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Science and Man's Dilemma

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THE PHYSICAL LAWS used in the production of the atomic bomb were not new to the physicists; but it took the destruction of two Japanese cities to reveal to the mass of humanity the fact that man today, as never before, has the power to destroy himself completely. Humanity is now haunted by an uneasy fear that an unconquerable monster has been released. But uneasiness and alarm possessed the student of human welfare before Hiroshima was destroyed. Lewis Mumford, months prior to that date wrote:

> Modern man is the victim of the very instruments he values most. Every gain in power, every mastery of the natural forces, every scientific addition to knowledge, has proved potentially dangerous because it has not been accompanied by equal gains in self-understanding and self-discipline. We have sought to attain perfection by eliminating this human element. The disproportionate development of the sciences themselves only hasten the benign end (*The condition of man*, p. 393).

This quotation crystallizes two most disturbing questions: Does humanity know how to live with the physical power it possesses? Can science, or can man by using scientific methods, control his own destiny?

Preponderating evidence forces negative answers to both these questions. World War II, with its wholesale destruction, is followed by starvation, cold, and disease. The United States failed to solve its human problems of poverty and unemployment that broke the spirit and injured the health of millions during the 1930's. It took the global cataclysm to provide jobs for the mass of our working population: unemployment was conquered by forces of destruction rather than by constructive effort.

America and American scientists now hold a unique position of power on the one hand and a national and a global responsibility on the other. Spengler observed prevalent characteristics of the German society, and upon his observations forecast the doom of the West. Concentration camps and scientifically designed murders attest the ability he possessed to perceive trends. A dominant fear on the part of the student of cultures now is that German depravity was only a forerunner of a general depravity towards which all Western civilization is descending. To examine this possibility and to help define more succinctly the dilemma facing science a few facts respecting trends in pre-Hitler Germany and present-day America are first given, followed by a few suggestions as to what scientists may do.

Pre-Hitler Germany

The pertinent fact about Germany, for the scientist, is that Germany was a world leader in science before World War I and between the two wars. Unhappily, the years between 1933 and 1939 saw the scientists of that country make a retreat from the free spirit of scientific discovery and become not free men but Nazi tools. Some of the great scientists fled, but the majority—as did the German Universities—became only putty in the hands of a state morality that used scientific methods to perpetrate legalized crimes and inflate the egos of the perpetrators. The philosopher of degradation, Spengler, some years before Hitler, did not see science as a tool in the service of man, but saw in it an instrument for the attainment of the supremacy of a few over many, as the rule of the technics, and as a means of routinizing and devaluating the individual. Though he marshaled his facts from the entire panorama of history, he could not have ventured on such a thesis had he not felt the chilly winds of Germany's mechanized objective life on the one hand and her subjective fear, frustration, and insecurity on the other. It was from a people, part of whom were highly trained in scientific methods but who had lost hope of securing jobs or making their adjustment into society, that Hitler built his regimented machine. The Germans, trained and untrained, who had suffered from insecurity and frustration were willing to fall into the goose step when ordered, to accept supinely a suggestion to persecute the Jews, or to desist from any act, regardless of how strongly it might be morally impelled, if it was "verboten."

Out of race prejudice Hitler erected race hatred and race slaughter; from personal despair, frustration, and social disorganization he built individual pride and his "new" social order. By accusations, persecutions, haranguings, marching, singing, Hitler brought unity out of disunity, fanaticism out of despair, transferred feeling of guilt and failure from the Germans to others, and set his nation on the high road of its own destruction. All this after a distinguished record of accomplishments in science! Pertinent to this fact Lewis Mumford asks:

> Had not Germany long led the world in philosophy, in music, in scholarship, in the sciences? So convinced, indeed, was a large part of mankind of the soundness of this civilization that it refused to heed the malignity of the Fascists' inventions or the hideous results that flowed from them (*The condition of man*, p. 369).

Then there was the wild inflation and the economic depression in which security was taken from millions overnight. Germany could not withstand the impact of poverty and widespread unemployment. Hitler gave work. Indeed, it may be observed that a spearhead—if not *the* spearhead of the early Nazi movement—were some 50,000 technically trained college men who could not find a niche in Germany's economic organization.

Symptoms in American Life

It would be foolhardy to assert that America will immediately go the way of Germany, but some of the same symptomatic trends of destruction once prevalent in Germany may be observed in America. An eminent economist, some three years ago when under fire by a Congressional Committee for what the Congressmen thought he believed, said to the author: "In 1933 I told my German friends in Berlin what was coming. They would not believe me. Now I fear for the United States." A second widely known American scholar, who lived for three years with a Nazi husband in Germany during Hitler's ascendency, recently remarked: "I see so many signs in America, like those so prevalent during those years, that I shudder for the future." Neither of these is an alarmist; both are highly trained social scientists.

