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A Physicist's Reflections on the Resurrection and Ascension of Christ

In this interesting and unusual article Dr. Scott Blair, internationally known as a leading authority on Rheology, tells us how he relates his knowledge of physical science to the Resurrection of Christ. He argues that although no full explanation is possible, because science cannot incorporate unique events, nevertheless some account, in physical terms, of what probably happened should be possible.

“Do not think for a moment that it is the understanding of the ideas which moves mankind ; it is their faith in the ideas.” Thus wrote Vladimir Simkhovitch.¹ Nevertheless, so many books have recently been written and so much propaganda put out on the wireless, ‘explaining away’ the Resurrection of Christ as a mere myth, that there are people whose faith may be shaken by the idea that ‘Modern Science’ has made belief in the physical Resurrection difficult, if not impossible.

In the present article, an attempt will be made to show that, so far as the physical sciences are concerned (the author is not a biologist) the reverse is the case. The whole trend of modern thought, especially in physics and cosmology, would seem not, of course, to ‘prove’ the validity of the orthodox view, but to make it much easier to accept.

We shall try, therefore, to describe what *may* have happened, in so far as this is possible, in the terms of modern physical theory, leaving much unexplained.

We need not repeat here in detail what has been so well said by R. E. D. Clark² in a recent book about the limitations of science. Science is concerned with reproducible or reobservable phenomena. It seems incredible that quite a distinguished group of scientific philosophers believed (perhaps some still do) that any statement that does not depend on sensory data, or on postulates logically derivable from them, must be meaningless! Thus the statements "There is a God" and "There is not a God" would be considered equally meaningless!

All *scientific* information come through our senses. The sense organs transfer messages that are interpreted in the brain. The evidence for telepathy and clairvoyance, both experimental and observational, would seem to be overwhelming. With the famous 'card guessing experiments' highly significant results are obtained with a limited number of subjects, especially if the 'transmitter' and the subject are '*en rapport*', but the capacity fades after a time. Tests on the radio (a small number of tests on a large number of subjects having no connection with the 'transmitter') appear to give negative results. It is perhaps a pity that the term 'extrasensory' is used: all we mean by it is that the sense organ, probably in the brain, which picks up telepathic messages has not yet been located and that we have no idea how the messages are propagated through space. From reported observations on more primitive peoples, it seems likely that these faculties have weakened, in some cases to vanishing point, in our modern technological society.

Our brains no doubt are adapted primarily to enable them to detect the sources of information needed to maintain and reproduce life. There are many other sources that we do not perceive. Some, such as radio waves, we have learned to convert into frequencies that we can see or hear: doubtless others remain unknown to us. We can shield ourselves from some frequencies, using sunshades or blocks of lead, but not from all.

Many of the influences that reach us from long distances are electromagnetic radiations. We are only very recently beginning to learn about gravity waves (see Penrose³) and we have not yet found any material or apparatus that will shield us from the force of gravity. (We can escape from the earth's gravitational field, of course, by moving at very high velocity).

Also, we cannot imagine more than three dimensions of space: i.e. more than three straight lines crossing at a single point and at right-angles to one another.

It is interesting that, in the case of 'dimensions' in the other sense, the one in which we usually describe physical properties in terms of mass, length and time (or force, length, time), we have no difficulty in envisaging a description in terms of two, four or more dimensions, though three is generally found to be the most convenient number to use. Equating the speed of light to unity, we can eliminate either length or time, but this is inconvenient. Some physicists have preferred to keep temperature, or some electrical quantity, as a fourth dimensional unit; but three is the number generally preferred (see especially Bridgman⁴). For our perception of space it is likewise true, no doubt, that three dimensions are best suited for our needs.

Physicists have shied away from postulating a fourth dimension of space. As is well-known, Minkowski showed that time and space can be combined in a single equation. Time (t) is replaced by ict , where c is the speed of light in free space and i is the imaginary square root of -1 . But he confused many people by going on to say that "henceforth, space and time in themselves vanish to shadows, and only a union of the two exists in its own right". He had evidently forgotten, for a moment, the significance of i . To put it very simply, one can be at two times in one place, but not in two places at one time!

On the other hand, Katchalsky and Curran,⁵ in their brilliant book on non-equilibrium thermodynamics say: "The concept of time is implied in the very notion of a process; it is indeed the 'event' that is perceived directly as a four-dimensional space-time

entity. Only through a long and involved process of abstraction was time isolated as an independent analytic co-ordinate." Even so, this does not justify Minkowski's statement.

