

be said that they know physics, that, in other words, they command a theory.) A theory, at least a good one, is thus not merely a kind of data bank in which one can "look up" what would happen under such and such conditions. It is rather more like a map (an analogy Kaplan also makes) of a partially explored territory. Its function is often heuristic, that is, to guide the explorer in further discovery. The way theories make a difference in the world is thus not that they answer questions, but that they guide and stimulate intelligent search. And (again) there is no single "correct" map of a territory. An aerial photograph of an area serves a different heuristic function, say, for a land-use planner, than does a demographic map of the same area. One use of a theory, then, is that it prepares the conceptual categories within which the theoretician and the practitioner will ask his questions and design his experiments.*

Ordinarily, of course, when we speak of putting a theory to work, we mean drawing some consequences from it. And by that, in turn, we mean postulating some set of circumstances that involves some terms of the theory, and then asking what the theory says those particular circumstances imply for others of the theory's terms. We may describe the state of the economy of a specific country to an economist, for example, by giving him a set of the sorts of economic indices his particular economic theory accommodates. He may ask us some questions which, he would say, emerge directly from his theory. Such questions, by the way, might give us more insight into whether he is, say, a Marxist or a Keynesian economist than any answers he might ultimately give us, for they would reveal the structure of his theory, the network of connections between the eco-

* It must not be thought that this heuristic function of theory is manifest only in science. To name but one of the possible examples outside the sciences, Steven Marcus, the American literary critic, used theories of literary criticism freshly honed on the stone of psychoanalytic theory to do an essentially anthropological study of that "foreign, distinct, and exotic" subculture that was the sexual subculture of Victorian England. See his *The Other Victorians* (New York: Basic Books, 1966). More recently he wrote in the preface of his *Engels, Manchester, and the Working Class* (New York: Random House, 1974), "The present work may be regarded as part of a continuing experiment . . . to ascertain how far literary criticism can help us to understand history and society; to see how far the intellectual discipline that begins with the work of close textual analysis can help us understand certain social, historical, or theoretical documents." In neither book was a theory of literary criticism "applied," as, for example, a chemical theory may be applied to the chemical analysis of a compound; instead, Marcus' theories were used heuristically, as travelers use maps to explore a strange territory.

nomical laws in which he believes. Finally, we expect to be told what his theory says, e.g., that the country will do well, or that there will be a depression. More technically speaking, we may say that to put a theory to work means to assign specific values, by no means always numerical, to some of its parameters (that is, to the entities its terms signify), and then to methodically determine what values the theory assigns to other of its parameters. Often, of course, we arrive at the specifications to which we wish to apply a theory by interrogating or measuring some aspect of the real world. The input, so to speak, to a political theory may, for example, have been derived from public-opinion polls. At other times our specifications may be entirely hypothetical, as, for example, when we ask of physics what effect a long journey near the speed of light would have on the timekeeping property of a clock. In any case, we identify certain terms of the theory with what we understand them to denote, associate specifications with them, and, in effect, ask the theory to figure out the consequences.

Of course, a theory cannot "figure out" anything. It is, after all, merely a text. But we can very often build a model on the basis of a theory. And there are models which can, in an entirely nontrivial sense, figure things out. Here I am not referring to static scale models, like those made by architects to show clients what their finished buildings will look like. Nor do I mean even the scale models of wings that aerodynamicists subject to tests in wind tunnels; these are again static. However, the system consisting of both such a wing and the wind tunnel in which it is flown is a model of the kind I have in mind. Its crucial property is that it is itself capable of behaving in a way similar to the behaving system it represents, that is, a real airfoil moving in a real air mass. The behavior of the wing in the wind tunnel is presumably determined by the same aerodynamic laws as govern the behavior of the wings of real airplanes in flight. The aerodynamicist therefore hopes to learn something about a full-scale wing by studying its reduced-scale model.

The connection between a model and a theory is that a model *satisfies* a theory; that is, a model obeys those laws of behavior that a corresponding theory explicitly states or which may be derived from it. We may say, given a theory of a system *B*, that *A* is a