

5. Comprehension

AUGUST 6, 1945 - The day the atomic bomb was dropped on Hiroshima - brought home to all of us in a dramatic fashion the significance of science in human life. The impact of that bomb has left us stunned and confused. Certainly we laymen are frightened by science as we never were before. And certainly too, we are bewildered by the power which science has suddenly placed in our laps - bewildered and humbled by our realization of how unequipped we are, in terms of ethics, law, and government, to know how to use it.

That, I think, is the first reaction of a layman to the stupendous repercussion of that bomb on Hiroshima. And the first question that comes to his mind is this: what use are radio and automobiles and penicillin and all the other gifts of science if at the same time this same science hands us the means by which we can blow ourselves and our civilization into drifting dust? We have always been inclined to think research and technology as being consciously related to human welfare. Now, frankly, we are not so sure, and we are deeply troubled, by the realization that man's brain can create things which his will may not be able to control.

To the layman it seems as if science were facing a vast dilemma. Science is the search for truth, and it is based on the glorious faith that truth is worth discovering. It springs from the noblest attribute of the human spirit. But it is this same search for truth that has brought our civilization to the brink of destruction; and we are confronted by the tragic irony that when we have been most successful in pushing out the boundaries of knowledge, we have most endangered the possibility of human life on this planet. The pursuit of truth has at last led us to the tools by which we can ourselves become the destroyers of our own institutions and all the bright hopes of the race. In this situation what do we do - curb our science or cling to the pursuit of truth and run the risk of having our society torn to pieces?

It is on the basis of this dilemma that serious questions are forming in the public mind. Unless research is linked to a human and constructive purpose, should it not be subject to some kind of restraint? Can our scientists afford to be concerned solely with fact and not at all with value and purpose? Can they legitimately claim that their only aim is the advancement of knowledge regardless of its consequences? Is the layman justified in saying to the scientists: 'We look to you to distinguish between that truth which furthers the well-being of mankind and that truth which threatens it?

One of the scientists who played a leading role in the development of the atomic bomb said to the newspapermen: 'A scientist cannot hold back progress because of fears of what the world will do with his discoveries'. What he apparently implied was the science has no responsibility in the matter, and that it will plunge ahead in the pursuit of truth even if the process leaves the world in dust and ashes.

Is that the final answer? Is there no other answer? Frankly, as a layman, I do not know. Offhand, this disavowal of concern seems callous and irresponsible. But we may

be facing a situation where no other answer is realistic or possible. To ask the scientist to foresee the use - the good or evil of the use - to which his result may be put is doubtless beyond the realm of the attainable. Almost any discovery can be used for either social or anti-social purposes. The German dye industry was not created to deal with either medicine or weapons of war; and yet out of that industry came our sulphur drugs and mustard gas. When Einstein wrote his famous transformation equation in 1905 he was not thinking of the atomic bomb, but out of the equation came one of the principles upon which the bomb was based.

Willard Gibbs was a gentle spirit whose life was spent in his laboratory at Yale University, and who never dreamed that his work in mathematical physics might have even a remote relationship to war; and yet it is safe to say that his ideas gave added power to the armaments of all nations in both World War I and World War II.

I suspect that the way out of the dilemma is not as simple as the questions now being asked seem to imply. The good and the evil that flow from scientific research are more often than not indistinguishable at the point of origin. Generally they are by products, or they represent distortions of original purpose, none of which could have been foreseen when the initial discovery was made. We are driven back to a question of human motives and desires. Science has recently given us radar, jet propulsion and power sources of unprecedented magnitude. What does society want to do with them? It can use them constructively to increase the happiness of mankind or it can employ them to tear the world to pieces. There is scarcely a scientific formula or a process or a commodity which cannot be used for war purposes, if that is what we elect to do with it. In brief, the gifts of science can be used by evil men to do evil even more obviously and dramatically than they can be used by men of goodwill to do good.

I fear there is no easy way out of our dilemma. I would not absolve the scientists from some measure of responsibility, for they are men of superior training and insight and we are entitled to look to them for help and leadership more help and leadership, I venture to add, than have thus far been given. However, I note that a considerable number of scientist who were connected with the atomic bomb project have publicly expressed their apprehension of the consequences of their own creation. 'All of us who worked on the atomic bomb, said Dr Allison of the University of Chicago, had a momentary feeling of elation when our experiment met with success; but that feeling rapidly changed to a feeling of horror, and a fervent desire that no more bombs would be dropped.

Nevertheless, in the long run I do not believe that we shall be successful in making science the arbiter of its discoveries. Somehow or other society itself must assume that responsibility. The towering enemy of mankind is not science but war. Science merely reflects the social forces by which it is surrounded. When there is peace, science is constructive; when there is war, science is perverted to destructive ends. The weapons which science gives us do not necessarily create war; they make war increasingly more terrible, until now it has brought us to the doorstep of doom.

Our main problem therefore, is not to curb science but to stop war to substitute law for force and international government for anarchy in the relations of one nation with another. That is a job in which everybody must participate, including the scientists. But the bomb on Hiroshima suddenly woke us up to the fact that we have very little time. The hour is late and our work has scarcely begun. Now we are face to face with this urgent

question: 'Can education and tolerance atd understanding and creative intelligence run fast enough to keep us abreast with or own mounting capacity to destroy?

That is the question which we shall have to answer one way or another in this generation. Science must help us in the answer, but the main decision lies within ourselves.