ADDRESS OF THE PRESIDENT

SOME PERSONAL RESPONSIBILITIES OF SCIENTISTS

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Our attentions are so often drawn to the momentous emotion-stirring events both at home and abroad, that we relegate to the background those questions which do not clamor for immediate attention and action. Yet a delay in considering a question and the failure to prepare for a situation may result in a catastrophe or in postponement of a major discovery.

One such question to which science should seriously dedicate itself, I believe, is the position of science itself. Science has a place of unprecedented importance, it affects the lives of most people, it carries the major part of the gigantic burden of adding to the total of human knowledge; yet in its rapid expansion into our educational, social, economic, and industrial life, it is losing much of its recently acquired identity. Effective and desirable unity among scientists is difficult to obtain. Many different groups, professions, organizations, research institutions, and foundations are conducting scientific work under many different names, and frequently they are not linked with other workers in the basic sciences to which their own work is so closely related. Yet all are engaged in the discovery of the secrets of nature and their classification and utilization. This motive should be a far stronger bond than that which serves to hold together many another group.

It is the highly trained scientific personnel who developed and largely perfected the scientific method of thinking, the application of which has advanced civilization. Such people have achieved the developments that distinguish the world of today from that of the stone age. Their devices determine today's methods of warfare in which the victor is the one who uses superior equipment. Manpower odds must be tremendous to make an exception to this statement. A great industry may be founded on one successful research project. Is it necessary to elaborate on the importance of such discoveries as radar, the sulpha drugs, plastics, electrical and mechanical power, the X-ray, and the airplane? The list might be extended indefinitely, yet the exploration of physical and biological realms has scarcely begun.

Although realizing the tremendous influence of science, we should remember that its motives remain restricted, its activities limited, and its component groups scattered. The science which has given the world such vast knowledge for both human betterment and destruction, has generally remained neutral on moral questions. Its products may be used for either good or evil, but it has

exerted no concerted influence to control their uses. The primary motive is only to discover, classify, and apply the laws of nature; nevertheless the individual scientist is still a human being, and not all his vital needs are served by his diligent labor under this primary motive.

Some of the limitations may be indicated by the following queries:

(1) In case some highly meritorious legislation is desired, do you constitute a well recognized political, lobbying, or pressure group? Would you be willing to become one upon the recommendation of the proper authorities?

(2) The history of science reveals many workers who tried to carry on, in spite of poverty, inadequate facilities, and social abuse. What corrective methods have originated within professional groups concerned?

(3) One person in seven normally dies of cancer. Should research on this vital problem be largely curtailed until voluntary public subscriptions finance it? Should research be more effectively subsidized?

(4) Does your salary average more than one-half the income of a professional practitioner with equivalent training?

(5) Are you cooperating systematically and continuously in carefully planned activities with State and Federal Departments?

(6) Are you willing to make recommendations restricting the use of your products when public welfare is jeopardized?

(7) If you are an educator, what percentage of students take basic science courses in comparison with other subjects?

(8) What is the relative cost per student in your department compared with other more personal subjects? Are all schools financially able to equip a high ranking science department? Do instructors of science work under conditions as suitable as those in other subjects?

(9) Do you give assistance and protection to needy scientists suffering under unquestionable injustices and persecutions?

(10) Are you carefully watching sources of research material, such as archeological, which may become lost, damaged, or destroyed?

(11) Do you agree that the responsibility for a large project can be borne better by an organization than by some interested individual? If so, what rules and regulations has your organization established?

(12) What means of close cooperation have been provided among the various State Academies of Science? Likewise with the National Academies beyond usual mere affiliation as with the A.A.A.S.?

(13) By what means of systematic publicity is the general public informed about the values of research? Does the public mind give the credit for it to the proper sources? Will that public support your activities expended in its behalf?

(14) Advanced educational training has been largely curtailed during the war; what action is planned to compensate for the resultant deficit of highly trained scientists?

(15) In nearly any of the medium sized and small institutions of this State, there are several capable and ambitious members of the Illinois Academy of Science who are far too limited by both time and facilities to conduct independent research. Have large high quality projects been subdivided so that members in different localities may take part and thus advance professionally?

