GENERAL SCIENCE

Call To Action Sounded For All Men of Science

Retiring President of A. A. A. S. Warns That Ignorance Is Gravest Danger to Democracy; Teaching Urgent Need

A CALL to action for scientific men to take a crucial part in the present struggle to maintain democracy and freedom, was issued by Dr. Wesley C. Mitchell, research director of the National Bureau of Economic Research and economics professor at Columbia University, when he delivered as its retiring president the keynote address of the meeting of the American Association for the Advancement of Science in Columbus, Ohio.

The world of science can make a major contribution to the preservation of the institutions that secure freedom to all citizens, Dr. Mitchell declared.

"The gravest dangers to democracy come from within, not from without," he warned. "They are ignorance and propaganda that turns ignorance to its uses. The best way of dispelling ignorance is by diffusing knowledge. The most effective defense against meretricious propaganda is critical inquiry. John Dewey is warranted in saying that 'the future of democracy is allied with spread of the scientific attitude.' To foster this attitude among their fellow citizens by all means within their power is a duty incumbent upon us who cherish science.

"As teachers in schools and colleges we can help thousands to develop respect for evidence. As citizens we can be brave opponents of prejudice and hysteria. We can promote general understanding of the methods and results of science through our own writings or those of allies more skilled in popular exposition. These things we should do, not as high priests assured that they are always right, but as workers who have learned a method of treating problems that wins cumulative successes, and who would like to share that method with others."

To increase knowledge of human behavior was declared by Dr. Mitchell to be "the most urgent item in the unfinished business of science.

"If we had keener insight into individual psychology," he said, "we might not be able to alter fundamental drives, but we might be able to direct them into beneficent channels. Preaching righteousness doubtless prevents men from being as bestial as they might otherwise become. Appeals to reason prevent them from making as many errors as they otherwise might. But the moralist and the rationalist admit that the results of their efforts are grievously disappointing.

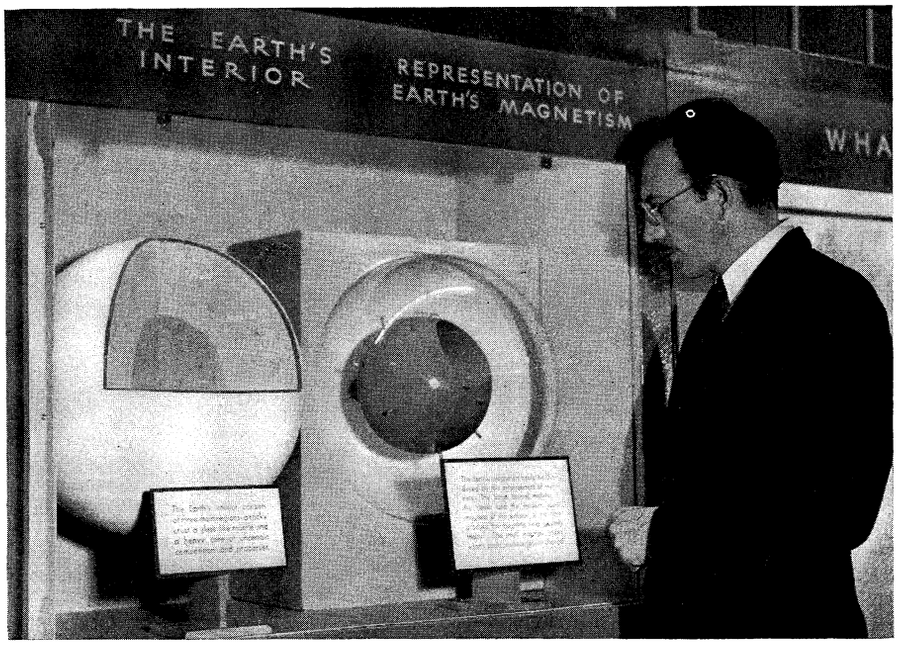
"Scientific men with any gift of self-analysis realize that they have their own shares of selfishness and animosities. To subdue traits in oneself is hard enough to give an inkling of the difficulty of controlling them in society at large. Perhaps, and perhaps is all we can say, if we can come to a clearer understanding of how we behave, we can learn how to condition men so that their energies will go less into making one another miserable.

"One of the things we have learned about individual behavior is that it is influenced greatly by social environment," Dr. Mitchell continued. "In John Dewey's phrase, 'all psychology is social psychology.' Improving knowledge of social organization and its working is therefore part and parcel of the urgent task of learning how men behave. Though we may believe ourselves citizens of the most fortunate nation in the world, we have no more reason for complacency about the way in which our social organization works than for complacency about individual behavior.

"For example, our economic organization does not permit us to buy from one another as much wealth as our workers are able and eager to produce. Even in the best of years we fail to provide a national income large enough to give American families on the average what experts on household economics hold to be a standard of living adequate to maintain efficiency.

"In bad years this adequate income falls off by a fifth or a sixth; in the very worst years by 40% or more. All this is true of our industrial equipment and practise as they stand. Proud as they are of our technological progress, engineers know that much of our equipment and many of our methods are far behind the times. We fail to make full use of knowledge that technological applications of scientific discoveries have put at our disposal.

