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Research in the Social Sciences

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AMONG NATURAL SCIENTISTS there has been much discussion, both privately and in print, of the proposals for a National Science Foundation. Among social scientists there seems to have been too little such discussion. Certainly very little has appeared in print where social scientists generally could consider it. This paper is an attempt to raise for consideration some pertinent questions.

It seems appropriate first of all to try to get a broad general view of the similarities and differences between research in the natural sciences and research in the social sciences. Second, we may look more closely at some special characteristics of social science research and consider the extent and forms of present Federal support and of other support of such research. Finally, I shall venture a few tentative opinions that seem to me warranted.

The Social vs. the Natural Sciences

Let us set down in parallel columns the names of some of the social and natural sciences as an aid to reflection on comparisons:

Social	*Natural*
Economics	Biology
Political Science	Chemistry
Sociology	Physics
History	Taxonomy
Business Administration	Astronomy
Journalism	Geology
Psychology	Geography

At the head of each list appear, in alphabetical order, the three sciences which represent the three major divisions of their area of science. The appearance of taxonomy next in the natural science list may cause some raised eyebrows. It is there mainly for parallelism to emphasize a suggestion that history is largely the taxonomy of the social sciences. In history, the collection and ordering of social science facts has a more independent and unified existence as a branch within its own division of science than collection and ordering of facts has in the natural sciences. If one thinks, however, of taxonomy as primarily a branch of biology, its closest counterpart in the social sciences is statistics, meaning by statistics, census and other similar numerical data.

Statistics is omitted from both lists (which are frankly incomplete) partly because of the ambiguity of the term. In one sense statistics is a sort of taxonomy; in another sense, it is a branch of mathematics. The omission of mathematics also from the lists will not be taken as a slight, I hope, by any of my good mathematical friends. If mathematics is a science, as some have questioned, I am not sure whether it is social or natural.

Some may question whether there exists a science of business administration or of journalism. I shall insist only that their inclusion in the list will prove useful for my purposes.

Psychology and geography appear properly at the bottoms of the lists, as mavericks. At Stanford we class psychology as a social science, but the National Academy of Sciences says that it is a real science. Geography started out as a physical science but developed social tendencies, and at Stanford it has become one of the humanities.

The Bases of Science

It is useful to compare the natural and the social sciences with regard to their bases, and a diagram may be helpful (Fig. 1).

Science rests on description and analysis, and analysis rests in turn on observations in nature and on experiments. This generalization applies equally to natural science and to social science. If a diagram such as Fig. 1 were to be made quantitative, social science would perhaps deserve to be shown as resting more largely on description and less on analysis than natural science; and analysis in social science would have to be shown as resting more on observation in nature and less on experiment than in natural science.

From a paper presented before the Research Club of Stanford University, 6 March 1946.

Some unsympathetic observers of the social sciences might be inclined to depict part of economic analysis as hanging without visible support. But it must be obvious that any attempt to draw the diagram to scale would necessarily lead to a different diagram

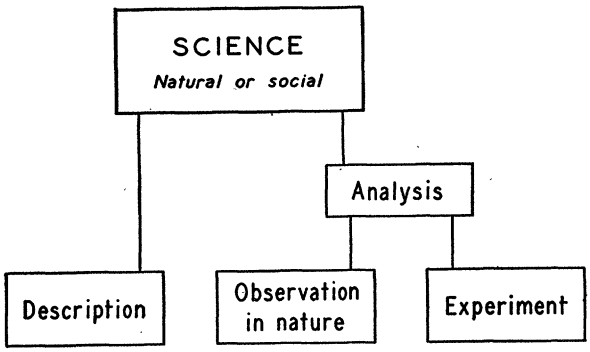

FIG. 1

for each science and even to quite different diagrams for different branches of any one science.

A further significant aspect of the bases of science is the nature of scientific analysis. The classical concept of the analytical process may be represented as in the upper part of Fig. 2.

