



Metal-bending child: paranormal phenomenon? (Picture: Hemel Hempstead Gazette.)

IN February 1974 we made contact with Mr Uri Geller and were able throughout the year to observe psychokinetic phenomena at four sessions, in addition to participating in sessions with children. A brief report of our observations has been prepared for circulation to those interested. Among the claims made are that plasticity of metal was paranormally produced and that part of an encapsulated single crystal of vanadium carbide apparently vanished. It is clear both to us and to the referees used by *Nature* that this account does not amount to a rigorous loop-hole-free report on a subject historically shot through with loop-holes. Nevertheless we believe that we have some significant work in progress, and the experience we have gained may be of value to other physicists interested, like ourselves, in the interactions between mind and physical systems.

We have come to realise that in this domain the experimental situation is different in certain crucial ways from that which has been common in scientific experimentation. This is because the phenomena under investigation have to be produced from the minds of one or more of those who participate. Relationships among the participants therefore play a much more essential role than is usual in traditional scientific fields. These relationships have to be taken into account in a way that is somewhat similar to that needed in the disciplines of psychology and medicine. But, of course, this does not mean that we are committed from the outset to the belief that paranormal phenomena are genuine. Rather our minds are open to all possibilities, and our wish is simply to discuss what is the truth about these phenomena. Indeed, our experiments contain features designed to clear up a number of doubts that naturally arise in this type of work. Nevertheless, in addition to being careful in this way, we have also to be sensitive and observant, and not to react with a preconceived pattern of tough-mindedness that will interfere with our perception, and that may destroy the very possibility of the phenomena that we wish to study. With proper sensitivity and perceptivity we attempt to develop an approach that will adequately allow for the interpersonal element and yet permit us to engage in valid scientific research.

One of the first things that reveals itself as one observes is that psychokinetic phenomena cannot in general be produced unless all who participate are in a relaxed state. A state of tension, fear, hostility, on the part of any of those present generally communicates itself to the whole group. The

entire process goes most easily when all those present actively want things to work well. In addition, matters seem to be greatly facilitated when the experimental arrangement is aesthetically or imaginatively appealing to the person with apparent psychokinetic powers.

We have found also that it is generally difficult to produce a predetermined set of phenomena. Although this may sometimes be done, what happens is often surprising and unexpected. We have observed that the attempt to concentrate strongly in order to obtain a desired result (the bending of a piece of metal, for example) tends to interfere with the relaxed state of mind needed to produce such phenomena. It appears that what is actually done is mainly a function of the unconscious mind, and that once the intention to do something has been firmly established, the conscious functions of the mind, in so far as they have bearing on the goal, tend to become more of a hindrance than a help. Indeed, we have sometimes found it useful at this stage to talk of or think about something not closely related to what is happening, so as to decrease the tendency to excessive conscious concentration on the intended aim of the experiment. A comparison might be made with the process of trying to go to sleep, for which is needed a firm intention, without subsequent efforts.

Many of the conditions described above are also required for fruitful research in the natural sciences. Thus, if any of those who participate in a physical experiment are tense and hostile, and do not really want the experiment to work, the chances of success are greatly diminished. Likewise, the aesthetic appeal of the experimental set-up often helps to maintain interest and enthusiasm, whereas an attitude that consistently tends to damp these latter is evidently detrimental to the whole enterprise. In the study of psychokinetic phenomena, such conditions are clearly much more important than in the natural sciences, because the person who produces these phenomena is not an instrument or a machine. Any attempt to treat him as such will almost certainly lead to failure. Rather, as indicated earlier, he must be considered to be one of the group, actively cooperating in the experiment, and not a 'subject' whose behaviour is to be observed 'from the outside' in as cold and impersonal manner as possible.

The following analogy may help to give a more orderly overall description of the phenomena in the field. Consider a person whose hand has been paralysed as a result of destruction of nervous tissue. If this person is to regain the use of his hand, he must somehow

In the past 18 months the scientific community has been confronted with renewed claims that certain people possess paranormal powers, including the ability to effect physical changes in materials. Work has proceeded in several scientific laboratories in an effort to come to terms with these apparent abilities. What sort of attitude should be adopted in attempting to verify these claims? First, J. B. Hasted, D. J. Bohm, E. W. Bastin and B. O'Regan describe their approach in recent work done at Birkbeck College, University of London. Then J. G. Taylor, of King's College, London, who is the author of a forthcoming book on his study of these phenomena, reviews the philosophy of his work.

activate new nervous pathways. How he is to do this, he does not know. All he can do, with all his energy, is to feel out the possibilities of movement and to observe with great attention and alertness what movements actually take place. He cannot describe or even think about just what it is that he does in getting his hand to move. Moreover, he cannot at first produce controlled movements, which bring about consciously intended results. Rather it is clear that the contact between brain and hand is brought about almost entirely by unconscious functions of the mind, which tend to be erratic and fortuitous. Of course, if he works with sustained interest and energy, he will generally find that his movements do begin to come closer to what he intends. But it is also clear that if he is surrounded by people who are not open to the possibility that he can move his hand or who bring about a state of psychological tension through hostility, then he will be less likely to be able to sustain the interest and energy needed for learning how to move his hand.