Even when astronomers found a 'curvature' in space (Einstein postulated a universe in which if one travelled in a straight line for long enough one would so 'curve round' space as to return to one's point of departure), the "curvature" was allowed for by discarding Euclidean geometry rather than by postulating a fourth space dimension.

It is true that Eddington introduced a five-dimensional space-time.⁶ It will be remembered that he was attempting to interrelate all physical phenomena. He preferred to make his fifth dimension 'time-like' rather than 'space-like'. "Not more than three perpendicular components can have homothetic * symbols", and "since it is more fitting that the real numbers . . . should be used to represent time components, which have distinctive directions towards future and past", he very unusually makes his three space components 'imaginary' and his time components 'real'.

Various authors have proposed more than one time dimension but this need not concern us here. Does Eddington really mean that there *can* be only three homothetic perpendicular components, or that one cannot *imagine* more than three? Can one 'imagine' an antithetic equation in any case? There are mathematical difficulties in postulating more than three homothetic dimensions; but are these difficulties also a result of the limitations of the brain?

Hinshelwood⁷ pointed out that St. Thomas Aquinas had postulated properties of angels, very similar to those now ascribed to electrons. Among other things, they can pass from one place to another in an instant of time, without traversing the intermediate space. But the idea that this could involve a fourth dimension of space is not mooted. (Is it possible that angels exist in a fourth dimension of space, and that that is why we so seldom see them?).

* "Homothetic" means either all real or all imaginary: "antithetic" means "mixed".

A very remarkable book was published more than twenty years before Einstein produced his *Special Theory of Relativity*,* by an anonymous author (actually Edwin Abbott, 1836–1926) who, somewhat prophetically called himself “A Square”.⁸ This author imagines a world whose inhabitants can perceive only two dimensions of space. Their houses, cities, etc., are all in a plane with no possible “elevation”. One of these inhabitants is taken by a Superior Being into worlds of other dimensions. The one dimensional world is, of course, extremely limited; our own three dimensional world interests the visitor most. By moving ‘upwards’ (a concept that he cannot conceive), he can see, simultaneously ‘people’ in the different rooms of his house and in different parts of the town. Also, he can pass through a ‘wall’ (a line), disappearing into thin air from one room and appearing in another. He discusses with his guide the possibility of worlds having four or more dimensions of space and there seems to be no objection to their probable existence.

The reader will by now have seen the purpose of this rather long introduction before we discuss the Resurrection; but let us now come to the point.

We need not repeat here the overwhelmingly strong case for the historical truth of the death, physical Resurrection and Ascension of Christ. These are fully dealt with by Gore, and in greater detail by Morison,⁹ as well as by many other authors. The dramatic change in the behaviour of the disciples, the spread of Christianity and the existence of the Church over nearly two thousand years speak for themselves.

Nor need a physical scientist have doubts about belief in miracles. An event that happens “once, only once and once for all” does not come within the field of Science, and must be judged entirely by historical evidence. Gore quotes T. H. Huxley as saying: “The mysteries of the Church are child’s play compared with the mysteries of Nature. The doctrine of the Trinity is not more puzzling than the necessary antinomies of physical specu-

* Of course more than three dimensions had been used by various mathematicians during the intervening twenty-one years.

lation"; and this is much more obviously true today than it was a hundred years or so ago: in fact it is remarkable that Huxley should have said this.

We must, I believe, accept at least *some* miracles, including those of the Resurrection and Ascension of Christ for which as St. Luke says, there are "many infallible proofs", but it is to be noted that, although we can never answer the question *how*? we can make some attempt at suggesting *what* may have happened on these occasions.

To take modern examples, it seems certain, from the carefully preserved records, that a very few of the patients, pronounced incurable, have been miraculously cured at Lourdes and also elsewhere. We cannot know *how*, but the doctor who had previously found a rapidly developing malignant tumour before the 'cure', would find that, after the 'cure', it had regressed, or at least not spread. This happens occasionally without any faith, or visit to a healing shrine. Presumably some chemical substance is produced in the body (alas we do not yet know what) that inhibits the spread of the disease. The miracle (when there is one) lies in the fact that it happened at a particular time and place and in answer to prayer.

