THE PERVERSITY OF PHYSICS

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When Newton proposed universal gravity as a cornerstone of the universe, a very eminent scientist of that day said: "The thought that one body may act upon another at a distance, through a vacuum, without the mediation of anything else, is to me so great an absurdity that no man who has a competent faculty of thinking can ever fall into it." Can you guess who wrote that? It is a quotation from Newton's own third letter to Bentley in which he protested that he never postulated action at a distance; because that is an occult property and goes against the laws of nature. There has to be an ether. In 1609, eighty years before Newton, a man called Johannes Kepler proposed the same idea. Kepler's *Astronomia Nova*, which contains two of his three laws that formed the beginning of modern astronomy, also contains in the preface the postulate that the tides are caused by the attraction of the moon and that two bodies free in space would attract each other in proportion to their masses and in inverse ratio to their distance. The reaction from the most modern of his contemporaries, Galileo, was: "Poor Kepler, he was a brilliant mind, but now he has taken to occult fancies." Kepler was so dismayed by this and similar reactions that he mentioned gravity only in the *preface* of *Astronomia Nova*; in the whole body of the book itself and in all his subsequent works, there was not a word about universal gravity. He dropped it like a hot potato, because it smacked of occultism.

If psychologists had followed his example, we would not be sitting here. So I do not think one can draw a line between what is occultism and what is respectable parapsychology. Naturally, one tries to navigate between Scylla and Charybdis, between open-mindedness and gullibility, but it is terribly difficult to find that narrow channel. When I was hunting gurus in India, I came back enriched with one insight. It was: "Never ask whether that 'holy man' is a charlatan or really holy. Just ask to what extent he is a charlatan and to what extent genuine. Never apply an all-or-nothing criterion." Showmanship comes in the moment you get into the public eye. Exposed to the public eye

of unlimited numbers of followers, you have to apply some showmanship. On bad days, when nothing works, you would be superhuman if you would not resort to *corriger la fortune* by a few tricks.

Now, one word concerning the discussion about methodology. Bob Brier said that belief in the possibility of the absolute confirmation of a scientific theory by experiment is an illusion, but he thinks that falsification, in line with Popper, is still a valid criterion of scientific methodology. I would go with Polanyi one step further. Polanyi attacked Popper on the grounds that even falsification is not good enough and very subjective. There are so many examples that come to mind. The Mendeleev system, that every schoolboy learned before isotopes were discovered, falsified itself. There were deviations from the expected numbers so it just could not be correct. But, as Einstein said: if the facts do not agree with the theory, then the facts are wrong.

Generally speaking, when a new theory in physics or biology comes out, and there are small deviations, as in the Mendeleev system, the normal reaction is: these are just impurities, unknown parasites in the apparatus, let us not worry, everything will be all right. This is really the method of progress of science. "It will come all right, somehow." You are never on really secure grounds in the so-called exact sciences. Creative scientists take much greater liberties than the layman would ever dream of imputing to them. Everybody who works in that field knows that it is so. There is a sort of hope: it will come out all right. And the theory will only be dropped by falsification when the cumulative evidence against it exceeds a critical limit, never before. Well, we are not such very poor cousins of the exact sciences.

The next step leads to a closer examination of the relationship between the exact sciences, epitomized in physics, and parapsychology. I think we have to distinguish two steps. There is a kind of *negative* affinity between the two, in the sense that the unthinkable propositions of quantum physics make the unthinkable propositions of parapsychology a little less preposterous. That is a negative affinity. Modern physics, and even Newtonian physics, had to go against common sense —action at a distance is certainly an offense against common sense, electromagnetic fields existing in a vacuum are offenses against common sense. Secondly, each revolutionary program in physics had to offend against the so-called Laws of Nature, as they were formulated at the time. You heard Newton's indignant protest that he is not going against the laws of mechanics after he had done just that. Half a century ago, Einstein, De Broglie and Schrödinger between them had dematerialized matter—it was something like the stage magician's trick of making the lady vanish from the box. Dirac populated the uni-