Those who work with such a person (for example, the physiotherapist) must evidently not be committed to resisting the notion that the hand can eventually move. For the thoughts in the paralysed person's mind, and those in the minds of his colleagues, are both important factors in bringing about success. The necessary open-ness to the possibility of an ultimate result must be maintained in the minds of all concerned, while at the same time there is a healthy capacity to be tentative and free of definitive conclusions in statements about what particular results may have been achieved at a certain stage. And so reliable inferences can be made in physiotherapy, though by methods that are rather different from those used traditionally in the natural sciences.

The analogy between this field and that of psychokinetic research is fairly clear. The main difference is this: we can account for and to some extent explain the connection between the brain and the hand in the case of the paralysed person (through the nerves which link them) but we have no way either to account for or to explain the connection between the brain and the object that is moved, bent and so on, in terms of what is now known to science. If, however, we suppose that there is some at present unknown force, energy or mode of connection, then we may also suppose that psychokinetic power may function in a way that is essentially similar to the power to move the hand. Thus, one might suggest that perhaps there is an unconscious 'feeling out' of the connection. In many cases there is a visible 'feedback' that enables a person to

recognise that he has done something, and that permits him to try to go further along the same (indescribable and undefinable) lines. But there may other forms of 'feedback'. Thus, if a piece of metal can respond to the brain in an unknown way, the brain may similarly respond to the metal. By being sensitively aware of this response, the person concerned might be able to tell when something had actually happened, even though the object in question was not sensually perceptible to him.

It is important, at this point, not to insist on having a potential theoretical explanation before one will seriously consider observing the phenomena themselves. Thus, when magnetic and electrostatic effects were first observed, it was impossible to account for them in terms of the known forces, which were considered to arise only when bodies were in mechanical contact. Evidently, this did not prevent the effects from being observed. The main aim of such observation is to give rise to an orderly account of the phenomena, which is first qualitative and



then quantitative—for example, first the qualitative observation that like charges repel, unlike charges attract, and then the quantitative observation that the force is inversely proportional to the square of the distance. On the basis of such an account, current field-theoretical explanations of electromagnetic phenomena were later developed. We propose a similar approach to psychokinetic phenomena, and in our work thus far we have tried to carry it out.

In such research an attitude of mutual trust and confidence is needed; we should not treat the person with psychokinetic powers as an 'object' to be observed with suspicion. Rather, as indicated earlier, we have to look on him as one who is working with us. Consider how difficult it would be to do a physical experiment, if each person were constantly watching his col-

leagues to be sure that they did not trick him. How, then, are we to avoid the possibility of being tricked? It should be possible to design experimental arrangements which are beyond any reasonable possibility of trickery, and which magicians will generally acknowledge to be so. In the first stages of our work we did in fact present Mr Geller with several such arrangements, but these proved to be aesthetically unappealing to him. From our early failures, we learned that Mr Geller worked best when presented with many possible objects, all together on a metal surface; at least one of these objects might appeal to him sufficiently to stimulate his energies. In a later session, we had such a set-up, which included two small plastic capsules, each containing a thin disk of vanadium carbide single crystal. A clearly observable change in the disk within one of the capsules was brought about when Mr Geller held his hands near them.

In discussions with magicians we have learned that the best conditions for a conjuring trick arise when the happening significantly precedes the observation. In the above instance we believe that the conditions were such that the failure to observe and record the precise moment of change is of no importance, because there is no known way of producing this effect within the closed capsule and no possibility of substitution. For this reason we conclude that this was something that no magician could have done.

Nevertheless, we realise that conditions such as we have described here are just those in which a conjuring trick may easily be carried out. We understand also that we are not conjuring experts, so that if there should be an intention to deceive, we may be as readily fooled as any person. Moreover, there has been a great deal of public criticism, in which the possibility of such tricks has been strongly suggested. For this reason it has often been proposed that a skilled magician should be present, to help to see to it that there will be no possibility of deception.

It is in the nature of the case, however, that no such assurance can actually be given. For a skilled magician is able to exploit each new situation as it arises in a different and generally unpredictable way. The corpus of tricks is not fixed, but rather continually changes and evolves. A particular magician could therefore say at most that he knew of no tricks that could have brought about a given set of observed phenomena. Of course, if several magicians of recognised proficiency were to conclude that what was done on a certain occasion did not in-