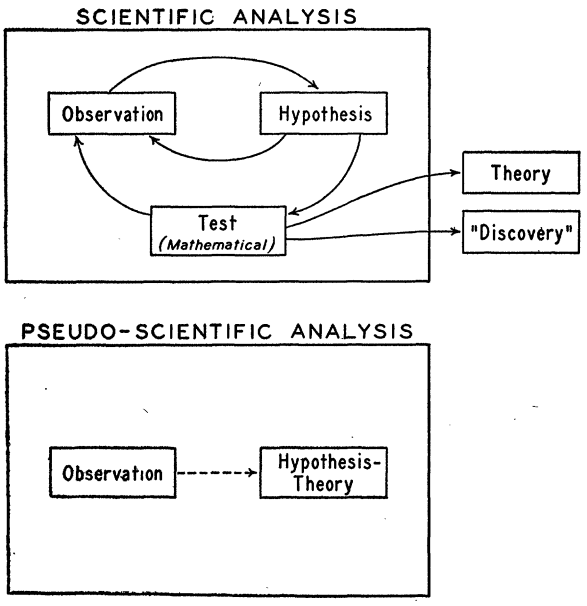

FIG. 2

Science proceeds in general from observations to an hypothesis and from an hypothesis to its test. The test of an hypothesis involves precise reasoning, which is mathematical in spirit and which may require elaborate formal mathematics. The first result of an hypothesis, however, may be a return to further observation, seeking additional data required for the indicated test. If the test fails, we return to consideration of the observational data and thence to a new hypothesis. If the test substantiates the hypothesis, there results a theory, or a conclusion which may be classed under some less pretentious name—I have said "discovery." In the diagram, boxes are provided outside the area representing scientific analysis to accommodate these results of successful tests, but these boxes are merely repositories for duplicate records of scientific results. There is no break in the circle of the analytical process: the results of a successful test flow back to augment the fund of observational data. The circle of the scientific process might indeed be represented better in three dimensions as an upward spiral.

The lower diagram in Fig. 2 attempts to represent the pseudoscientific process in which hypotheses are framed on a weak basis of observation and then treated uncritically as theories. The weakness of the observational basis may be inevitable, as in the early stages of any science; it may result from ignorance of the worker framing the hypothesis or from his inability to handle known facts effectively; or it may rest on more or less deliberate selection of facts that promise to support a desired hypothesis. When the choice of facts has been honest and reasonably thorough, the feature of the pseudoscientific process most deserving of criticism is its failure to distinguish between hypothesis and theory.

In economics, to cite one example from the social sciences, there has been, and still is, far too much of pseudoscience. The contrast drawn between science and pseudoscience must be recognized as a representation in black and white of a scene that in fact has many grays of varying shades. This variation is perhaps most conspicuous in the social sciences. One may find in economics examples of conclusions accepted as economic laws that are in fact only hypotheses founded on casual observation, known to be incomplete; one may find there conclusions founded on the most painstaking and rigorous search for facts and testing of hypotheses; and one may find conclusions of all degrees between.

Having spoken so frankly of the weaknesses of my own social science, perhaps it is permissible to say that I have thought I observed a tinge of gray in some writings in the natural sciences. I wonder if any science has been able to maintain a strict standard for distinction between hypothesis and theory.

If you are willing to entertain the idea that there may not be an entirely objective basis for distinction between hypothesis and theory, expression of a few thoughts on reasons for varying standards of acceptance for theories may be permitted. One may readily admit it as natural, if perhaps not fully justifiable,

that standards for promotion from hypothesis to theory should be relatively lax in a new science, in a science where experiment is impossible, or in a science where needed additional data, whether from observation in nature or from experiment, may be extraordinarily difficult to come by. If so, then it is at least natural that the social sciences in general should be prone sometimes to accept as theory what, by standards of the more rigorous natural sciences, should be regarded as only hypothesis. Among the natural sciences themselves, one might expect to find some tendency toward differences in standards, as between astronomy or geology, which find experimentation difficult or impossible, and physics or chemistry, where it is relatively easy.

Sciences vary also with respect to the pressure under which they stand to produce conclusions applicable to practical problems. Astronomy has felt little of such pressure, since not many people feel compelled to reach conclusions involving the stars. Geology and meteorology, scarcely more accessible to the experimental method than astronomy, have been subject to more pressure from people who want answers to practical problems; and so they have been somewhat inclined, I suppose, to accept propositions as adequately proven on evidence such as in astronomy might be considered to warrant serious consideration only as a major hypothesis. In medicine, if it may be counted a science, and in the social sciences, the pressure for conclusions is especially strong.

In short, much of what we count as knowledge at any time is not certainly true, but only probably true. The level of probability required before we say, "This *is* so," rather than "This *may be* so," varies widely with circumstances. It is natural and proper that the social sciences, hampered by difficulty of obtaining adequate data, usually unable to make controlled experiments, and pressed to reach conclusions on vital social problems, should change "may be" to "is" on less conclusive evidence than is required as a rule in the natural sciences. To say this, however, is not to excuse the gross laxity of standards of proof which may sometimes be found in the social sciences nor to gloss over the fact that in large areas still the social sciences are scarcely to be called scientific in a strict sense.