verse with holes; out of these holes pop, occasionally, particles of antimatter, ghosts with negative mass and negative energy. Then there is Thompson's famous experiment in which an electron is apparently made to go through two slits at the same time—about which Sir Cyril Burt commented that it was a feat that no human ghost has ever accomplished. There is time reversal—Feynman's positrons traveling back into the past. There are Black Holes in astronomy into which matter is sucked; there, according to the equations of relativity, the laws of physics are suspended and matter disappears into the blue yonder. There are singularities in space, and there is infinite space curvature. So, if somebody said yesterday: "You cannot visualize at the same time a square that is also a circle"—well, I think quantum physics can perfectly well visualize a square that is a circle or two parallels that meet because of the curvature of space. So, if one has swallowed the propositions of quantum physics, one feels a little less guilty about swallowing those of parapsychology. But these are, as I said, negative rapprochements. Both physics and parapsychology are guilty of crimes against common sense, against the accepted laws of nature as formulated before. But have we got any signs of a positive rapprochement? I think the main witness is Heisenberg, who stated repeatedly that the complementarity of particles and waves is a very pretty parallel to the mind-body complementarity. This is a statement which one has to take seriously, particularly because it issues from an intellectual circle including Heisenberg, Wolfgang Pauli, Bohr, von Neumann, and so on, all of whom realized that materialism is old hat and that we are out somewhere on the wild ocean where we have not so much to replace our basic categorical concepts (it's too early for that), but first to chuck them out, throw them overboard. So the quantum analogy to the mind-body complementarity was not just an individual statement of Heisenberg's, but it flowed out of this atmosphere, just as the famous postulate of an a-causal principle acting in the universe came from Pauli's association with Jung. Here we have a more positive rapprochement. Next we come to what one feels might be premature physicalistic theories of ESP, such as Axel Firsoff's "mindons," and Adrien Dobbs' "positrons." There is also a newer theory advanced by Ruderfer who has got a neutrino theory of ESP. Speaking just subjectively, I have an uneasy feeling that these theories are guilty of what Whitehead called "misplaced concreteness." They are premature, they are trying to pin things down before they are pinnable. But, there is one very positive rapprochement: I think we can observe in quantum physics a realization of the position of the mind, the function of the human mind, as a factor in all quantum physical measurements, and in quantum

physical theories. Here there are essentially two schools of thought. One says that the interaction of the observer with the observed process cannot be eliminated, but it does not affect the basic determinism of the observed object as it would be if it were left alone. That theory is practically dead by now. The other theory says that you cannot eliminate the observer from any quantum equation, not because of the observer's fallibility, but because the observer no longer manipulates his models like the clockwork universe of the nineteenth century. Instead the observer now operates with probability theory models that are mental constructs and our predictions refer no longer to a model, but to a mental construct.

What this seems to lead to is that the indivisibility of observer and observed objects smacks very much of the Vedantic proposition that the subject's consciousness and the object of his consciousness cannot be separated. It is "I am thou, thou art me." I do not take it too literally, but there is very much a sort of "gestaltung" which moves in that direction. I do believe that there is a positive, not only a negative rapprochement, between those two black sheep: parapsychology and quantum physics. But let us not try to rush things. The great new syntheses in the history of science occurred when each component, which ultimately went into synthesis, was already there and they only needed to be together. I do not think the time is ripe, but I think there is this affinity between parapsychology and modern physics which is more intuitive than logical, more potential than actual—a kind of "gestalt" affinity.

We have similar trends in biology. There is general systems theory with its approach to open systems that feed on negative entropy and seem to go counter to the second law of thermodynamics. It points in a direction which amounts to a complete rejection of the mechanistic, materialistic, behavioristic approach. There is general discontent in two groups of biologists—the very old and the young undergraduates. Once they become graduates, in most American universities, they are professionally deformed. But among the young, there is a general discontent with orthodox neo-Darwinism's claim that random mutations plus natural selection explain all there is to evolution and nothing else is needed.