volve any tricks, this could help create a presumption in favour of the notion that the phenomena are genuine. In principle, we would welcome help of this kind in decreasing the possibility of deception. It has been our observation, however, that magicians are often hostile to the whole purpose of this sort of investigation, so that they tend to bring about an atmosphere of tension in which little or nothing can be done. Indeed, even if some magicians were found who were not disposed in this way, it does not follow that their testimony will convince those who are hostile, since the latter can always suppose that new tricks were involved, beyond the capacity of those particular magicians to see through them. Because of all this, it seems unlikely that significant progress toward clearing up this particular question could be made by actually having magicians present at the sessions, though we have found it useful to have their help in a consultative capacity. We have learned in such consultations not to withdraw our scrutiny from the identified specimen, from the first moment when it reaches the hand of the subject until the bend occurs. We are familiar with the use of the human hair in producing small movements, with the use of mercuric salts in alcohol to corrode metals, and with the weakening in metals produced by continued bending to and fro. We recognise that there is a genuine difficulty in obtaining an adequate answer to criticisms concerning the possibility of tricks, and that a certain healthy scepticism or doubt on the part of the reader may be appropriate at this point. Indeed, it would be inappropriate if the scientific community did not at first react in such a way. We believe, however, that our approach can adequately meet this situation.

It is essential that in at least some experiments, conditions must be controlled in such a way that the possibility of deception is insignificant. Metal bending and cleavage experiments are particularly suitable for this approach. Encapsulated specimens can play an important part, although up to the present we have only been able to achieve success with one such specimen.

We feel that if similar sessions continue to be held, instances of this kind might accumulate, so that there will be no room for reasonable doubt that some new process is involved here, which cannot be accounted for or explained in terms of the laws of physics at present known. Indeed, we already feel that we have made sufficient progress toward this point to warrant further investigations along these lines. We hope to carry out more tests and to report on them when results are available. □

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THE crucial question that any scientist has to ask himself if he wishes seriously to investigate the paranormal (spoon-bending, telepathy, clairvoyance and the like) is how to do so scientifically. There are those who claim the very elusiveness which paranormal events have in their nature precludes any such approach. But there are also persons like myself who feel that these strange phenomena are relevant to their world view and so deserve careful study. Do we necessarily have to doff the garb of scientist when satisfying our curiosity about such events?

We can say at the outset of attempting to answer this question that if the response were "yes", science would be circumscribed in a very peculiar way. No elusive phenomenon would be allowed as a suitable object of scientific enquiry; on this score quarks, for example, would be beyond the scientific pale. To avoid such absurdity we must realise that there is a continuum of levels of elusiveness. It is not easy to discern a sharp boundary at which scientists must stop and turn into magicians.

There is one feature, however, which should be present in any phenomenon to be investigated scientifically. That is repeatability, allowing the possibility of many investigators observing the event at different times. Not only does this allow the 'consensibility' to be practised which is so crucial to scientific investigation but above all it permits the phenomenon concerned to be probed ever more deeply. Only then can the event begin to be seen in terms of current understanding. Thus the two processes of validation and model building can be carried out, possibly hand in hand or almost simultaneously.

At this point the notion of repeatability for paranormal phenomena must be clarified, since it seems to mean different things to different people. It is being used here in the following sense. Suppose that an event, such as a child causing a spoon to bend, has occurred a number of times in a given environment. The bending may not happen every time the child is tested, possibly because some crucial factor in the surroundings has changed from one test to the next without anyone realising. Yet provided that in a non-zero fraction of the test situations spoon bending (or whatever it is) has occurred and enough tests have been made to feel confident that the phenomenon will continue at about the same rate then the para-

normal event will be termed repeatable.

One of the main difficulties in applying this criterion is in the specification of the precise environment in which the event will recur. There can well be psychological pressures put on the subject by the presence of particular objects or persons, and the most suitable environment has to be found by laborious trial and error. But these problems need not make one despair of obtaining repeatability. In particular subjects should not be expected to cause a paranormal event every time they are asked to, and in any surroundings. It is like expecting a particle accelerator to produce its beam of particles whatever level of vacuum there is in the accelerating tube or whatever potential is applied. The design of such a machine is so precise that it can only function under very special conditions. We are in the position of dealing with even more complicated machinery in human beings and account must be taken of that when investigating the paranormal.

In order to be able to investigate a phenomenon further, it is necessary that it can occur under suitably modified conditions. If spoon bending were only ever possible when the subject could not be directly observed during the bending process then, even if it were repeatable, a number of explanations for it, including the obvious one, would be possible. In general it is clear that conditions must be able to be chosen so that simple explanations of paranormal phenomena, especially trickery, are ruled out.

We come, then, to the clash between the eventual rigour of science and the laxity apparently needed to produce paranormal phenomena. Seances need to be held in the dark since the light of day seems to prevent anything strange occurring. This is not true of spoon bending or distant viewing, for which there is some level of repeatability in daylight. There are other phenomena, such as dowsing, which can also bear further investigation of a sort which allows various explanations to be tested.

It is this feature of allowing critical testing which is a *sine qua non* of a phenomenon for its investigation to be regarded as scientific. The range of tests used will naturally be at the discretion of the investigator, but it is in the event itself that this 'testability' resides. Not that further enquiry need prove easy, since it will involve modifying the environment in some way that may prevent the phenomenon from recurring. If any such change is too inimical to the event then clearly it is not possible to test it at all; the event will have to be regarded as a curiosity, but one which at present cannot usefully be studied scientifically.

As new tests are tried with a subject,