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CHAPTER 1

CAN SCIENCE HELP?

THE MISUSE OF SCIENCE

By the middle of the seventeenth century it had come to be understood that the world was enclosed in a sea of air, much as the greater part of it was covered by water. A scientist of the period, Francesco Lana, contended that a lighter-than-air ship could float upon this sea, and he suggested how such a ship might be built. He was unable to put his invention to a practical test, but he saw only one reason why it might not work:

. . . that God will never suffer this Invention to take effect, because of the many consequencies which may disturb the Civil Government of men. For who sees not, that no City can be secure against attack, since our Ship may at any time be placed directly over it, and descending down may discharge Souldiers; the same would happen to private Houses, and Ships on the Sea: for our Ship descending out of the Air to the sails of Sea-Ships, it may cut their Ropes, yea without descending by casting Grapples it may over-set them, kill their men, burn their Ships by artificial Fire works and Fire-balls. And this they may do not only to Ships but to great Buildings, Castles, Cities, with such security that they which cast these things down from a height out of Gun-shot, cannot on the other side be offended by those below.

Lana's reservation was groundless. He had predicted modern air warfare in surprisingly accurate detail—with its paratroopers and its strafing and bombing. Contrary to his expectation, God has suffered his invention to take effect.

And so has Man. The story emphasizes the irresponsibility with which science and the products of science have been used. Man's power appears to have increased out of all proportion to his wisdom. He has never been in a better position to build a healthy, happy, and productive world; yet things have perhaps never seemed so black. Two exhausting world wars in a single half century have given no assurance of a lasting peace. Dreams of progress toward a higher civilization have been shattered by the spectacle of the murder of millions of innocent people. The worst may be still to come. Scientists may not set off a chain reaction to blow the world into eternity, but some of the more plausible prospects are scarcely less disconcerting.

In the face of this apparently unnecessary condition men of good will find themselves helpless or afraid to act. Some are the prey of a profound pessimism. Others strike out blindly in counteraggression, much of which is directed toward science itself. Torn from its position of prestige, science is decried as a dangerous toy in the hands of children who do not understand it. The conspicuous feature of any period is likely to be blamed for its troubles, and in the twentieth century science must play the scapegoat. But the attack is not entirely without justification. Science has developed unevenly. By seizing upon the easier problems first, it has extended our control of inanimate nature without preparing for the serious social problems which follow. The technologies based upon science are disturbing. Isolated groups of relatively stable people are brought into contact with each other and lose their equilibrium. Industries spring up for which *the life of a community may be unprepared, while others vanish leaving millions unfit for productive work. The application of science* prevents famines and plagues, and lowers death rates—only to populate the earth beyond the reach of established systems of cultural or governmental control. Science has made war more terrible and more destructive. Much of this has not been done deliberately, but it has

been done. And since scientists are necessarily men of some intelligence, they might have been expected to be alert to these consequences.

It is not surprising to encounter the proposal that science should be abandoned, at least for the time being. This solution appeals especially to those who are fitted by temperament to other ways of life. Some relief might be obtained if we could divert mankind into a revival of the arts or religion or even of that petty quarreling which we now look back upon as a life of peace. Such a program resembles the decision of the citizens of Samuel Butler's *Erewhon*, where the instruments and products of science were put into museums—as vestiges of a stage in the evolution of human culture which did not survive. But not everyone is willing to defend a position of stubborn "not knowing." There is no virtue in ignorance for its own sake. Unfortunately we cannot stand still: to bring scientific research to an end now would mean a return to famine and pestilence and the exhausting labors of a slave culture.