Lastly, I want to defend a certain reluctance to being pinned down by definitions. Definitions proceed by a process of elimination. I could defend the thesis that all great advances in the history of science were made by people who operated with semantically unclean concepts. Parapsychologists should not be unduly afraid of that. I think, for instance, that it is futile to ask how the internal space of the mind

and objective space are connected. Once, when von Helmholz was a guest at a mundane dinner party, a young lady said to him: "Herr Professor, I have read and understood every line of what you have written. But there is one thing which puzzles me: what is the difference between concrete and concave?" The professor answered: "My young lady, this is very simple. It is the same difference as between 'Gasthof' and 'Gustav.' "

DISCUSSION

CAHN: Formally speaking, an open system that is increasing in information content is not denying the second law of thermodynamics. However, I am not saying this because I am denying your point. I think that the fundamental problem in biology is how to reconcile—we see it best at the biological level—what I called in my paper winding processes with unwinding processes. And one thing that, as a geneticist, I recognize very clearly is that if you attempt to talk about mutation, which is essentially an unwinding or an informational loss event, along with selection as a mechanism for evolution from speciation to macro-evolution, you can do very well up through Fitzpatrick's speciation and no further. And this is a fundamental problem. Bergson, Chardin and Sinnot, to mention names specifically, are people who are well aware that the problem is not a problem in mechanism. It is a problem in something much deeper. I think you touched it.

POYNTON: Following on that, I did criticize Hardy in my paper, but he also made a profoundly important point which I find quite incredible that others have not thought of before: That an animal can determine its own selective background through its behavior. It can also plot the entire course of its fate. This is also a very important fact that Hardy did bring up. It is quite incredible that biologists have not thought of it before.

KOESTLER: This has a historical root, of course. What Hardy called "evolution initiative"—you know the example of the blue tits in which one genus of blue tit is discovered opening a milk bottle and then drinking the milk. That was evolution by initiative. Anyway, it became instinctual after a while.

POYNTON: It was brought out by Hardy and Ewer very recently as a real thing, and this shows the immense gaps in evolution which had hardly occurred to anyone.

ALBERTI: Mr. Koestler, I would like to defend (perhaps against your opinion) this discrepancy between occultism and science. I think we should, in this scope, distinguish scientific activity from science

as a corpus, as an established "ensemble" of defined laws which describe nature or psychological phenomena and which permits a prevision of the consequences of certain phenomena. Occultism, compared with science in general, does not give the opportunity of prediction. On the level of scientific activity, you quoted the example of de Leeuw. Of course this is an a priori opinion. This is a not-proven statement of his and I think this can be explained from the condition of polemics and dialectics which precedes the establishment of certain definite rules which make up the corpus of science as a result of these efforts.

KOESTLER: It was not Galileo's personal opinion, it was the corpus of the opinion of his time. To postulate that the tides are caused by motions of the moon is absolute madness: a reversion to the "anima mundi." That was the climate of opinion.

ALBERTI: I think this does not discredit science as a result . . .

KOESTLER: It discredits only to believe that the formulation of the laws of nature is absolute and eternal.

ALBERTI: A science is a good science, as for instance physics, a sane science. The corrections of the actual opinions are made in terms of a more precise formulation of the rules.

KOESTLER: I do not believe that science proceeds asymptotically, getting closer and closer. It proceeds by repeated appeals which Kuhn called paradigm changes. Einstein did not only refine the practical equation of gravity, he abolished absolute space and absolute time. So each revolution has a destructive and a constructive aspect, which an asymptote has not.

ALBERTI: Yes, but Newtonian mechanics work well now in our limits of exactness, in our limits of usual and not particularly refined. . . .

KOESTLER: But Kepler's laws worked, but as explanations of the universe, the Newtonian universe had been taken to pieces.

BELOFF: Koestler took issue with Dr. Brier here over the issue of falsification and, from one point of view, he is absolutely right. I think this has to be treated very carefully because Popper gave us, after all, one of the few criteria that has ever really been put forward for distinguishing the false science, the pseudo science, the occult science and so on from genuine science. It is important that we not throw it overboard without very careful thought. It is quite generally agreed amongst philosophers of science that one cannot falsify a theory by any critical observation of this kind. It has to be worn away by attrition in the end, exactly as Koestler said. But at the same time, what is true in his conception and what should not be lost is the idea that a genuine science must be able to make predictions and the results must be able to count against that theory. It does not necessarily at one go

demolish it and falsify it, but if an observation cannot count against the theory, then you really have not got a science.

KOESTLER: I fully agree, John. What I meant was there is no absolute falsification, there is a cumulative one. They overstate one side against the other side.

