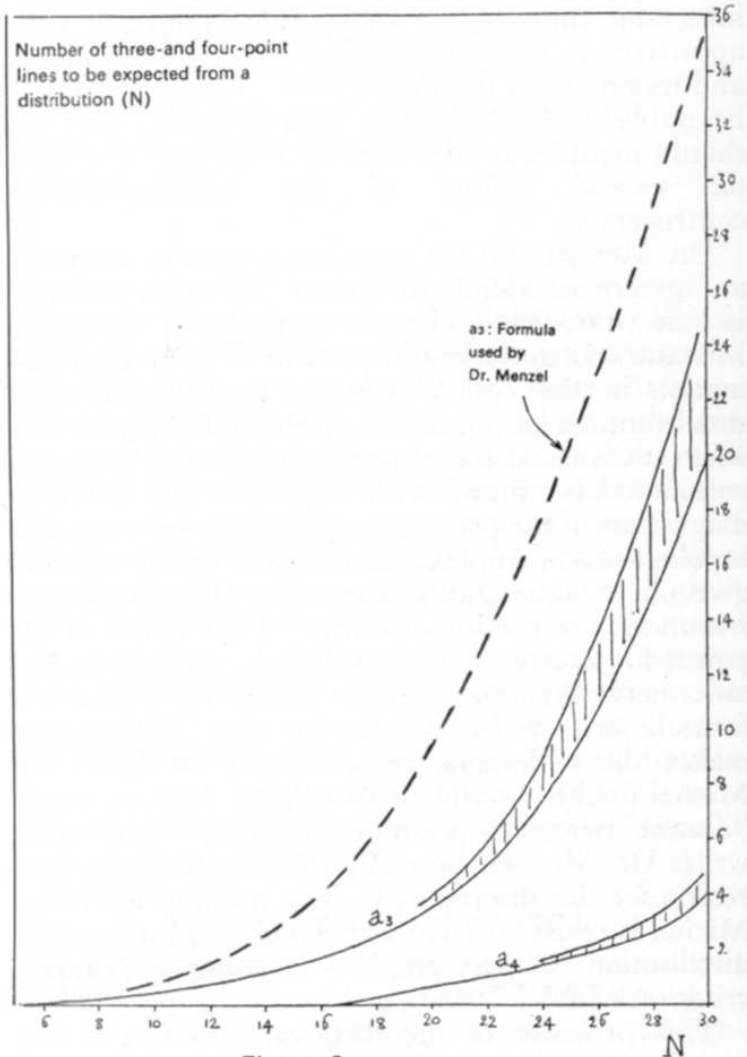

Figure 2

(*continued on page* 20)

A QUESTION OF TIME

Part Two

by Adrian Cox

IN the first part of this article in the March-April issue of the REVIEW I dealt with one of the basic reasons for scientists' unwillingness to accept flying saucers. By discussing the time aspect first I rather put the cart before the horse, but with flying saucers the problem of energy is less pressing. It has always been obvious, to those of us who are interested in UFOs, that they possess a completely different form of power from anything we understand.

The distances between stars are so enormous that we have to measure them in light years or parsecs. When we try to express them in miles we have to use impossibly large figures; for example, it is much easier to say 13 light years (or 4 parsecs) than to say 78,000,000,000,000 miles. When scientists talk of space travel they think of rockets. All very natural, but it does seem to make some of them a bit too dogmatic about what can and cannot be done—not by ourselves but by anyone anywhere.