One of the most vicious of these signs is race prejudice, which has raised its ugly head out of many psychoeconomic quagmires since Pearl Harbor to strike violently against the American-born Japanese, the Negroes, and the Jews. This green-headed hatred, if limited evidence can be trusted, appeared more and more frequently and in widely scattered places as America approached victory. Within a few months preceding VE-Day there were 16 shooting incidents in California directed at the Japanese-Americans. Mrs. Agnes Meyer, in the *Washington Post*, 4 May 1945, wrote: "In California Americans of Japanese extraction are being terrorized with shootings and dynamite bombs, yet the terrorists are exonerated by juries on the statement of their council, 'This is a white man's country.' Prejudice, fear and greed prevent the local authorities from protecting the homes of our fighting men whose parents were Japanese." Moreover, the Supreme Court approved "our worst war-time mistakes," the removal of the Japanese from the West Coast, which, according to Eugene V. Rostow (*Harper's Magazine*, September 1945), "was an injustice in no way required or justified by the war."

Other types of race hatred have sprung up like weeds in a fertile field. Anti-Jewish antagonism appears to have been systematically organized in New England. In some cities hatred has been intensified against the Jews and, in other places, against the Catholics. Not all who know the situation are opposed to it. Racial hatreds and accompanying violence stem from definite psychological characteristics of individuals and economic and sociological traits of the society. Hatreds accompanied by jealousy, a feeling of insecurity, frustration, disappointment with life goals, the desire for dominance, and a paucity of individual and social guidance of ideals are among the maladies of man's spirit. These are the subjective traits of the inner man that parallel social disorganization. America was badly disorganized during the 1930's but did not know it. The failure then to meet the human problems of inadequate food and protection of health was a national scandal later revealed by the Selective Service examinations. Of 10,000,000 men examined by local draft boards between 7 December 1941 and 31 December 1943, 3,600,000, or over one-third, were physically unfit. Before Pearl Harbor, when the physical standards were at their highest level, 52.6 per cent of all men examined were rejected. Those who studied the problems of the growing numbers of unemployed and maladjusted youth during the 1930's were in no way surprised that the report on the "Physical examinations of Selective Service registrants during the war-time" read: ". . . while the standards maintained by the military forces have been admittedly high, the prevalence of disqualifying defects has become a matter of national concern, not only from the viewpoint of the armed forces, but from the standpoint of national health as well."

Other prewar characteristics reveal the amnesia in our social body. The marked phenomena of the 1920's were the dominance of gangsterism, lawlessness and a mad race for gain by chance and speculation, and the heavy migration from country to city. When the United States floundered in the whirlpool of depression, all ameliorative measures were con-

stantly machine-gunned by intrenched interests and well-intentioned guardians of the status quo. Our real moral flabbiness was most blatantly revealed in our refusal to raise a finger against international aggression, first in Asia and then in Europe. We turned against the gangsters when their depredations became so widespread that no citizen was safe; we arose against the international gangsters after we were attacked.

Then there is another possibility: the United States may follow a course of inflation and complete disorganization. If the United States again goes on a wild spree of buying, selling, and speculation, it is to be expected that we shall plunge into another depression in which all the above-mentioned trends which lead to an authoritarian society will rush forth like a desert brook—having only trickles in the dry season but a dangerous, devastating flood when the rain comes. The symptoms of complete social and economic disorganization are with us. Strikes, picket lines, tear gas, refusal to compromise—all are marks of growing factionalism, distrust, fear. These maladies cannot be put down by the physical inventions, but they may be cured by the scientific method.

Science and the Future

What happens in America will go far in determining the destiny of the world. Moreover, if we cannot solve our own problems, how can we give adequate aid to those baffling situations that belong to world affairs? There are two courses to follow: to accept the destruction of man as inevitable, or to take hold of national and world problems involving the biological and psychological man, and economic, political, and social relations in both national and international realms.

The implications of the foregoing discussion, when coupled with man's new-found atomic power, are ominous; they forecast the inevitable rapid destruction of man, the first of these alternatives. This is in accordance with conclusions held by some scientists. For example, Dr. Gerrit S. Miller, Jr., writing in *Science,* when the man on the street had not dreamed of the atomic bomb (*Science,* 1941, **94**, 163–164), said:

> . . . in his mental constitution man unites the dominating type of social behavior that is common to most anthropoid primates . . . with such a unique genius for "implementing" it as to make a totally new phenomenon in animal evolution. This combination may well prove to be, in the end, as racially lethal as the huge size and great bodily specialization of titanotheres, proboscidians and dinosaurs appear to have been in the past.