ROGO: I think one of the key points in Mr. Koestler's presentation and in his book in general is the feasibility of the use of data of physics in support of the general framework for the understanding of psi. I think in a way we are treading very dangerous territory. I for one have not been very enthusiastic about the feasibility of finding physical explanations for psi. We who are in parapsychology all know how occultists will often use the data from parapsychology to support wild and irrational occult theories. Parapsychologists, in my opinion, are playing the same game in general when they take not fully understood concepts from physics and use them to try to promote equally illogical theories of psi. I would like your comment on that.

KOESTLER: I agree, my comment is worthless.

ROGO: I think that is the danger we have in the sort of conversation we are getting involved in now.

BRIER: I understand your comment on the thing with Polanyi and I agree. I think there is never any crucial experiment where the facts clue the theories out. There is always a fudging of the facts to fit another point in the curve. I think the point that Polanyi makes is too strong, because Polanyi is trying to push that there is no clear-cut delineation of what a science is. That is too strong. There are some general guidelines to what a science is.

TARG: I would like to ask for help rather than add to the controversy. It must be evident at this point that I am an experimental physicist. And I find myself in a group that I believe is more than half made up of theoretical philosophers and parapsychologists. My problem is very simple. When we will do an experiment involving human beings, and table and chairs, and verbal statements, and the experiment will involve the transmission of information or the movement of a billiard ball or some thing that has obeyed some law of parapsychology, that is, behaved in some way different from conventional psychology or conventional physics, what would an understanding of this phenomena be? We all here want to understand what is the lawful relationship of parapsychology to the rest of the universe about which we know some things. Physics is a fascinating field because it is open. We do not have all the answers in physics, but I am confident that we have some of the answers to some questions. As physics can put a man on the moon and get him back and explain how to turn the lights on,

there are some things that physics can do. What we are trying to achieve is a rapprochement between the observations of parapsychology and those lawful things we see in physics. In parapsychology, people have had a tendency for fifty years to do experiments on a single data point, which is like Archimedes's "Eureka!" in which a man does not experiment but says: "Yes, I have demonstrated the existence of an extrasensory phenomenon in the laboratory." And he publishes that data point. And another man goes on and publishes another data point. Now, what I would like to find is people publishing the functional relationship between the parapsychological phenomena they are examining and some other physical or psychological variable. If we cannot achieve the integration of the parapsychological data with the data of physics, then I do not know what an explanation would be. The point of this whole digression is that I think it is essential, and in fact incumbent, on a man postulating a theory for parapsychology—if he wants me to examine his hypothesis for extra-dimensionality in space or extra time dimensions, or to launch a search for the location of his thoughts or do some other mathematical problem in multi-dimensional space and time—that he also tell me how, in principle, I would verify his hypothesis. He does not have to outline the exact experiment, but he has to tell me how I would know, in principle, when I demonstrated his theory, that it was correct.

KOESTLER: I would rather answer that at the end.

ZORAB: I would like to mention the fact that, as far as I know, there has never been any investigation of the relationship between the table going up a foot in the air, people creeping on their knees to see what is happening and other relationships about which Dr. Targ is asking. The people just stayed there and did not do anything but observe and investigate. They did not do anything further. If you go into the history of D. D. Home, you see that time and again the table is rising a foot, two feet, people creeping under the table to see what is happening there, looking with lights under it, the table comes down slowly, settles very gently and everything is finished. They do not look for any other relationships. They observe, describe and that is it. If they would say that a new Home would be coming up, we would perhaps investigate it in quite a different manner. I hear there are some theories advanced about this PK experiment and PK phenomena. I heard people telling me about neutrinos darting across space and lifting up tables and that sort of thing; that does not bring us anywhere. We can only, at the moment, say that there are phenomena which really point to a sort of situation where gravitation has been inhibited. And, there we are.

SCHMIDT: I think some work has been done to study the physical parameters. For example, in psychokinesis, people tried with dice for distance effects; the same in telepathy, in precognition experiments, they tried the different kinds of displacements, they did experiments with precognition one week into the future, one year into the future. They made a good start. It turned out, it seems, that these physical parametists do not play a big role. But I think that it is perhaps one of the most important findings which every theorist should take as a starting point.

ROGO: I would like to respond to Mr. Zorab. I think that what happened, as you say when parapsychology was little more than groups of observation, with the experiments done in the 1880s would have made it impossible to do more because of the limitations of technology. So I do not think these experiments were just physical observations.