Experimentation in Social Science

It is often said that the social sciences, excepting psychology, cannot be experimental. This is not true. The fact is rather that experiments in economics and political science are quite possible, but must often be on a grand scale and usually not well controlled.

We have been reading in the newspapers of an experiment in the natural sciences on a staggering scale. Two billion dollars were spent on making a few atomic bombs. The book value of the ships which authorities were willing to have destroyed at Bikini was $400,000,000.

That experiment may be compared with one in economics in which the theories—or, more strictly, the hypotheses—of Karl Marx are being tested. The whole of one of the three most powerful of modern nations has been the subject of that experiment during a human generation, and the end is not yet.

Look at another example. Some 20 years ago the distinguished British economist, J. M. Keynes, advanced some hypotheses with regard to the effects of saving and spending on the national economy. A decade later the entire United States was the field of an experiment testing those hypotheses.

Lest an impression be left that all social experiments must be on a vast scale, some other examples should be added. The little city of Palo Alto has been a testing ground for many years, and rather painlessly, for the hypothesis that certain public utilities should be publicly operated. When an industrial establishment adopts a policy of submitting some questions of management to a labor-management committee, it is conducting a social experiment. Even the institution of a system of incentive pay for workers in a plant may be regarded as a social experiment.

At this point I can imagine an objection rising in the minds of some that many such examples as have been cited do not constitute true scientific experiments for lack of suitable controls. To such an objection two responses may be made: (1) that the good scientist scorns no pertinent experimental data if he has none better; and (2) that one of the grave needs of the social sciences is, in fact, to have social experiments so conducted as to afford more information than they usually do.

Social experiments require the cooperation of many people. If the Nation is involved, popular approval, or at least assent, must be obtained; a congressional committee, Congress itself, and the President must be persuaded; and sympathetic and competent administration must be provided. Even in a small social experiment within an industrial establishment, similar elements are involved in arranging and conducting the experiment. Through these circumstances, if no others, business administration and journalism play a large part in social science.

The nature of social experimentation makes it difficult in the social sciences to maintain a distinction between pure and applied science. In physics, devotion to pure science is refusal to be led into problems almost certainly of ephemeral interest, for the sake of concentrating on work that may indeed prove of no use at all but that may make a permanent contri-

bution to science. In economics, devotion to pure science is refusal to participate in the design and conduct of scientific experiments, and it is likely to mean also insulation from many facts pertinent to interpretation of the data of the science. The academic economist who, by choice or compulsion, keeps aloof from practical affairs, is likely to assure that he be also academic in the derogatory sense.

Whatever the choice of economists in the colleges and universities, the science of economics cannot keep aloof from current problems. Staffs of economists are employed by the major government departments concerned with economic questions—in the Federal Government, by Agriculture, Commerce, Interior, Labor, and State—and by numerous permanent and temporary agencies, such as the Commodity Exchange Administration, the Federal Reserve System, the Interstate Commerce Commission, the Tariff Commission, the Board of Economic Warfare, the War Production Board, and numerous others. Economists are employed by banks, brokerage houses, manufacturing establishments, great retail stores, and trade associations. Among the economists so employed are some of the highest standing in the profession. Some are working with great freedom on economic problems of the first importance. They work with facilities superior in important respects to those generally available to the academic economist and in close touch with the pertinent facts of their science. Many, of course, are mere interpreters of economic knowledge in relation to specific problems of application, but among them are some of the chief architects and builders of the science of economics as it stands today and, perhaps even more, as it will stand tomorrow. To them, economics owes much of its progress in the last 50 years.

Economics may stand somewhat apart from political science and sociology in the degree to which its advance has come to depend on workers in government service and in private employment instead of on those in universities and other institutions of learning, but it is not, I believe, in a fundamentally different position. Speaking of government support of research in the basic social sciences, we must recognize that government, and especially the Federal Government, is already supporting such research on a grand scale. The question is not whether government should support research in the social sciences or even whether it should increase its support of the social sciences. It will do that also. The question may better be put: Should government channel much of its support of research in the social sciences through the colleges and universities and other independent institutions, decentralizing it and increasing its freedom from restraints of special interests and from political pressures?