Dr. Purcell's equation

When a rocket is used for any type of journey it has to carry sufficient fuel for four different accelerations. Let me explain: first there is the initial acceleration from rest up to the "cruise" velocity; secondly there is the deceleration from this velocity back to rest again at the destination, together with a possible landing; thirdly and fourthly, there is the reversal of the whole process for the return journey. I can best demonstrate what this means by quoting from an article in the book *Interstellar Communication**. In his article "Radio Astronomy and Communication through Space", Dr. Purcell of the Physics Department of Harvard University, U.S.A., has derived an equation for determining the relationship between the initial mass and the final mass of a rocket in the ideal case. He then worked out the results using, first, a perfect nuclear fusion and then a perfect anti-matter propellant for a round trip of 24 light years at a maximum speed of 0.99c (c=the speed of light). The results are astonishing. In the case of the fusion propellant we would need an initial mass of a little over a thousand million times the final mass. He tells us that there is no way to improve upon this unless we can think of a better reaction. Dr. Purcell then has a look at the results one could expect from about the most impossibly dangerous fuel imaginable—an equal quantity of matter and anti-matter. The point of this combination is that the matter and anti-matter annihilate, and the resulting energy leaves the rocket "at c or thereabouts" to use his own words. In this case the ratio of initial to final mass is 14 simply to *reach* 0.99c. However, to complete the round trip of 24 light years, it would need a mass-payload ratio of some 40,000 (the ratio is 14^4 and not 14 times 4). Therefore, to take a ten-ton payload on such a journey we would need a 400,000-ton rocket. Two small points have been omitted in the example. The first one is the problem of shielding the space ship from the matter in space. At a speed of 0.99c the hydrogen atoms in space look *to the space ship* exactly like 6 billion-volt protons (6 times 10^9). In the second case the earth has to be shielded from the energy output of the matter-anti-matter rocket. When matter and anti-matter annihilate the energy that is released is in the form of gamma rays.

Does this sound preposterous? Dr. Purcell intended that it should.

The nature of resistance

I think it should now be obvious why any advanced civilisation could not be expected to use rockets for space travel, and incidentally, why so many of our scientists are quite unable to accept flying saucers. If all you can imagine by way of a space ship is some form of monstrously ineffective rocket, then you would quite naturally have a great deal of resistance to the idea of anything as revolutionary as a flying saucer.

Flying saucers are certainly interstellar space ships. It might be interesting to try to see how they might have surmounted some of the more obvious difficulties.

The first one is the problem of energy. If we try to approach this in the light of present day knowledge we come up against the difficulties inherent in using "gravitational" machines of the type described in Chapter 12 (ibid*). The trouble with these machines is that they are almost impossibly

large (something of the order of several hundred miles). They also have to use binary stars to obtain their acceleration. The theory behind this being that one builds a vast machine which is large enough to harness the gravitational forces between two suns, and so obtain sufficient acceleration to give the space ship a boost on its way during a journey between different star systems. No, I think the answer is to be found in a fundamentally different approach. It is the same problem of trying to explain in present day terms something which is much more advanced than anything we know. If we look at UFOs and try to imagine how they have solved this problem, we are immediately baffled because we just do not know how they obtain their supply of energy. It might be by using some form of controlled thermonuclear reaction, but they may have got beyond the stage of using miniature "suns" to give them the energy they need. However, let us assume for the moment that they use a very sophisticated form of fusion process (with 100 per cent efficiency). This now brings us right back to the problem of the rocket. The energy output cannot be used directly for propulsion—it is inadequate as we have just seen. Therefore it has to be used as some kind of servo mechanism for the real power which would provide the actual propulsion. Here at last we do have some clues. They are the magnetic disturbances, coupled with the absence of radiation, which characterise the presence of a flying saucer. Leonard Cramp and others have suggested that they use some form of "gravitational" propulsion. However, the gravitational fields in space are very weak indeed, and would have no effect at all except on bodies of truly astronomical proportions.

A form of field force

Let us consider for a moment the sort of advances a civilisation which had flying saucers would be likely to have made in this context. At the moment no one has been able to produce a Unified Field Theory—i.e., one which unites all the different fields of force into one general theory. Such a race as theirs would almost certainly have solved this problem and have developed an application of field force that could be used to produce a very intense artificial "gravity" in the region of a space ship. Quite how this field would then be made to couple up with the very weak fields in space, so that they could use them to obtain acceleration, etc. I do not know. That they use a form of field force for their propulsion is certain, but just what it is and how it works, is almost anyone's guess. However, all this is too speculative, so let us turn to the next point.