MEERLOO: I find in this meeting that, when we talk about parapsychology in science, there is too much emphasis on the experimental model; when you cannot see it or prove it through an experiment, a physical or physiological experiment does not exist. There are many *einmachlichkeiten*, things that only happen once. We have a tremendous experience of things that never repeat themselves, but which we have to affirm or confirm, especially in our clinical experience about telepathy. And, of course, we work on that too. This is a complete different science. Science is not only something which has to be proved: Mineralogy does not talk about experiments but describes everything as exactly as possible, like meteorology. One case of cancer which regresses without interference tells us more than all the experiments up to now. And so with telepathy, only one experience with telepathy, in this meeting, tells us more than all experiments.

CUTTEN: I think Mr. Scott Rogo has put his finger on an important point when he says that we have to wait for another D. D. Home and I think that is just what we have to do. We spend a lot of our time discussing what we have not actually got. We are discussing things which happened so many, many years ago. I think if we can find another Home or any one who can produce this phenomenon, the technology has advanced so much in the meantime that we might be able to do a great deal more about it. But first, we have to find the phenomenon.

FLEW: About repeatability, I want to pick out the remark about the regressive case of cancer which is valuable because it shows the thing is curable. It seems to me that what you said itself suggests repeatability. Just so if this case does genuinely show that there is something that you can regularly do with similar cases which produces a regular effect,

well and fine! The objection to nonrepeatability is not an objection to phenomena which, as a matter of fact, would be impossibly difficult to repeat. It is objection to phenomena that are supposed to have occurred and which there is reason to describe as impossible for someone to repeat. Most historical events, as normally described, are nonrepeatable —we cannot have Caesar's conquest of Britain over again. This does not make the thing repeatable in the relevant sense, because there is nothing about Caesar's conquest of Britain which anyone had any reason to believe was, in principle, impossible. Objection to nonrepeatable phenomena in psychical research is that it is claimed there are certain real phenomena, but no one can repeat them. And they are phenomena which are supposed to be in principle impossible. The objection is not to things which are de facto nonrepeatable, it is an objection to things which are thought to be in principle nonrepeatable.

The psychical phenomena are in general supposed to be of a kind that are potentially repeatable. One hears of experiences in telepathy spontaneously occurring that are quite commonplace. It is unlike some very rare astronomical phenomena for which you have to wait fifty years to see another. They are supposed to be potentially observable and therefore amenable to an experimental approach.

MEERLOO: I did not deny this but there is a denial of the *einmachlichkeit*. That tells us also something. When you have an experience with patients or with people with whom you have daily relationships or a kind of communication which you call telepathy, then there is another question. If you can repeat experimentally part of it—and it is only part of it—then you come nearer to a special answer. But that other part also belongs to science. I am talking about the scientific method, and especially what Mr. Koestler has given us in showing us from history several examples of mistaken theories, because of the insight they can give us into something new. There is something in the scientific method that we are forgetting and that is the individual case. We have talked about individual cases and, as physicians, we always bring in individual cases. This is a completely different aspect of the science of telepathy than experimental repetition which only tries to prove part of it and, maybe, forgets the other part.

BRIER: As for repeatability, I think the reason for so much opposition is, granted, because these things are supposed to be repeatable, but also because of the claim that we know how to repeat them. For example, there is the Pearce $100 experiment, where the reason Pearce scored so well was because he was motivated. This suggests that if you motivate your subject, you get good results. And then when you mo-

tivate your subject and do not get good results, that is a reason for criticism.

KOESTLER: This is the kind of discussion where one has to be either very long or very short. I feel Dr. Meerloo's indignation that spontaneous or anecdotal cases are hardly mentioned. But this is a predicament. It is the nature of the evidence that it does not count by the accepted criteria of science as evidence in court. And against that, one is helpless. About repeatability, that is a game. It is one of the basic short cuts. You cannot expect phenomena which are so deeply rooted in unconscious processes and unknown processes to obey the sort of thing like, "If I wind up the clock, it will go." That again is a predicament which is in the nature of parapsychology. However, the spontaneous experience creates, I think, a vital role in the parapsychological world. Because I do not think anybody could spend his life or years of his life in going into parapsychology without having had some experiences which he feels "are for me enough; they are not evidence, they are not proof, I cannot convince anybody. But for me, they are enough." And that exactly is a motivational factor.