That type of social behavior is *domination* or, as the psychologists may call it, the desire to dominate. War, the desire for huge fortunes, the urge to surpass others (all basic in our economic, political, and social systems) are expressions of this primate characteristic, if the present writer understands the quotation correctly. Science has now put into the hands of the highest form of primate the power of his own destruction.

But what has science to offer man by which he can save himself? What can science offer the American politician as well as the American citizen that it did not give to the Germans? The first contribution it can make is the basic philosophy that has made science possible, namely, the openminded search for truth. Respecting racial hatreds, the anthropologists have amply shown that there are no basic differences among races. Therefore, scientists of all types have the responsibility of helping to put that fact into practice in our society.

If this is to be done, it requires man, the primate, to conquer his own innate characteristic, which is the urge for domination. It is in this respect that "modern man is obsolete, a self-made anachronism becoming more incongruous by the minute. He has exalted change in everything but himself. He has leaped centuries ahead in inventing a new world to live in but he knows little or nothing about his own part in that world" (Norman Cousins. *Modern man is obsolete.* New York: Viking Press, 1945).

As human beings we do not like to accept destruction as inevitable or to feel that the biological and psychological man is obsolete, but to solve the socio-economic and sociopsychological problems or to control the trends in these fields, science must push back many frontiers and at the same time apply the scientific method to the results of its own discoveries. The physical, biological, and social sciences have made greater advancement in the past 50 years than during the preceding 50 centuries. The fact that the advance of science may be paralleled by public and personal moral decay is enough to challenge the most critical, especially if he has any interest in human society beyond his own laboratory or personal advancement.

Pure scientists must become human beings and not claim for themselves the right to be independent of all values. No one can question this as a requisite for advancement in science, but the maintenance of pure science does not excuse the scientist from applying his methods to the problems of human society. It is the belief of the present writer that the scientific method can be used in planning for the coming atomic age. The coal age, the petroleum age, the electric age were ushered in with no foresight. Hogben, in his *Retreat from reason,* has this to say: "We blundered into the age of coal and steel with no provision. We are now blundering on the threshold of an era of

technical changes which may have more drastic consequences" (p. 63). Scientific method has shown the way to extrapolate in dealing with physical and biological facts. This same method can be used in the social sciences to project an economic, social, and political organization that will meet man's external needs, especially in relation to the human values, health, love, emotional adjustment, and security.

Physical, biological, and social scientists can no longer remain compartmentalized. This applies to all types of problems whether they be those of housing and slum clearance, developments of more nutritious soya beans, or the cure and prevention of the development of millions of physical, mental, and emotional defectives such as were found by the draft. The defects of those from the Appalachian Highlands rejected by the draft should be studied by the economists, sociologists, psychologists, nutritionists, soil chemists, as well as specialists in public health.

The English scientists appear to be pointing the way along these lines; at least they are very much alive to the situation. Their general position, given in *Advance of science,* August 1943 and September 1944, two publications of the British Association for the Advancement of Science, are here presented.

Science, which is the search for truth, devotes itself to the study of the universe in which we live, "especially to the study of the natural processes by observation and experiment." But the truths that have been discovered through science have been directed away from the humanities. In fact, the natural sciences lost their place among the humanities "when the technological demands of modern institutionalism claimed for themselves a status apart from and alternative to the 'more humane' studies as it became the fashion to call them, in the hope of producing experts and specialists in some one line of lucrative research at the age of twenty-two or twenty-three" (Prof. Sir John L. Meyers, F.B.A.). Perhaps by reason of high specialization during the war years science, necessarily and with success, was turned to the augmentation of destruction. This had to be. Moreover, future historians will tell us how close Germany, through her technical power, came to destroying England and holding the European Continent.

From mature thinking, the British scientists have concluded that the function of science is to serve society in ways other than by providing machines and gadgets for commercial channels. They see a sphere of activity and service far beyond these limits. They hold that "there is no department of human activity that cannot be approached in the scientific spirit" (F. R. G. Duckworth). Recognizing the power of science, another wrote: "But now that science is on its way to a place in the sun, is there no risk of our failing . . . to turn out balanced citizens? It seems to me that the risk is great—and all the greater because in these war years our energies have been rightly concentrated on practical ends—unless we are prepared to face the question squarely, what is the cultural value of science?"

Further conclusions provide a base for the scientist who is interested in the ills of humanity. "European civilization has not yet decided the exact form of the more social view of man to which it seems to be returning." In contrast to the authoritarian approach such as that pursued by the Nazi, "we should like to see clearly the development of an outlook which would continue to affirm the value of the individual while at the same time seeing him as a being formed by and forming the society of which he is a member . . . the sciences that treat man as a complete organism have been very little developed" (Dr. C. H. Waddington).

