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## Some Comments on the Social Aspects of Science

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## Some Comments on the Social Aspects of Science

The preliminary report of the Interim Committee on the Social Aspects of Science of the American Association for the Advancement of Science concludes "that there is an impending crisis in the relationships between science and American society" (AAAS, 1957). This crisis has resulted from conflicts in the relationship between science and society. On the one hand, there is a conflict between the achievements of science and established social institutions. On the other hand, there is a conflict between the attitudes, habits, and institutions of our society and science as a potential means of improving the conditions of human life. The first type of conflict constitutes a problem of cultural lag or slowness in adapting our social institutions to changes in our material culture. The second type of conflict constitutes a problem of lack of adequate development of science due to lethargy and opposition to science in our society, factors which prevent science from being applied in the solution of our problems.

The first type of conflict pertains to the relationship between the natural sciences and society, while the second type of conflict pertains to the relationship between all sciences and society but especially to the relationship between the social sciences and society. A solution to the problems arising from the first type of conflict depends upon a more adequate development of science and elimination of inertia and opposition to science in our society, which prevent science from being utilized for the betterment of human life. This proposition is supported by the following statement in the report of the Interim Committee: "At a time when decisive economic, political, and social processes have become profoundly dependent on science,

the discipline has failed to attain its appropriate place in the management of public affairs". Since the management or control of public affairs is singularly within the domain of the social sciences, the most serious omissions of scientific attainment appear to be in the fields of the social sciences.

The factual information contained in the report of the Interim Committee on the Social Aspects of Science supports the thesis that inertia and opposition to science in our society are more noticeable in the relations between social sciences and society than in the relations between natural sciences and society. It is pointed out in the report that society has become more dependent on science than ever before and that scientific activity is the second most rapidly expanding sector of our social structure, military activities being first. In the 23 year period between 1930 and 1953, expenditures for scientific research increased fifteen-fold. However, in another part of the report the Committee points out that financial support of science "is heavily slanted toward physical sciences" as compared with the biological sciences and social sciences. In 1954, the physical sciences received 87 percent of the total financial support of research by the Federal Government, while the biological sciences received 11 percent and the social sciences 2 percent of this support. The Committee believes that "industrial research is at least as heavily weighted in this direction." Colleges and universities which are the site of much of our basic research activities are dependent on federal funds for the greater portion of their research support (60 to 70 percent in 1954). Therefore, it appears that also in the colleges and universities the major portion of expenditures on research is upon research in the physical sciences. The Committee finds that growth of science "has been based less on internal needs of science than on the interest of external agencies in possible practical results." These external agencies are principally the industrial and military agencies.

The Committee believes that the disproportionate growth of the physical sciences as compared with the biological and social sciences is the source of some of our major social problems. The problems mentioned are dangers of radiation, dangers of synthetic food additives, the waste of natural resources, and the dangers from weapons made possible through scientific knowledge. The concentration of

economic power in the hands of a few producers as economies of large-scale productive plants are made possible through technological development and the displacement of workers resulting from the substitution of machines for human labor in production are also social problems which might have been mentioned. The impact of the changes being wrought by the physical sciences on human life are so great as to cause the eminent philosopher, Bertrand Russell, to remark: "Whether men will be able to survive the changes of environment that their own skill has brought about is an open question . . . If the answer is to be in the affirmative, men will have to apply scientific ways of thinking to themselves and their institutions" (Russell 1955: 7).

If one accepts the view expressed in this Committee Report that society, itself, to a considerable degree, governs the speed and direction of the development of a science, why has not society given adequate support to the development of the social sciences? The comments here are directed principally to the relations between the science of economics and society. Economics may be defined as the study of the principles governing the allocation of scarce goods or resources among many competing ends or uses. It is concerned with principles of social relationship and organization rather than with the relationship between the individual and his natural environment. The failure of society to utilize economic science in the solution of social problems may be due to two types of causes. On the one hand, there are factors that account for the limitations and inadequacies of economic science as a means of improving society. On the other hand, there are factors that explain the failure of society to recognize that economic science is an important means of improving the conditions of human life.

Among the factors explaining the limitations of economic science, are the inherent difficulty of treating human relations scientifically, the failure of economists to make adequate use of scientific methods, and the difficulty of obtaining adequate data to study social problems scientifically. Among the factors explaining society's failure to recognize the importance of economic science are a traditional disregard in the United States for abstract thinking, the inherent conservatism of people generally towards change in social institutions and habits, the opposition to change in economic institutions by people

who have special and vested interests that might be affected adversely by the application of economic science to social problems, the political philosophy and the political institutions of nationalism, the threat of global warfare, and last, but not least, the economic illiteracy of people concerning economic science and economic facts of life.