We shall not consider in any detail the two other types of 'resurrection' recorded in the New Testament: (1) the raising of the dead by Christ before the Crucifixion. If we accepted these as valid (*vide infra*), it is clear that there was no drastic change in the bodies of the revived people except for a return to health and normal life: (2) our own resurrection for which we shall need entirely new bodies of a kind which, as St. Paul points out, we now can have very little idea. Christ's risen Body was in most ways identical with His pre-risen Body, including the wounds of the crucifixion. It has always been believed that our own risen bodies will not retain losses of limbs, or other defects acquired on earth. And yet in other respects, the matter of His Body had obviously been changed. (There is a spiritual sense in which Christ's Resurrection is a kind of guarantee of our own, but that does not concern us here).

At last we can come to the main purpose of this article: to consider the sort of changes that *might* have happened at the time of the Resurrection of Christ. We shall see that there must have been at least two separate miracles, as well as, probably, one quite 'natural' event:

First we must consider what happened at the moment of His Death. He was taken down from the cross well and truly dead, yet after thirty-six hours or slightly more His Body acquired new life and new properties. Clearly, during this period, "God rested on the seventh day" and "He did not suffer His Holy One to see corruption." A normal body would have undergone irreversible changes during thirty-six hours at all but a very low temperature.

In a little book, Schrödinger¹⁰ discusses the significance of the second law of thermodynamics for living systems. This law, as is well-known, states that in an isolated system, the entropy, a measure of randomness, or lack of specific structure, always tends to increase. Living organisms are not isolated systems and they are prevented from an "entropy death" by their nutrients, whose own structure is broken down (entropy increased) as they replace the material of the body. At death, this process stops and the body rapidly disintegrates at a rate dependent on the temperature. At the absolute zero of temperature (-273°C) there would be no increase in entropy. It has even been recently suggested that a patient with a disease at present incurable, might be frozen and kept alive until a treatment had been discovered, and then thawed out, brought back to life and treated.

There was, of course, no refrigerating equipment in the tomb of Christ! Can we believe that, by a direct miracle, His Body was frozen, or the entropy prevented from increasing in some other way? Physics has little to suggest here; but there is one rather strange observation that might just possibly bear on the problem. People who claim to have seen ghosts and other psychic phenomena often comment on a sudden sensation of cold.¹¹ Christ's Body was no 'ghost' but there could, just possibly, be some unknown connection. (The reader is referred to a rather strange article on ghosts in a serious physics journal, by Wright.¹² This author

concludes on physical grounds that ghosts could be seen only when they are very cold. He suggests that they may come rapidly from the intense cold of outer space.)

There is a possible alternative to this very nebulous suggestion. Although we may, or may not, agree with Gilbert Ryle¹³ that mind and body are no more than different aspects of one whole being, that there is no 'ghost' in a 'machine', as Descartes implied; yet, as Christians we must be to some extent dualists if we are to believe in our own after-life. At the moment of death, the soul (or spirit) must leave the body if we are later to have a new body, unless there is to be a complete 're-creation' of our whole beings.

We gladly accept the Gospel assertion that Christ "gave up His spirit." The early Christians believed that He went to preach to those who had not lived to see His ministry on earth. He was indeed 'dead', in this fundamental sense.

But, physically, death is not so easy to define. There have been a small number of cases recently even in this country, in which death certificates were issued, it was found that the patients were not dead, but in deep coma. It has been suggested that the only really safe criterion of death is a complete cessation of all electrical activity in the brain checked over quite a considerable period of time.

On a different issue, it seems likely that Jairus' daughter was cured from a state of coma and not 'resurrected' (Christ said that she was not dead). We do not know the situation with the young man at Nain. The writer can think of only two other texts stating that Christ raised people from the dead during his ministry: the reply to the messengers from St. John the Baptist ("the dead are raised up") and the very definite statement, to be found only in the Gospel of St. John, written much later, that "Lazarus is dead". Certainly the writers believed these statements to be true: rightly or wrongly not all Christians feel so convinced today.

To return to Christ Himself: do we know that the departure of the spirit coincides with the cessation of electrical activity in the brain? Is it possible that the miracle (as indeed it was) consisted in the maintaining of this activity for thirty-six hours, so that in fact the Body was in a certain sense still alive and not subject to decay? (It is not implied that a cessation of brain potentials alone would prevent decomposition.) These can be no more than the vaguest speculations.