Because research in the social sciences so often has a clear or apparent direct bearing on the interests of groups of people that are influential either because of their numbers or their position, social science is more subject than natural science to restrictions on freedom of research. Such restrictions occur, indeed, in the natural sciences. I have heard the head of a Department of Dairy Industry in a great university report privately results of research on comparative nutritive values of butter and margarine which he felt it inexpedient to publish. Medical and biological research has to fight a recurring battle with professed lovers of animals who object to their use in experimentation. But restraints on freedom of research and publication in the social sciences are much greater, and with them goes much pressure to support favored views.

These restraints and pressures are probably nowhere to be escaped, but they differ in different types of institutions and in different regions. Governmental agencies are subject to one set of restraints and pressures, which may change to some extent with the situation in party politics. Business-supported research is often subject to more obvious warping in direction and in conclusions. In state-supported educational institutions the situation is much as it is in government, though with large variations from state to state. Even the large endowed universities and independent research organizations are not without their pressures and restraints. In this situation, safety for social science research seems to lie in its diffusion, along with all possible efforts to maintain freedom and adherence to sound scientific and scholarly standards.

The Data of Social Science

A great part of the work of collecting the data of social science is now in government hands and largely in the hands of the Federal Government. It must be, because of the magnitude of the task. One thinks immediately of the Bureau of the Census as the most important collector of statistical data. A convenient, quick view of much of the quantitative data of the social sciences may be had by a glance at one of the annual volumes of the *Statistical abstract of the United States,* which asserts appropriately that it "presents in one convenient volume important summary statistics on the industrial, social, political, and economic organization of the United States, and includes a representative selection from most important statistical publications." It is a handy little volume of 1,000 closely printed pages. Included is a list of statistical tables according to sources, in which credit for data is given to 66 Federal Government agencies

in addition to the Bureau of the Census. Next in the list are one state agency, and 37 nongovernmental agencies, from the American Bankers Association to the Western Union Telegraph Company. Of the 37, all are commercial organizations except two: the American Medical Association and the National Bureau of Economic Research. Though the nongovernmental agencies listed comprise over one-third of the total number, they provide only a small fraction of the total mass of data.

While the Federal Government is now supporting and administering, apart from the collection of data, a substantial portion of social science research in the United States, it is the mainstay of such research in the provision of basic statistical information for the social sciences.

There is perhaps no good reason why the more or less routine collection of statistical data which may reasonably be supported from Federal funds should be administered by other agencies, and there are good reasons for centralizing responsibility for such collection. It is important, however, that the Federal agencies collecting data should be responsive to the needs and wishes of independent research workers and groups of workers, readily giving consideration to proposed changes in practice.

Some of the governmental collection agencies have provided for advisory committees through which nongovernmental social scientists are represented and given a voice in the planning of data collection. Another avenue through which nongovernmental interests may gain a hearing is the important and very useful Division of Statistical Standards of the Bureau of the Budget, which exercises general supervision over collection of statistical data by all branches of the Federal Government, is very capably staffed, and takes a broad view of the functions of Federal agencies in collection of statistics. It might not be inappropriate, however, to have more specific and formal recognition than now exists of the function of governmental data collection as a service for social scientists generally.

If routine collection of data should be largely in government hands, it does not necessarily follow that collection of data for special research purposes should likewise be so concentrated. A new governmental activity is hard to get started. One reason that it should be so is that it may also be hard to stop. Research needs to be flexible. It needs to be implemented by a large measure of freedom for men with ideas to act, without too much interference from minor administrative officials, whose sense of importance may exceed their capacity for wise supervision of scientific research. Research does not fit comfortably into the pattern of governmental administrative routine.

Collection of statistical data for special research purposes is a continually recurring need of the social sciences, corresponding in many respects to the need for performing experiments in the natural sciences. Facilities for such collection of special data should be available to workers in the social sciences, so far as possible, with only such restrictions as have been found appropriate on the use of facilities for experimentation in the natural sciences. A chemist in a university would labor under a handicap if he had to arrange that any large experiment from which he needed data be conducted in a government laboratory in Washington.

Association Affairs

Call for Papers

113th Meeting, Boston, 26-31 December 1946

Persons desiring to present papers at the Boston Meeting of the AAAS and its affiliated societies are requested to notify at an early date the secretaries of the sections and societies before which they wish to report their work. The secretaries will be aided in their acceptance of papers if each speaker will enclose with the notice an abstract describing the purpose of the investigation, the nature of the results obtained, and the relations of the results to earlier investigations. It is not necessary that those presenting papers be members of the Association.

Copy for the *General Program* of the meeting is due in the Washington office of the Association by 21 October; titles of papers should be submitted without delay to the secretaries in order that those accepted may be included in the printed program.