SCIENCE AS A CORRECTIVE

Another solution is more appealing to the modern mind. It may not be science which is wrong but only its application. The methods of science have been enormously successful wherever they have been tried. Let us then apply them to human affairs. We need not retreat in those sectors where science has already advanced. It is necessary only to bring our understanding of human nature up to the same point. Indeed, this may well be our only hope. If we can observe human behavior carefully from an objective point of view and come to understand it for what it is, we may be able to adopt a more sensible course of action. The need for establishing some such balance is now widely felt, and those who are able to control the direction of science are acting accordingly. It is understood that there is no point in furthering a science of nature unless it includes a sizable science of human nature, because only in that case will the results be wisely used. It is possible that science has come to the rescue and that order will eventually be achieved in the field of human affairs.

THE THREAT TO FREEDOM

There is one difficulty, however. The application of science to human behavior is not so simple as it seems. Most of those who advocate it are simply looking for "the facts." To them science is little more than careful observation. They want to evaluate human behavior as it really is rather than as it appears to be through ignorance or prejudice, and then to make effective decisions and move on rapidly to a happier world. But the way in which science has been applied in other fields shows that something more is involved. Science is not concerned just with "getting the facts," after which one may act with greater wisdom in an unscientific fashion. Science supplies its own wisdom. It leads to a new conception of a subject matter, a new way of thinking about that part of the world to which it has addressed itself. If we are to enjoy the advantages of science in the field of human affairs, we must be prepared to adopt the working model of behavior to which a science will inevitably lead. But very few of those who advocate the application of scientific method to current problems are willing to go that far.

Science is more than the mere description of events as they occur. It is an attempt to discover order, to show that certain events stand in lawful relations to other events. No practical technology can be based upon science until such relations have been discovered. But order is not only a possible end product; it is a working assumption which must be adopted at the very start. We cannot apply the methods of science to a subject matter which is assumed to move about capriciously. Science not only describes, it predicts. It deals not only with the past but with the future. Nor is prediction the last word: to the extent that relevant conditions can be altered, or otherwise controlled, the future can be controlled. If we are to use the methods of science in the field of human affairs, we must assume that behavior is lawful and determined. We must expect to discover that what a man does is the result of specifiable conditions and that once these conditions have been discovered, we can anticipate and to some extent determine his actions.

This possibility is offensive to many people. It is opposed to a tra-

dition of long standing which regards man as a free agent, whose behavior is the product, not of specifiable antecedent conditions, but of spontaneous inner changes of course. Prevailing philosophies of human nature recognize an internal "will" which has the power of interfering with causal relationships and which makes the prediction and control of behavior impossible. To suggest that we abandon this view is to threaten many cherished beliefs—to undermine what appears to be a stimulating and productive conception of human nature. The alternative point of view insists upon recognizing coercive forces in human conduct which we may prefer to disregard. It challenges our aspirations, either worldly or otherworldly. Regardless of how much we stand to gain from supposing that human behavior is the proper subject matter of a science, no one who is a product of Western civilization can do so without a struggle. We simply do not want such a science.

Conflicts of this sort are not unknown in the history of science. When Aesop's lion was shown a painting in which a man was depicted killing a lion, he commented contemptuously, "The artist was obviously a man." Primitive beliefs about man and his place in nature are usually flattering. It has been the unfortunate responsibility of science to paint more realistic pictures. The Copernican theory of the solar system displaced man from his pre-eminent position at the center of things. Today we accept this theory without emotion, but originally it met with enormous resistance. Darwin challenged a practice of segregation in which man set himself firmly apart from the animals, and the bitter struggle which arose is not yet ended. But though Darwin put man in his biological place, he did not deny him a possible position as master. Special faculties or a special capacity for spontaneous, creative action might have emerged in the process of evolution. When that distinction is now questioned, a new threat arises.

