

## WHY ORGANISMS BEHAVE

The terms "cause" and "effect" are no longer widely used in science. They have been associated with so many theories of the structure and operation of the universe that they mean more than scientists want to say. The terms which replace them, however, refer to the same factual core. A "cause" becomes a "change in an independent variable" and an "effect" a "change in a dependent variable." The old "cause-and-effect connection" becomes a "functional relation." The new terms do not suggest *how* a cause causes its effect; they merely assert that different events tend to occur together in a certain order. This is important, but it is not crucial. There is no particular danger in using "cause" and "effect" in an informal discussion if we are always ready to substitute their more exact counterparts.

We are concerned, then, with the causes of human behavior. We want to know why men behave as they do. Any condition or event which can be shown to have an effect upon behavior must be taken into account. By discovering and analyzing these causes we can predict behavior; to the extent that we can manipulate them, we can control behavior.

There is a curious inconsistency in the zeal with which the doctrine

of personal freedom has been defended, because men have always been fascinated by the search for causes. The spontaneity of human behavior is apparently no more challenging than its "why and wherefore." So strong is the urge to explain behavior that men have been led to anticipate legitimate scientific inquiry and to construct highly implausible theories of causation. This practice is not unusual in the history of science. The study of any subject begins in the realm of superstition. The fanciful explanation precedes the valid. Astronomy began as astrology; chemistry as alchemy. The field of behavior has had, and still has, its astrologers and alchemists. A long history of prescientific explanation furnishes us with a fantastic array of causes which have no function other than to supply spurious answers to questions which must otherwise go unanswered in the early stages of a science.

#### SOME POPULAR "CAUSES" OF BEHAVIOR

Any conspicuous event which coincides with human behavior is likely to be seized upon as a cause. The position of the planets at the birth of the individual is an example. Usually astrologers do not try to predict specific actions from such causes, but when they tell us that a man will be impetuous, careless, or thoughtful, we must suppose that specific actions are assumed to be affected. Numerology finds a different set of causes—for example, in the numbers which compose the street address of the individual or in the number of letters in his name. Millions of people turn to these spurious causes every year in their desperate need to understand human behavior and to deal with it effectively.

The predictions of astrologers, numerologists, and the like are usually so vague that they cannot be confirmed or disproved properly. Failures are easily overlooked, while an occasional chance hit is dramatic enough to maintain the behavior of the devotee in considerable strength. Certain valid relations which resemble such superstitions offer spurious support. For example, some characteristics of behavior can be traced to the season in which a man is born (though not to the position of the planets at his birth), as well as to climatic conditions due in part to the position of the earth in the

solar system or to events in the sun. Effects of this sort, when properly validated, must not be overlooked. They do not, of course, justify astrology.

Another common practice is to explain behavior in terms of the structure of the individual. The proportions of the body, the shape of the head, the color of the eyes, skin, or hair, the marks on the palms of the hands, and the features of the face have all been said to determine what a man will do. The "jovial fat man," Cassius with his "lean and hungry look," and thousands of other characters or types thoroughly embedded in our language affect our practices in dealing with human behavior. A specific act may never be predicted from physique, but different types of personality imply predispositions to behave in different ways, so that specific acts are presumed to be affected. This practice resembles the mistake we all make when we expect someone who looks like an old acquaintance to behave like him also. When a "type" is once established, it survives in everyday use because the predictions which are made with it, like those of astrology, are vague, and occasional hits may be startling. Spurious support is also offered by many valid relations between behavior and body type. Studies of the physiques of men and women predisposed to different sorts of disorders have from time to time held the attention of students of behavior. The most recent classification of body structure—the somatotyping of W. H. Sheldon—has already been applied to the prediction of temperament and of various forms of delinquency. Valid relations between behavior and body type must, of course, be taken into account in a science of behavior, but these should not be confused with the relations invoked in the uncritical practice of the layman.

Even when a correlation between behavior and body structure is demonstrated, it is not always clear which is the cause of which. Even if it could be shown by proper statistical methods that fat men are especially likely to be jolly, it still would not follow that the physique causes the temperament. Fat people are at a disadvantage in many ways, and they may develop jolly behavior as a special competitive technique. Jolly people may grow fat because they are free of the emotional disturbances which drive other people to overwork or to

neglect their diet or their health. Fat people may be jolly because they have been successful in satisfying their needs through excessive eating. Where the feature of physique can be modified, then, we must ask whether the behavior or the feature comes first.

When we find, or think we have found, that conspicuous physical features explain part of a man's behavior, it is tempting to suppose that inconspicuous features explain other parts. This is implied in the assertion that a man shows certain behavior because he was "born that way." To object to this is not to argue that behavior is never determined by hereditary factors. Behavior requires a behaving organism which is the product of a genetic process. Gross differences in the behavior of different species show that the genetic constitution, whether observed in the body structure of the individual or inferred from a genetic history, is important. But the doctrine of "being born that way" has little to do with demonstrated facts. It is usually an appeal to ignorance. "Heredity," as the layman uses the term, is a fictional explanation of the behavior attributed to it.

Even when it can be shown that some aspect of behavior is due to season of birth, gross body type, or genetic constitution, the fact is of limited use. It may help us in predicting behavior, but it is of little value in an experimental analysis or in practical control because such a condition cannot be manipulated after the individual has been conceived. The most that can be said is that the knowledge of the genetic factor may enable us to make better use of other causes. If we know that an individual has certain inherent limitations, we may use our techniques of control more intelligently, but we cannot alter the genetic factor.

The practical deficiencies of programs involving causes of this sort may explain some of the vehemence with which they are commonly debated. Many people study human behavior because they want to do something about it—they want to make men happier, more efficient and productive, less aggressive, and so on. To these people, inherited determiners—as epitomized in various "racial types"—appear to be insurmountable barriers, since they leave no course of action but the slow and doubtful program of eugenics. The evidence for genetic traits is therefore closely scrutinized, and any indication

that it is weak or inconsistent is received with enthusiasm. But the practical issue must not be allowed to interfere in determining the extent to which behavioral dispositions are inherited. The matter is not so crucial as is often supposed, for we shall see that there are other types of causes available for those who want quicker results.

#### INNER "CAUSES"

Every science has at some time or other looked for causes of action inside the things it has studied. Sometimes the practice has proved useful, sometimes it has not. There is nothing wrong with an inner explanation as such, but events which are located inside a system are likely to be difficult to observe. For this reason we are encouraged to assign properties to them without justification. Worse still, we can invent causes of this sort without fear of contradiction. The motion of a rolling stone was once attributed to its *vis viva*. The chemical properties of bodies were thought to be derived from the *principles* or *essences* of which they were composed. Combustion was explained by the *phlogiston* inside the combustible object. Wounds healed and bodies grew well because of a *vis medicatrix*. It has been especially tempting to attribute the behavior of a living organism to the behavior of an inner agent, as the following examples may suggest.

Neural causes. The layman uses the nervous system as a ready explanation of behavior. The English language contains hundreds of expressions which imply such a causal relationship. At the end of a long trial we read that the jury shows signs of *brain fag*, that the *nerves* of the accused are *on edge*, that the wife of the accused is on the verge of a *nervous breakdown*, and that his lawyer is generally thought to have lacked the *brains* needed to stand up to the prosecution. Obviously, no direct observations have been made of the nervous systems of any of these people. Their "brains" and "nerves" have been invented on the spur of the moment to lend substance to what might otherwise seem a superficial account of their behavior.

The sciences of neurology and physiology have not divested themselves entirely of a similar practice. Since techniques for observing the electrical and chemical processes in nervous tissue had not yet