

Sub-Atomic Energy and "Science Sins"

Physics

War, Peace, Food, and Physics Complexities Discussed

THE world need have no fear that some scientist probing into the atom will let loose enormous stores of sub-atomic energy and blow the earth to star-dust. For Dr. Robert A. Millikan, California physicist and Nobel prizeman, president of the American Association for the Advancement of Science, at its recent meeting dispelled this dire hobgoblin once seriously believed by physicists but now shown to be a mere nightmare when viewed in the light of modern theories of matter.

So widespread had become the belief that dangerous quantities of energy are locked in the atom to be released by a little more scientific knowledge that solemn churchmen called for a complete cessation of scientific research for fear some bad boy scientist might use the hypothetical power for evil ends. A current drama, "Wings Over Europe," pictured the British Cabinet bowing before a young physicist who unlocked the atom.

Declaring that the "new evidence born of scientific studies is to the effect that it is highly improbable that there is any appreciable amount of available sub-atomic energy for man to tap," Dr. Millikan said that we "may go home and henceforth sleep in peace with the consciousness that the creator has put some foolproof elements into His handiwork and that man is powerless to do it any titanic physical damage."

Answering a second alleged sin of science, that science has made war more deadly, more horrible and less heroic, Dr. Millikan said that "every scientific advance finds ten times as many new, peaceful, and constructive uses as it finds destructive ones."

"Explosives and fertilizers are basically the same," he said, "and even explosives find a dozen peaceful uses to one warlike one. Public thinking is misled by the fact that a horror makes better news than a wheat crop. One man blown painlessly to atoms

gets more news space than a thousand men dying by inches from disease. Steel does indeed make bayonets, but it also makes plowshares and railroads and automobiles and sewing machines and threshers and a thousand other things whose uses constitute the strongest existing diverter of human energies from the destructive to the peaceful arts. In my judgment, war is now in the process of being abolished chiefly by this relentless advance in science, its most powerful enemy."

Maintenance of a balance between future population and food supply was called by Dr. Millikan "mankind's greatest problem." He called upon the fullest stimulation of both the biological and physical sciences to solve this critical situation facing civilization.

The complete text of Dr. Millikan's address will appear in the February number of *Scribner's*.

THE scientifically inclined layman who feels bewildered at the host of new physical conceptions that have been brought forward in recent years, can now have the consolation that he is not alone in such feeling. Speaking as vice-president of the physics section of the American Association for the Advancement of Science, Dr. P. W. Bridgman, of Harvard University, admitted a similar sensation.

"Many of us could, I believe," he declared to the physicists, "confess to a feeling of breathlessness at the rapid changes of our present physical

progress and some of us might even, in a moment of candor, admit a little resentment at our shortness of breath."

Some of the important landmarks in the progression of physical knowledge he listed as follows: the electromagnetic theory of light, the special theory of relativity, the general theory of relativity, the quantum theory of Bohr, the matrix calculus of Heisenberg, the wave mechanics of Schrödinger, the transformation theory of Jordan and Dirac, the group theory of Weyl, and, finally the double quantization theory of Jordan and others.

However, Dr. Bridgman said, such changes and new ideas in rapid succession are to be expected, for "when ever we extend the domain of experiment we must be prepared for unexpected new facts."

In order to be better prepared for such changes in the future, he suggested that physicists abandon the quest for what is called "reality".

"We used to demand that the ultimate goal of physical theories should be nothing less than the discovery of the underlying realities," he said. "Today our demand for reality is much less insistent, in large part because we are much less confident that the ultimate reality, which we thought to be our goal, has any meaning. The meaning to be attached to reality is to a large extent a personal matter, and changes with time, but I believe it is fair to say that the sense in which every one used reality a few years ago and the sense in which the majority use it today has 'uniqueness' as a minimum connotation. It would not have been admitted that two entirely different explanations of the universe could be equally real, but today we see that uniqueness in an explanation is an impossible ideal, and the quest for reality in so far as reality connotes uniqueness, must be abandoned as a meaningless quest."

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