"The pivotal question of the postwar reconstruction is the ordinary living of the ordinary man. This is where the citizen meets science and has to meet problems of applied science most frequently and most urgently. But the central scientific subject . . . is most often overlooked and is the most important of all. I refer to the human. . . . According to the psychologists, no man is complete and healthy unless he has moral or ethical standards which he feels he can trust" (Mr. N. F. Sheppard).

The responsibilities of the scientists were recognized. "The time has now come when every scientist must realize how his work is related to social and economic conditions. It is clear, that as much as any class of workers, it will be even more evident that reconstruction, if it is to be successful and permanent, must be built within such a social framework that it is able to give to the community the full benefits which accrue from the work of the scientists. . . . We must make our work in the field of the social relations of science a living force of immediate effectiveness and value."

Acceptance of Responsibility

Many scientists of America are awake; they see the ills of human relations (intra- and international) and the dangers of aggravating those ills. Lawrence K. Frank pointed out (*Science,* 1945, **101,** 433–434) that the major threat of our age is the discrepancy between advancing technology and our established practices and organizations. Dr. Harlow Shapley (*Harper's Magazine,* October 1945), aptly states that in Russia the conception of science is much broader than among us. There the social and historical sciences are on a par with the physical and biological sciences. Captain John G. Jenkins, USNR, in speaking on the subject, "New opportunities and new responsibilities

for the psychologist" (*Science,* 1946, **103**, 33–38), asserts that psychology must of necessity enter "the stage of *social* loyalty and social responsibility."

In the hearings on the establishment of a National Science Foundation, before the Subcommittee on War Mobilization of the Senate Committee on Military Affairs, recognition was given to the necessity for a unified approach to the problems of mankind. Dr. F. R. Moulton, Permanent Secretary of the American Association for the Advancement of Science, an eminent mathematician and astronomer, urged the necessity of including the social sciences in any program involving the research of such a foundation. The testimony given in these hearings largely supported the position that the Government should support research in all fields of fundamental scientific inquiry. Then the President, in his message recommending legislation for scientific research, asked for the inclusion of the social sciences.

These are all straws pointing in the wind, but there are adverse currents. We who believe in the position taken in this discussion can only be satisfied when there are strong signposts telling exactly where we are going.

Association Affairs

Revision of the Association's Constitution

A Statement by the Special Committee on Constitution and Bylaws

Otis W. Caldwell, Burton E. Livingston (*Chairman*), and F. R. Moulton

AT A MEETING HELD 11 NOVEMBER 1945, the Executive Committee directed that the proposed revision of the Association's Constitution be republished in *Science* and that it be presented, as an amendment to the present Constitution, for ratification at a general session of the approaching fourth St. Louis meeting. It is here published for the second time, as it appeared in *Science* for 1 September 1944. The present Constitution was last published in *Science* for 6 June 1941. It is published again here to facilitate comparison.

The original "Objects and Rules of the Association" were amended to become the First Constitution in 1851. A partial revision was made in 1856, and the Second Constitution was ratified in 1874, at which time the Association was incorporated under the laws of the Commonwealth of Massachusetts. Prior to 1887, the Standing Committee of the Association controlled Association affairs, but in that year the Standing Committee became the Association Council. The Council has been the official governing body since that time.

In 1917 a special committee—consisting of J. McKeen Cattell, *chairman,* Herman L. Fairchild, and Daniel T. MacDougal—undertook a thorough revision of the Second Constitution. On recommendation of that Committee, the Third Constitution was ratified at the third St. Louis meeting. With a few minor amendments, it has been in force since 3 January 1920.

On 30 December 1939 the Executive Committee of the Council named a special committee to revise the Constitution still further. That committee consisted of B. E. Livingston, *chairman,* E. R. Long, and F. R. Moulton. On the resignation of Dr. Long in 1942, because of pressing duties connected with national defense and the war, the Executive Committee named Dr. O. W. Caldwell to succeed him. After intensive study of numerous suggestions and proposals, some of which had been brought forward in a prolonged discussion at the Dallas session of the Secretaries' Conference, this special committee presented a proposed new Constitution to the Executive Committee on 6 August 1944, recommending that this document be submitted for ratification at a general session of the approaching annual meeting for 1944, at Cleveland.

That recommendation was approved by the Council, but the proposed Fourth Constitution failed to receive a unanimous vote for ratification at the Cleveland general session when presented, although it received all but one of the votes that were recorded. It is therefore to be submitted again, this time to a general session at the next succeeding annual meeting, which will be the approaching St. Louis meeting. As before, it is to be proposed as an amendment to the present Third Constitution, which provides as follows:

ARTICLE 11. ALTERATION OF THE CONSTITUTION. *This Constitution may be amended at a general session by unanimous vote or by a majority vote at two consecutive annual meetings.*