(16) If you are allowed to live in the so-called "ivory tower", largely immured from disturbing influences

and able to pursue your research and other professional activities to the full extent of your energy and capability, will you concentrate temporarily on supplying the necessities of life to alleviate the suffering which accompanies economic depressions, low salaries, and unemployment?

(17) After witnessing the changes in nations abroad which have been wrought by those extreme force-systems of government, as in Germany which to a large extent made possible the present global war, can you believe that organizations with excellently educated personnel should fail to be ready to protect at all times with all means at their disposal our democratic form of government?

(18) Should not intellectual groups, using a reasonable and practical interpretation consider the "four freedoms" not only an ideal, but a workable and permanent goal? Should not scientists continue in time of peace to defend America against subversive infiltrations as "The fifth columns" which may again attempt, as a social cancer, to eat at the vitals of duly established and regulated law and order?

(19) From a business viewpoint, is a low financial balance difficult to explain if you not only give away the valuable results of your research, but also pay publication costs to hasten the process of giving them away?

(20) An underlying thought of many observers of prominent conferences for the settlement of differences is, "Has humanity, through suffering and education, learned yet to cooperate for mutual benefit?" Was torture an indispensable factor in causing you to perform excellent research, or did you respond to your own will and interest?

Some may consider the foregoing questions unnecessarily critical or that they do not come within the usual reaches of science; if so, their attention should be called to a changing and dangerous trend that is founded on a debatable assumption, a trend to which many professions and organizations are receptive and one that will grow as the stress of war diminishes. This trend is the tendency to relegate the sciences to a position of lesser importance, and instead, for the purpose of maintaining human harmony, to rely in the post-war period on social sciences—philosophy, religion, history, economics, and education. Although there is much merit in asserting the dependence of peace upon better human relations, the assertion does not solve the problem. These social fields, significant and indispensable as they are, have not yet proved effective in maintaining international goodwill.

If the real scientists neglect to expand their activities and influences, with subsequent loss in prestige and curtailment of research, it will be a step toward unpreparedness—toward popular indiffenence and complacency—toward the next war. Science, so valuable in war, is equally effective in peace. No well-balanced solution of international ills, armed conflict and chaos, will discourage or handicap science. We must depend on science, even when no crisis exists.

Mankind has often turned to philosophy for answers to urgent questions, and perhaps always will, for we have no assurance that all the secrets of nature will ever be discovered. Yet such a practice recognizes the inadequacy of science and man's limitations in accepting responsibility for his own welfare. Our wars are extreme examples of our failures.

Time and again society has tried out its variations of behavior patterns, each with merits, each with faults. And all too often the merits are submerged and forgotten. We cannot help but wonder whether such speculation and trial-and-error methods are always necessary, and whether it may not be possible to solve more and more problems by the fact-finders, by scientific unbiased investigators. Does the price paid in terms of human life and suffering warrant delay in the permanent universal adoption of established knowledge? Such questions are with us always, in times of both peace and war.

This discussion is not an attempt to include all the issues of the universe nor to encourage an unreasonable expansion in science's objectives, but it is an emphatic appeal for the application of scientific methods to additional significant and vital realms. We hear the agonized voices of the impoverished, the suffering, and the dying; we see the crosses which mark the resting places of the war dead. We comprehend the price which, down through the ages, humanity has paid in the hope of attaining higher ideals and better ways of life. We look candidly at the results and see little cause for optimism. When we consider the future, our faith in the traditionally appropriate administrative non-scientific groups is at best only moderate. We wonder what a different approach might contribute, and if it would be welcomed and supported.

It may be that, great though its attainments, science will truly come into its own when it produces workable solutions to the old questions and problems that are the fundamental causes of human unhappiness and of national and international strife.

In conclusion, our rapidly maturing science should expand tremendously, should assume responsibilities adapted to the demands of its members, should protect itself through representation rather than restrict its activities and trust others to show benevolence, should continue its eminent part through research and the application of research in making the lives of people more full and complete, should influence the uses of discoveries for human betterment rather than for destruction, and should undertake the task of assisting with the solution of momentous borderline issues. Much may be accomplished through effective organization and through sustained active participation of all who labor in one of the noblest of all professions, the great brotherhood of science.