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THE REALIZING CHARACTER OF THE SOCIAL SCIENCES

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Because of successful construction of theories in the mathematical, physical, and biological sciences, and because of their unchallenged technological usefulness, the philosophy of science has concentrated on the formal and epistemological aspects of sciences. However, the less formal social sciences have had a greater impact on society. This realizing character of the sciences, i.e., their influence on society through policy (in the case of the social sciences), has been inadequately studied. In this paper the normative character of the social sciences is seen from the perspective of realization. Norms as internal and external criteria, which are entailed by realization, are introduced and discussed, and the problem of how norms can be imposed on theories is shown by a formal model. This leads to a discussion of how the norms derived from the realizing aspect of a science can be applied, for example, in welfare economics and policy, the ethical foundations of social sciences (jurisprudence), and theories of justice. Finally, it is shown how these norms can serve as guidelines for a theory of the historical development of sciences.

† † †

REALIZATION DEFINED AND EXEMPLIFIED

From Aristotle through twentieth-century neopositivism, the philosophy of science has been chiefly concerned with the epistemological aspect of sciences; theories have been judged by their ability to describe, explain, and predict. The culmination of this emphasis on epistemology is two-fold: (1) sciences have been expected to be value-free, and (2) the philosophy of science has become metatheoretical, concerned mostly with semantics and syntax. Using metatheoretical analysis, philosophers have been able to study two aspects of theories: (1) the formal aspect, which is pure syntax, and which is exemplified by mathematics and logic, and (2) the cognitive aspect, which incorporates semantics or interpretations and is exemplified by the empirical sciences.

However, there are aspects of the sciences other than just these two. In order to consider additional aspects, I will use the notion of *epitheoretical* analysis introduced by Leinfellner (1974). The *epitheoretical* mode of inquiry includes not only the metatheoretical but also the normative, deontic, modal, ideological, and paradigmatic aspects of sciences. Thus, epi-

theoretical analysis is all-encompassing and allows us to re-introduce ethics into the philosophy of science. Under the heading of *epitheory* we can include, along with the formal and cognitive aspects of theories, the realizing aspect.

Realizing theories are those which have an impact on the real or physical world outside the science itself, and they thus include sciences like organic chemistry (which is used in the production of plastics) and geology (which is used in the exploration for petroleum), but especially the realizing theories include the social sciences. In the natural sciences, realization is secondary to the purposes of prediction and explanation; but realization is the *primary* aspect of social theories, which are developed as much for modifying society as for predicting and explaining social behavior. As John Maynard Keynes pointed out, in an often quoted passage,

. . . the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist (1964).

Furnishing examples of realization in the social sciences is, of course, not difficult. The social theory of Karl Marx is a major influence in the lives of nearly half the people of the world. And the macroeconomic theory of Keynes has made billions of dollars worth of difference in the United States alone since the tax cut of 1963–64, which was argued for on Keynesian principles. No one would dispute that both Marx and Keynes had in mind the alteration of the society which they were studying, but other theories which have also influenced society may have done so inadvertently.

For an example of the unforeseen effects of social theories, I draw upon the book by Karl Polanyi, *The Great Transformation* (1957). Polanyi shows that it is possible to view the

capitalist economic system as an experiment based on the social theories of John Locke and Adam Smith and their followers. When Smith wrote his *Wealth of Nations* in 1776, the British economy was just beginning to emerge from its feudal structure, but no one knew what changes to expect from the development of steam and textile technologies. The writings of Smith provided a theoretical framework in which to view the newly emerging socio-economic structure, and provided guidelines for policy makers. Since any government is always in a position where it must decide whether to act or not to act, in this case it eventually chose to follow the Smithian dictum of *laissez-faire*. Smith's economic theory told policy makers not to intervene in the economy, except insofar as it was necessary to extricate the government from economic activity. Another social scientist, William Townsend, aided this liberal take-over by declaring in 1786 that people could be looked upon as beasts subject to a natural law inasmuch as hunger could be used as a motivation for labor (Polanyi, 1957).

The seriousness of the unforeseen realization of Smithian economics was demonstrated by the consequences of the Industrial Revolution. At first there were still the Poor Laws which kept displaced people from starvation, but which violated Townsend's law and prevented mobilization of the labor force of Britain. After arguments against the Poor Laws by Malthus, Ricardo, Bentham, and Burke, they were eventually repealed in 1834. At that point *laissez-faire* capitalism became the social framework, and human labor became a commodity in the market economy. Polanyi goes on to show that the society subject to its economy deteriorates toward warfare and fascism.

NORMATIVE CRITERIA BASED ON REALIZATION

Since the most familiar aspect of the sciences is their contribution to knowledge and understanding, we can also say that a major contribution of the sciences is the reduction of uncertainty and risk. In the social fields reduction of uncertainty means not only increasing knowledge and understanding by developing scientific theories, but also involves applying policies in the social realm in order to reduce the practical uncertainties of everyday life. These policies in turn imply acts, properly human or moral acts because of their impact on other people and upon society.

From the three aspects of scientific theories—the formal, the cognitive, and the realizing—we are able to derive various sorts of criteria and to impose these on the sciences. The formal aspect of theories entails such norms as internal consistency, completeness, and problem formation and solution. The cognitive aspect imposes further criteria such as compatibility with other current theories, accurate prediction, plausible explanation, simplicity, and so on. These formal and cognitive criteria will be called *internal criteria* (Leinfellner, 1974). Some of these, particularly consistency and complete-

ness, are judged by explicit formal rules developed by philosophers like Aristotle and his successors; other criteria have not been so rigorously defined.