Now we come to the Resurrection itself. When Christ awoke from the sleep of death on Easter morning, we will suppose that the matter of His Body was converted into a different form, which we will call 'quadridimensional', as described in *Flatland*.⁸ He could see through, and pass through matter and, by moving into the fourth dimension, disappear from one place and re-appear at another at will. (From now on, we will use the term 'dimension' to apply only to space). Very quickly, (we shall see why in a moment), He passes out of His grave-clothes, leaving them collapsed, "with the napkin that was about His head in a place by itself", and out of the cave-tomb. (The stone need not have been rolled away for Him, but this was done, either by a man or a minor earthquake, so that His disciples could enter and see what we have just described).

Now comes a problem that worried the writer over some years: what about His clothes? It has been suggested that God, by a special act of Creation, produced an outfit of suitable (and presumably quadridimensional) clothes.

We can provide, however, a much more likely type of explanation. We shall remember that, at the crucifixion, the clothes of the victims (except for a loin-cloth) were the perquisite of the soldiers and that Christ had what was probably quite a valuable cloak which was allocated to one of the soldiers (presumably with His other less valuable clothing). What would a Roman soldier do with these? Clearly he could not wear them: he would sell, at least the cloak, in the Jerusalem Market. But the Market was just closing for the Sabbath and he may not have trusted his fellow soldiers, or indeed have had time, to take them to his

barracks. There was a general alert on in Jerusalem that week-end and he may well have still been on duty elsewhere. Where could he hide the clothes until he could collect them after the Market re-opened ?

Although Joseph of Arimathaea who perhaps did not get on too well with his colleagues because of his attitude to Christ evidently did not wish to be buried alongside other members in the Sanhedria (which the writer has visited), no doubt the tomb he provided on his own land was typical. A cave, perhaps partly natural, widened out to make a big enough chamber not only for the body but also for the mourners, as was the Jewish custom. Nearby there were probably smaller holes in the rock, one of which, covered with a stone, would make an excellent hiding place for the clothes.¹⁴ But of course Christ would see them at once after His resurrection and re-claim them. It is not claimed that this is necessarily exactly what happened. The suggestion given here is made only to show that, given the fundamental physical changes in the nature of Christ's Body, a perfectly natural explanation for 'the mystery of the clothes' is possible.

Why did He not immediately leave the spot and go, as He did later, to break the glad news of His Resurrection to Peter and the others ? *If we assume that any matter in contact with quadridimensional matter is itself rather slowly transformed, several events are explained.*

He had to wait until His clothes were transformed into a quadridimensional state by contact with His Body. Meanwhile, Mary Magdalen appeared and clung to His feet. He said "Do not cling to me, (see Gk.) for I am not yet ascended"; yet, sometime later, He offered to let St. Thomas *touch* His wounded hands and side.

In the appearances described during the forty days before the Ascension, there is only one occasion when it seems that He might have stayed in direct contact with ordinary matter for more than a few moments: when He ate the fish and the honey in the Upper Room; and it may well be that this and His short discourse,

took only a very short time before He disappeared again out of sight.

He *walked* with the two disciples to Emmaeus and stayed at their table only long enough to give the Blessing. Again, He ate with Peter, John and other disciples on the shores of the lake but we need not suppose that He stayed sitting on one spot for any length of time. Perhaps during His appearances out of the fourth dimension, He had always to keep moving.

Is the idea of the postulated "quadrimensional matter" so fantastic? Anti-matter would have appeared fantastic only a few years ago, not to mention "black holes" in space!³ (If a particle of matter comes into contact with a corresponding particle of anti-matter, both particles disappear and only energy is left. Many people think that there are whole nebulae consisting of anti-matter.)

Would He *need* to eat and drink during his appearances, except to convince the disciples that He was not a ghost? Presumably, yes. In walking, talking and breathing in the three-dimensional world, He would use up energy. His body would, presumably, function in the normal way in other respects during these appearances. We can have no idea what conditions would be like in the fourth dimension, either before or after the Ascension.

We will close with a few words about the Ascension. Of course Christ did not believe that His Father was waiting on a cloud for Him to come and sit at His right hand, nor did most educated Jews at that time believe in this crude picture of Heaven. The witnesses of His Ascension possibly did think in these primitive terms but Christ had not come to teach them cosmology. He had often appeared and disappeared into the fourth dimension during the forty days but there is no evidence that, during this period, His Body defied gravity in the three-dimensional world, for He stood and walked on the ground like other men. But now, to make it clear to His disciples that He would not again appear in physical form He ascended into heaven in the presence of many witnesses.

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