"I might develop the shortcomings of our economic organization at great length,



EARTH'S MAGNETIC FIELD DUPLICATED

For the first time, a cluster of magnets has been assembled so that they reproduce the magnetic field of the earth and its yearly changes. Dr. A. G. McNish, of the Department of Terrestrial Magnetism is demonstrating the model at the Carnegie Institution of Washington's annual exhibit.

and then go on to exploit the weaknesses of our political and sociological institutions. It is needless to do so; for every candid and intelligent citizen can point out defects however convinced he may be that, with all its faults, the American scheme of institutions is the best in the world. If scientists can do more than other intelligent citizens toward improving social organization, their contribution will consist in raising knowledge of social practice."

Dr. Mitchell admitted that social sciences lag far behind the natural sciences. This is "because they deal with phenomena more complicated, more variable, and less susceptible of experimental manipulation. Since social investigators cannot experiment at will upon social groups, they cannot effectively apply to their problems the methods that have made the laboratory sciences strong."

"Yet the case of economics and its sister sciences is not hopeless," in Dr. Mitchell's opinion.

"The rapid growth of statistics is providing mass observations upon social behavior of many kinds," he said. "The equally rapid growth of statistical technique enables us to learn more from a given array of data than our predecessors could. These materials and methods are making it possible to measure many social factors, some rather accurately, some roughly. Uniformities appear not only in averages, but also in the way in which individual items are distributed about their means. Statements in terms of probability can be substituted for vague statements about the effect a certain cause 'tends' to produce.

"True, work on this observational basis encounters many difficulties. It is limited by the variety, extent, and accuracy of reliable data upon human behavior. It is laborious, slow and expensive. In presenting his work a realistic investigator begins with a critique of his data and methods; he ends by setting forth the probable errors and limitations of his results, and the road from the beginning to the end may be long. Instead of definitive conclusions he thinks others should accept, he presents tentative approximations he expects others to improve.

"The work has not even the advantage of calling for less hard thinking than speculative theorizing; for the relations among the variables in the problem are seldom manifest of themselves. All that can be claimed for this type of work is that it deals with actual experience, that its results stand or fall by the test of conformity to fact, and that it grows cumulatively after the fashion of the observational sciences. But that is enough to give mankind strong reason for following this lead in seeking the knowledge required to improve social organization.

"Because of difficulties inhering in their subject matter, the social sciences will continue indefinitely to lag behind the natural sciences in precision and reliability. For a long time to come we shall have to form our opinions on many social issues in the light of commonsense rather than of science."

Dr. Mitchell advised scientists as citizens to "suspect the intelligence, candor or the disinterestedness of those who promise sure cures for social ills."

Unless freedom of thought prevails, Dr. Mitchell warned, science cannot flourish in the future and yield the fruits for which we hope.

"Freedom is a condition we have been inclined to take for granted as part of the heritage our predecessors won," he said. "Now we realize that what they fought to win we must fight to maintain. The investigator's right to follow truth wherever it led was part of the common man's right to freedom of conscience and freedom of speech. These rights were established by political struggles and embodied in political institutions. The democratic way of life and the scientific way of thinking grew up together, each nourishing the other. If one now fails the other will falter. Where democracy is suppressed today science is fettered; for autocracy cannot brook disinterested criticism of its dogmas or its practises. Freedom for scientific work in the years to come can be guaranteed only by preserving the institutions that secure freedom to all citizens."

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Protection of Civilians Is Paramount Duty of Science

PROTECTION of civilian population from attack by deadly weapons that science has created is set forth as one of the paramount duties of science in the present emergency, in the annual report by Dr. Vannevar Bush, president of the Carnegie Institution of Washington. This is Dr. Bush's first report since he became president at the beginning of the year.

Dr. Bush said that the far-flung research institution which he heads "should not fail to press its efforts" if it "sees a way in which its activities and facilities can aid this great problem of protection of civilian population from attack."

The scientist is "faced with a quandary" in a world much of which is at war, Dr. Bush said, adding:

"The same science which saves life and renders it rich and full, also destroys it and renders it horrible. Is it then possible to remain in a detached atmosphere, to cultivate the slowly growing body of pure scientific knowledge, and to labor apart from the intense struggle in which the direct application of science now implies so much for good or ill?

"Science and its applications have produced the aircraft and the bomb. Entirely apart from all questions of national sympathies, from all opinion concerning political ideologies, we fear to witness the destruction of the treasures of civilization and the agony of peoples, by reason of this new weapon. As science has produced a weapon, so also can it produce in time a defense against it. Science is dedicated to the advance of knowledge for the benefit of man. Here is a sphere where the benefit might perhaps indeed be immediate, real and satisfying. Can a scientist, skilled in a field such that his efforts might readily be directed to the attainment of applications which would afford protection to his fellow men against such an overwhelming peril, now justify expending his effort for any other and more remote cause?"

Although immediate participation of the scientist in the safeguarding of civilization is urged by Dr. Bush, he warned that we should not become stampeded.

"There is still a duty to keep the torch of pure science lit, and this duty is only the greater under stress," he said. "All the long struggle of a harsh evolution, the pitting of species against the environment, has produced a being whose primary distinction is conscious cerebration, and whose crowning attribute is his intellectual curiosity concerning his complex environment and a thirst for knowledge transcending the mere struggle for existence.

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