The next difficulty is interstellar matter. The UFOs obviously get round this problem, but how? The answer will probably lie in the very fields they use for propulsion. Perhaps by giving one of them a positive charge so that the protons are deflected, but as this would have to be a very powerful field, it would act as a very strong attraction to any negatively charged particles. Fortunately as there are not so many free electrons in space, it may not be such a problem.

I have tried to suggest that far from being improbable, flying saucers are quite likely to be an inevitable result of the conditions and distances of interstellar space. The big problem arises when one tries to describe these vehicles other than empirically. We do not really understand how, let alone why, they work the way they do. We could say their shapes (some only) give us an idea of their nature; for example, the large cylinders are rather like glorified bar magnets, and the round ones in some way echo the shapes of planets, etc., but where the pole runs is difficult to know — possibly from top to bottom. Perhaps the last sentence gives, or *could* give, us a real clue about the way they work, if we could only understand the principles involved.

A few more points

The question of time is another of the problems. I have dealt with tempic fields, albeit rather sketchily, in Part I of this article. I would now like to bring up a few more points about them.

If time is a field, one would assume that it should be possible to reverse its polarity. If we could do this we might find that time would run in the opposite direction—from the future to the past. In a universe composed of anti-matter the tempic field would have an opposite polarity naturally, so that the normal polarity of a matter-universe would then become a reversed polarity. I do not think there is anything strange about this, but it might mean that we could not reverse the polarity except in an anti-matter universe. I would now like to go back to the "normal" tempic fields.

In Part I, I set out four points about time fields. The first two do not require further explanation, so I will confine myself to the last two.

In point three, I said that when two fields differ, and the difference is increasing, there will come a point when an observer ("A") in the weaker field will lose contact with the stronger field (observer "B"). It seems to me that the whole crux of "B's" disappearance is that he is not accelerated by any force applied from outside the system loosely called "B". This means that we cannot invoke the part of the Special Theory which states that no object can be accelerated *to* the speed of light, because it would require an infinite quantiy of energy. It is therefore something inherent in the nature of "B" that is causing his acceleration. This something is "B's" tempic field.

In point four, I said that the flow of force in a

tempic field is the passage of time. Any variation in a time field affects *all* the other fields of force within it, not just some of them. Conversely, the actions of any of the other fields appear to be quite independent of the intensity of the tempic field. In this respect a time field would seem to be different to the other fields of force in nature. Does this argue against time being a field-force, or does it argue for the special nature of the tempic field—in much the same way as anything travelling at the speed of light is endowed with certain characteristics not possessed by anything else?

Perhaps what we call "time" is the *result* of a field and not the field itself, rather like gravity the result of which is seen in the mutual attractiveness of large masses. If this is correct, then time is merely an empirical description of the result of a field, and in no way attempts to describe the field itself.

I have made three basic assumptions in this article. They are: (1) that time is a field and not an arbitrary measurement of the "interval" separating the happening of events; (2) that the late Wilbert B. Smith did contact, by some means or other, one or more occupants of a flying saucer; and (3) that, if he did, he was correct in his understanding of their information. The verification of the reliability of Mr. Smith I leave to those better qualified. All I have done is to think about time as if it were a field, and then I have tried to imagine some of its characteristics.

* *Interstellar Communication*, a collection of Reprints and Original Contributions, Ed. A. G. W. Cameron, W. A. Benjamin, Inc., New York.

In our next issue

Readers of the REVIEW **are advised that** *TODAY* **magazine in its issue on sale on July 13 will be returning to the subject of flying saucers. In a previous issue it reproduced an officially released photograph of a Vulcan Bomber taken at night last December at Coningsby, Lincolnshire. In the top left hand corner there appeared a mysterious object of a shape familiar to readers of the** REVIEW. **Another photograph has come to light and will be reproduced by** *TODAY* **magazine. In the next issue of the** REVIEW **both photographs will be reproduced and will accompany an article surveying the history of this object, the "explanations" offered by the Air Ministry and others and a summing up of the problem that confronts the saucer student.**