There is no intention here to discuss the bearing of each of these factors upon the relationship between the science of economics and society but only the two factors of the failure of economists to make adequate use of scientific methods and the rather general economic illiteracy of people with respect to economic science. As social scientists and educators, we are in a position to influence these two factors. One of the methods most relied upon in economic science by economists is the principle of inference—that like things behave in the same way under identical conditions or that similar things behave in a similar way under identical conditions. Because of the uniformities of physical phenomena, laws of physics have been developed that enable the physical scientist to make predictions with a high degree of accuracy through the principle of inference. However, early attempts to apply this method to the social sciences resulted in a body of theory under the classical and neo-classical economists that proved later to be of limited validity in explaining the real economic world of the twentieth century. Nevertheless, the theoretical model of the neo-classical school of economics was the basis of much of our public policy towards the economy until the period of the 1930's.

The theoretical model of the neo-classical school of economics was based on assumptions of active and effective competition among sellers on one side of the market and among buyers on the other side of the market, a high degree of uniformity of the products of an industry supplied in the market, buyers and sellers acting in their self-interest, and a high degree of mobility of resources from one industry to another (Haney 1949: 650, 865, 918). Theories of price and employment equilibrium were based on these assumptions. Under these conditions, resources would be allocated among different industries and occupations in such a way that profits and wages in all industries would tend to equality, allowance being made for some immobility of resources (Boulding 1956: 134). This allocation of resources would yield the greatest utilities to the society relative

to the expenditure of resources. Under this theory, market values of goods would tend to move toward normal values which represented an equilibrium market condition. Also, unemployment of capital and labor resources was a temporary condition and represented a departure from equilibrium that soon would be corrected by appropriate adjustments of prices and wages. A decrease in wage rates would correct a condition of unemployment of labor and a decrease in interest rates would correct a condition of unemployment of savings or capital funds.

But in the 1930s, it became clear that unemployment of labor and capital resources was a condition of stable equilibrium rather than temporary disequilibrium. In a book published in 1936, J. M. Keynes developed a new theory of employment based upon a more realistic model of economic society (Keynes 1935). This model allowed for the effects of social relations and social institutions upon the motives and conduct of businessmen and consumers that had not been considered in the neo-classical model. According to the Keynesian theory, an adjustment of investment to savings would not occur automatically through a decrease in interest rates and wage rates and the economy could show an equilibrium condition at less than full employment of labor and capital resources (Hansen 1947: 142). The general acceptance by economists of the Keynesian theory of employment has been called the "Keynesian Revolution" (Boulding 1956: 137). This revolution in economic theory has markedly affected public policy toward the economy. It is now recognized in our public policy that it is a responsibility of the national government to intervene in the operation of the economic system to control fluctuations in the total level of spending, income, and employment. Other developments in economic theory represent departures from the neo-classical model and afford a more sound basis for public policy. One may point to the theory of imperfect competition, developed in the 1930's, that the major part of economic activity is carried on under neither conditions of perfect competition nor complete monopoly but under an intermediate form of market behavior and to the theories developed by welfare economists beyond the welfare theories of the neo-classical school based upon the inadequacies of a market system in achieving maximum social welfare.

These illustrations of the breakdown of some of the neo-classical economic theories and the displacement of these theories with more adequate theories do not constitute an argument for abandoning the principle of inference in the social sciences. However, they indicate the need for much greater research, caution, and care in the use of scientific method than economists have been prone to apply in the past. Greater care in the formulation of theories in the social sciences could be achieved by making use of knowledge that is available in each of the special social science fields. If social scientists were trained in all of the social science disciplines—economics, political science, sociology, social psychology, and history—and made use of knowledge in all of these disciplines, they should be able to develop theories that are closer to the truth.

The historical method is one which I believe might be advantageously used by economists in prediction. Some writers maintain that the historical method represents an art rather than a scientific method. It differs in that it does not seek laws but the kind of knowledge that explains a particular situation. It is based on the belief that human life at a particular time and place is unique rather than that human life is uniform at all times and places. The social scientist, by gaining experience and insight in studying and interpreting the past, is able to interpret better the present and to predict the future. As a supplement to the method of theorizing, the historical method should enable the social scientist to find more satisfactory solutions of many of our complex social problems.

Public complacency and opposition with respect to economic science reflect a general lack of understanding of economic science and of knowledge of facts concerning our economy. The importance of governmental decision-making in the solution of complex present-day economic problems creates a need for economic understanding if a democratic government is to function effectively. For most people, the only opportunity for disciplined training in economic thinking is in the schools. The principal contribution to economic understanding must be made by the secondary schools, since only about one out of five students who enter high school go to college. However, the evidence indicates that the high schools are not adequately providing for general education needs in economics

(Lewis 1956: 657). Evidence shows that teachers of social studies in high schools are inadequately trained to teach economics courses or courses requiring explanation of economic forces (Miller 1957: 40). On the brighter side, there is evidence of a growing trend in the secondary schools of offering more economics courses (Lewis 1956: 657). The removal of economic illiteracy is a responsibility and challenge to the secondary-school agencies and to institutions of higher education that train teachers of social science for the secondary schools, to the public, itself, which supports these agencies, and to educators who make recommendations concerning these agencies.

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