There are many ways of hedging on the theoretical issue. It may be insisted that a science of human behavior is impossible, that behavior has certain essential features which forever keep it beyond the pale of science. But although this argument may dissuade many people from further inquiry, it is not likely to have any effect upon those

who are willing to try and see. Another objection frequently offered is that science is appropriate up to a certain point, but that there must always remain an area in which one can act only on faith or with respect to a "value judgment": science may tell us *how* to deal with human behavior, but just *what* is to be done must be decided in an essentially nonscientific way. Or it may be argued that there is another kind of science which is compatible with doctrines of personal freedom. For example, the social sciences are sometimes said to be fundamentally different from the natural sciences and not concerned with the same kinds of lawfulness. Prediction and control may be forsworn in favor of "interpretation" or some other species of understanding. But the kinds of intellectual activities exemplified by value judgments or by intuition or interpretation have never been set forth clearly, nor have they yet shown any capacity to work a change in our present predicament.

THE PRACTICAL ISSUE

Our current practices do not represent any well-defined theoretical position. They are, in fact, thoroughly confused. At times we appear to regard a man's behavior as spontaneous and responsible. At other times we recognize that inner determination is at least not complete, that the individual is not always to be held to account. We have not been able to reject the slowly accumulating evidence that circumstances beyond the individual are relevant. We sometimes exonerate a man by pointing to "extenuating circumstances." We no longer blame the uneducated for their ignorance or call the unemployed lazy. We no longer hold children wholly accountable for their delinquencies. "Ignorance of the law" is no longer wholly inexcusable: "Father, forgive them; for they know not what they do." The insane have long since been cleared of responsibility for their condition, and the kinds of neurotic or psychotic behavior to which we now apply this extenuation are multiplying.

But we have not gone all the way. We regard the common man as the product of his environment; yet we reserve the right to give personal credit to great men for their achievements. (At the same time we take a certain delight in proving that part of the output of

even such men is due to the "influence" of other men or to some trivial circumstance in their personal history.) We want to believe that right-minded men are moved by valid principles even though we are willing to regard wrong-minded men as victims of erroneous propaganda. Backward peoples may be the fault of a poor culture, but we want to regard the elite as something more than the product of a good culture. Though we observe that Moslem children in general become Moslems while Christian children in general become Christians, we are not willing to accept an accident of birth as a basis for belief. We dismiss those who disagree with us as victims of ignorance, but we regard the promotion of our own religious beliefs as something more than the arrangement of a particular environment.

All of this suggests that we are in transition. We have not wholly abandoned the traditional philosophy of human nature; at the same time we are far from adopting a scientific point of view without reservation. We have accepted the assumption of determinism in part; yet we allow our sympathies, our first allegiances, and our personal aspirations to rise to the defense of the traditional view. We are currently engaged in a sort of patchwork in which new facts and methods are assembled in accordance with traditional theories.

If this were a theoretical issue only, we would have no cause for alarm; but theories affect practices. A scientific conception of human behavior dictates one practice, a philosophy of personal freedom another. Confusion in theory means confusion in practice. The present unhappy condition of the world may in large measure be traced to our vacillation. The principal issues in dispute between nations, both in peaceful assembly and on the battlefield, are intimately concerned with the problem of human freedom and control. Totalitarianism or democracy, the state or the individual, planned society or laissez-faire, the impression of cultures upon alien peoples, economic determinism, individual initiative, propaganda, education, ideological warfare—all concern the fundamental nature of human behavior. We shall almost certainly remain ineffective in solving these problems until we adopt a consistent point of view.

We cannot really evaluate the issue until we understand the alternatives. The traditional view of human nature in Western culture

is well known. The conception of a free, responsible individual is embedded in our language and pervades our practices, codes, and beliefs. Given an example of human behavior, most people can describe it immediately in terms of such a conception. The practice is so natural that it is seldom examined. A scientific formulation, on the other hand, is new and strange. Very few people have any notion of the extent to which a science of human behavior is indeed possible. In what way can the behavior of the individual or of groups of individuals be predicted and controlled? What are laws of behavior like? What over-all conception of the human organism as a behaving system emerges? It is only when we have answered these questions, at least in a preliminary fashion, that we may consider the implications of a science of human behavior with respect to either a theory of human nature or the management of human affairs.