now with utilization of what we have to-day, trusting that, in the light of what we know from the past, it may be turned to advantage for future guidance.

I see in medicine a field of human endeavor, not only essential for well-being and enjoyment of the moment, but carrying unavoidable responsibility for that advance of mankind upon which its happiness will depend. Constructive effort in this subject will serve not only to turn the tide against the deadening influence of disease and ill health, but to exert also in some measure a creative influence. We see the forward movement of life in the remotest beginning of beginnings as we know them. To living, hoping human beings this movement can not seem naturally to terminate in any conceivable end of endings.

JOHN C. MERRIAM

CARNEGIE INSTITUTION
OF WASHINGTON

RESEARCH AND THE UNIVERSITIES[1]

IT gives me pleasure to welcome you to-day as guests of the University of Pennsylvania. As the head, for the time being, of a university, I am deeply interested in the problems of scientific research in which you have gained distinction, and in which you are still engaged. A conference called by a half dozen university presidents was held at the university last spring for the purpose of discussing research as carried on in the universities, its relation to the work of research institutes and to the great industrial corporations. There were present at the conference representatives of the universities, the research institutes, and the industrial corporations. Several important facts were emphasized by those who participated. From the point of view of the universities perhaps the most important fact is that they are almost invariably the source of training of researchers in every field of science, and the research foundations and industrial corporations look to the universities for the trained men and women to carry on the work. A second point of interest is that if research workers are to be withdrawn from universities to do the work of research institutions and of industrial corporations, it is important that universities be protected against such withdrawals of those who are in many cases their ablest teachers and investigators. The questions of immediate importance to all who are interested in scientific research are, first, how shall we train and encourage young men and young women to engage in scientific research, and how shall we afford those who are particularly qualified the opportunity to proceed without interruption along lines of study often begun with the doctor's dissertation. Is it possible for universities to set apart more or less completely from the work of teaching a number of men and women who if given the chance would probably develop into important workers in the field of science, or of any other subject included in the courses of study of our institutions of higher learning? It too often happens, as has been pointed out, that the brilliant young student is at once taken as a member of the teaching staff of his institution and loaded with teaching and administrative work to the detriment of his work in scientific investigation. I believe that practically all members of a university staff should do some teaching, not only for the development of their own minds, but also for the establishing of necessary contacts with possible future workers in their respective fields, and I believe also that many a possible research worker has his interest dulled by the routine of too much teaching. An effort that we are making at this university to solve this problem, in part at least, is based upon the idea, that a roster may be so arranged that several days in each week may be left free for the teacher to spend in his laboratory. Of course the real researcher will work in spite of unfavorable conditions, some working all night. It is not the fact that teachers do not have time to do research, but rather that their time is so broken up by teaching that it is ordinarily exceedingly difficult to obtain sufficient uninterrupted days, in which to engage in serious and continuous pieces of work. It is necessary also for universities to provide sufficient laboratory space, and a freedom from interruption, to encourage the undertaking of research work, particularly by the younger members of the faculty. In one of our scientific departments, the experiment is being made of placing all the teaching hours of the members of the faculty on certain days of the week, leaving several other days entirely free from teaching or administrative duties. This is already beginning to show results, and more results are expected as we are able to develop the system more extensively. I believe that this plan could be adopted by almost any institution, which possesses the necessary laboratory space and the necessary potential workers in the field of science. The universities are the places to which the world looks for the fundamental training of research workers, and it is important that every facility be afforded both the universities and the workers to develop human knowledge.

It is essential that research be planned and directed particularly in universities, and here we find it necessary to differentiate between the research work of the university and the research work of special in-

[1] Address of welcome to the National Academy of Sciences by the president of the University of Pennsylvania, November 8, 1926.

stitutions or of industrial laboratories. Perhaps the most important university function of an institution of higher education is that of increasing knowledge, and it must be recognized that productive scholarship is the usual test of the intellectual life of an institution.

There are two aspects of research; one of these is the work of research as a means of the solution of certain so-called practical problems, the other is research in general the object of which, while it may incidentally prove to be practical, does not have practicality as its end and aim, but merely the increase of human knowledge. In the universities, perhaps alone, is to be found in its most complete expression the spirit of pursuing knowledge for its own sake. There also is to be found the complete circle of human knowledge. The chemist, the historian, the mathematician, the geologist, the philologist, preserve a breadth of vision and a sense of proportion, owing to the fact that they are linked side by side in the same institution. Moreover the student in one field frequently finds in his own subject problems that require aid from the student in some other field. The universities, therefore, offer the best combinations of knowledge that are to be found in the world. From the university come the research workers of the future. The achievements in applying science may be justly and generously credited with great accomplishments, but all achievements of applied science rest upon the work of men and women who were, for the most part, university trained, and interested in the fundamental laws of nature rather than in any practical application of them. It is a distinct function of a university to advance knowledge all along the line, and to give to the world these additions to knowledge by which alone we can grow.

The National Academy of Sciences, composed as it is of the products of university education, is also the highest scientific body in this country. Its members are living exemplars of what universities have done, and they are also exemplars of what individuals have done who possessed and were possessed by the spirit of research, and who used their university foundations and principles merely as stepping stones to higher things.

JOSIAH H. PENNIMAN

FELLOWSHIP IN THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

ONLY fellows of the American Association may serve as elected members of the council or elected members of the section committees and only fellows may be representatives of the affiliated organizations in council and section committees. These are constitutional provisions (Constitution, Articles 4 and 5). Members who are not fellows may be elected to other offices and may be elected or appointed to other committees. In actual practice, however, the *ex-officio* members of the council and of its executive committee (the president of the association, the general secretary, the permanent secretary), as well as the section officers (chairman and secretary, the chairman being also *ex-officio* a vice-president of the association) are always fellows. The control of the affairs of the association is consequently in the hands of fellows. The council is the legislative body for the association as a whole, the executive committee acting for it at times other than during the annual meetings. The section committees are generally the legislative bodies for their respective sections, though action is sometimes taken by a section at one of its sessions. The permanent secretary and the section secretaries are the executive officers.

It is intended that the group of fellows shall include those members of the association who have contributed to the advancement of science by the publication of original scientific research or in other significant manner, such as teaching or directing research in an institution of repute. (By-Laws, Article II, Section 4, and special interpreting clause of December, 1924. See *Summarized Proceedings*, 1925, page 13.) This requirement is considered to have been met by members of affiliated organizations having a research qualification; on the basis of this statement the following categories of membership in affiliated organizations are now understood to imply eligibility to election to fellowship in the association.[1]

Fellows of the American Physical Society.
Fellows of the American Meteorological Society.
Regular members of the Optical Society of America.
Members of the Geological Society of America.
Fellows of the Mineralogical Society of America.
Members of the Association of American Geographers.
Active members of the American Society of Zoologists.
Fellows and honorary fellows of the Entomological Society of America.
Active members of the American Association of Economic Entomologists.
Members of the American Society of Naturalists.
Members of the American Psychological Association.
Members of the American Association of Anatomists.

[1] This list has been carefully prepared, but it may require additions from time to time. If an affiliated organization has research qualifications for its membership, or for a category of its membership, and if it is not properly cared for in this list, its secretary should take up this matter by correspondence with the permanent secretary of the association.