The aspect of realization also imposes norms on theories, and therefore upon the scientists who do the theorizing. Such norms are at least as binding as the internal criteria, but are even more binding because they derive from the imposition of the theory and the theorizing on people and society. All internal criteria are entailed by realization because the impact of a theory upon society requires it to be a good theory in the formal and cognitive senses. All further criteria imposed upon theories and scientists because of the realizing character of the science will be called *external criteria*. A few examples of such external criteria are:

1. *The care of experimental animals and plants.* In this paper the concern would mostly be with humans as experimental subjects. Occasionally scientists remind each other to minimize the pain or damage they inflict on experimental subjects and to minimize invasions of privacy.

2. *The use of statistics and field work.* More properly this is an internal criterion because it involves the truth value of theoretical statements. However, it is included here because falsifying experimentation or experimental results in the social sciences has special consequences due to the impact of the social theory and because field work and statistics can affect the field studied (for example, statistical surveys can influence people's opinions). Within democratic societies there seem to be built-in safeguards against violating this criterion, although they function imperfectly.

3. *Engagement in prophecy.* This topic is included because social scientific prognostications seem to be wrong as often as they are right. This aspect of the natural sciences is called prediction and is also an internal criterion. But when employed by social scientists, prediction often has an escalating effect and sometimes results in a self-fulfilling prophecy. The realizing character of social theories thus requires care in the use of prophecy.

4. *The use of publication.* In some countries (e.g., Iran, during the reign of the Shah) access to publication is permitted only after the scientist has submitted his work to a government-appointed committee for approval. In the democracies (e.g., North America and Western Europe), it is more usual for each publishing company to have a committee for permitting or denying publication; often this committee is selected by a group of scientists. No matter what the regime, the potential impact of a social-scientific work imposes special norms on those who would use publications and on those who would control access to them.

5. *Funding research and development.* The aspect of realization also provides important standards for judging

whether certain research or development projects should be funded. Our present society is being very pressed over such questions as research into recombinant-DNA and the development of nuclear energy. The formal and cognitive aspects of theories tell us all too little about the value of theories which provoke such questions; however, the realizing aspect permits the philosophy of science to consider these questions in a systematic way and to employ the principles of ethics which have been developed over the centuries.

6. *Prescription.* Consider such statements as "a dollar received today is more valuable than a dollar received tomorrow" or "the single goal for the firm is the maximization of profit." Such innocuous-looking assumptions, which have been introduced into economic theories in order to simplify the real world enough to theorize about it, often become prescriptive outside the theory. A similar case was brought up earlier—the imposition of *laissez-faire* on British and other societies. Although positivistic philosophers would look upon these statements as conditional statements, practical people, who have few alternatives to turn to, are tempted to see such statements as answers to practical problems. This realizing aspect of social theories imposes a special standard on social scientists.

IMPLICATIONS FOR METHODOLOGY

The aspect of realization also compels us to question the methodology that has been traditional in social-scientific theorizing. During the past couple of centuries there has been a gradual increase in the number of social disciplines: economics, sociology, political science, anthropology, psychology, geography, and the like. These disciplines have in turn subdivided simultaneously with the increase in the number of scientists and the amount and depth of research. But the problems of the world, which the social sciences purport to address, are not so neatly divided. While one group of scientists is studying urban crime, another is studying unemployment, a third group is studying warfare, and another is studying the increase in mental illness. The subdivision of the academic disciplines almost precludes the possibility of viewing social relationships in their entirety and of seeing the interconnections among social problems.

Realization compels social scientists to approach problems in such a way that solving one problem won't aggravate another. That is, the social scientist must look upon his field (say, sociology or economics) as part of the world-wide social system. This is a rationale for the introduction of systems theory into the social sciences as an alternative to the mechanistic atomism which has dominated social thinking since John Locke learned it from Newton, Descartes, and Lucretius.

Atomism is the notion that the objects of a science can be broken down into smaller and smaller entities called 'atoms' so that these atoms can be studied independently and conclu-

sions can then be drawn which apply to the object of the science. A typical illustration of atomism is the principle that the pressure exerted by a volume of gas is due to the aggregate motion of the gas molecules. In this case atomism works, but an example of where it will not work is the attempt to derive the properties of water from the properties of hydrogen and oxygen.

Atomism has involved not only the decomposition of the objects of sciences, but has also led to the greater and greater subdivision of scientific disciplines, which I have just mentioned. Finally, atomism employs as one of its tools the infinitesimal calculus, developed by Newton for studying the motion of projectiles. But the calculus relies on smooth curves or continuous functions which are seldom found in the social world.

Holism, on the other hand, begins with a concept of a system which consists of interrelated components, which are themselves systems, and which also relate to elements of the environment, which is everything outside the system that has influence on the system. Holism and systems theory allow and compel scientists to see problems in their entirety, and this in turn should permit more successful theorizing and more fruitful problem solving.

CONCLUSION

The principles of systems theory in turn give two reasons for searching for and using the best methodology and for satisfying the external criteria entailed by the realizing character of the social sciences. (1) Realizing theories affect society as a whole as well as the individual people who are the elements of society. (2) Realization also affects the environment of a society because any open system reacts with its environment (Ackoff, 1974). Hence, when we come to apply external criteria to the social sciences, we must base these norms on the simultaneous socio-ecological impact of the social science.

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