not do the work of the eye nor the eye of the foot. Neither can these several organs perform each its own function except as properly joined to the body by means of which they are correctly assembled and their activities coordinated. In like manner should the various branches of botany be united in one great central body—this body big enough, and strong enough, and flexible enough not only to include every phase of botany but to give freedom and inspiration to every one of its numerous ramifications. Such an organization I believe we already have in the Botanical Society of America. If not let it be so changed that it may be fit for the larger responsibility. Or if best discard it, which let us hope will not be necessary, and build up a new organization under whose banner all may enlist. Every student of plants should then be first a member of the great all-inclusive parent organization and secondly a member of the section or branch wherein his own particular field of endeavor lies. Thus united we shall stand in the power and dignity that so great a science deserves; but separated, we shall ever fail to measure up to the high destiny that may be ours. I repeat Professor Arthur's statement made in an address given before this society just ten years ago. "The botanists' realm is the vegetable kingdom."

Is not this then our theme this evening? The scope of botany, unrivalled by that of any other science, and botanical unity. Only, we believe, by the force of such a unity as has been suggested shall botany fulfil, in largest measure, its high mission in the commercial, the intellectual and the cultural life of the world. It is to this larger fraternity that I would call every student of plant life.

HERBERT HOOVER AND SCIENCE

By Dr. VERNON KELLOGG

PERMANENT SECRETARY, NATIONAL RESEARCH COUNCIL

As a boy preparing for college Herbert Hoover decided to go to a university which paid especial attention to science. He went to Stanford University, took major courses there in geology and mining, graduated in 1895, and began at once a successful career as mining engineer. This lasted up to the beginning of the World War, when he gave it up and became known to all the world as relief worker, Food Administrator, Secretary of Commerce, and President of the United States. In all these capacities he has shown a notable appreciation of science and the scientific method, and he has helped materially to support and extend scientific knowledge.

As mining engineer in charge of very large enterprises in Australia, China, Burma, the Ural Mountains, Mongolian Siberia, South Africa and elsewhere he attacked with success various scientific mining and metallurgical problems. Most notable, perhaps, was his success in Australia in advancing the flotation process and in working out means of profitably recovering the zinc content from low-grade silver ores.

In the prosecution of his large mining operations he successfully met important social problems arising from the gathering together of communities of thousands of workmen and their families in parts of the world distant from civilized regions. His great Kyshtim project in the Ural Mountains, for example, maintained a community of 70,000 people who were lifted by him through his scientific and social work from poverty and squalor to a high state of comfort and prosperity.

He is the author (with specialist collaborators) of "Economics of Mining," published by the *Engineering and Mining Journal,* New York City, 1905; also of "Principles of Mining," 199 pp., 1909, McGraw-Hill Book Company, used in mining schools; also of "De Re Metallica," by G. Agricola, founder of the modern science of mineralogy, translated by Mr. Hoover and his wife from the first medieval Latin edition of 1556. To the original text the translators added an important biographical introduction and an invaluable host of annotations and appendices about the development of mining law and mining and metallurgical methods from the earliest times to the sixteenth century. He also is the author of numerous addresses and papers published in mining and engineering magazines and elsewhere. He has lectured on engineering at Stanford and Columbia Universities, and has been president (1920–1921) of the American Institute of Mining and Metallurgical Engineers; president (1920–1921) of the American Engineering Council (federated American engineering societies); chairman of the Advisory Committee of the Food Research Institute, Stanford University (1921–); president (1927) of the International Radiotelegraph Conference; trustee (1920–) of the Carnegie Institution of Washington; trustee (1912–) of Stanford University, and officer or member of various other major national engineering and scientific societies and organizations.

He has been given honorary academic degrees by twenty-five universities, and has been awarded the following medals for scientific merit:

1914—Mining and Metallurgical Society of America—gold; jointly with Lou Henry Hoover for "distinguished contribution to literature of mining." ("De Re Metallica.")

1920—National Academy of Sciences—for "eminence in the application of science to the public welfare."

1928—American Institute of Mining and Metallurgical Engineers—for "achievement in mining."

1929—John Fritz Gold Medal—awarded jointly by the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers for notable scientific or industrial achievement.

In 1902 he was elected member of the American Association for the Advancement of Science, and fellow in 1915. On the occasion of the meeting of the association in Philadelphia in December, 1926, Mr. Hoover made a notable and largely attended public address ("The Nation and Science") in which he emphasized energetically the importance to the nation of science, and urged strongly the support by the people of this country of "pure" or fundamental science as a necessary basis for continuing advance in applied science.

> No greater challenge has been given to the American people since the great war than that of our scientific men in the demand for greater facilities. It is an opportunity to again demonstrate in our government, our business, and among our private citizens the recognition of a responsibility to our people and the nation greater than that involved in the production of goods or trading in the market.

He delivered a similar address ("The Vital Need for Greater Financial Support to Pure Science and Research") before the American Society of Mechanical Engineers in December, 1925. In this address he made the following statement:

> The far-sighted leaders of industry fully recognize the dependence of their progress upon advances in science, and emphasize their belief that fundamental research should be much more greatly aided. . . . We have prided ourselves on our practicality as a nation. Would it not be a practical thing to do to give adequate organized financial support to pure science? If, by chance, we develop a little contribution to abstract learning and knowledge, our nation will be immensely greater for it.

In 1922 he was elected member of the National Academy of Sciences, and in November, 1925, accepted the active chairmanship of a special board of eminent scientific men and outstanding men of public affairs set up by the National Academy to attempt to establish a National Research Fund of several million dollars for the support of work in fundamental science. Mr. Hoover took an active personal part in the work of obtaining pledges for this purpose from large industrial organizations and wealthy men of this country. The amount already pledged is at least five million dollars, with contingent possibility of another five.

As Secretary of Commerce and President he has made an impressive record in bringing about ever increasing support and extension of the work of the government's scientific divisions and bureaus. He became Secretary of Commerce in March, 1921. In the past ten years the appropriations for the support of the (primarily) scientific bureaus of the department have increased as follows: Bureau of Standards, from $1,354,632 to $3,485,671; Bureau of Fisheries, $1,291,810 to $2,640,560; Bureau of Mines, $1,302,642 to $2,729,480; Coast and Geodetic Survey, $2,316,317 to $3,020,104.

It was as a result of his vigorous championship that the establishment of a great National Hydraulic Laboratory ($350,000) at the Bureau of Standards was brought about.

He has been active in having formulated, adopted and enforced various important fish conservation measures based on careful studies by leading scientific fisheries experts of the country. In this connection have been established, under his active sponsorship, an Upper Mississippi River wild life and fish refuge; a Northern Pacific Halibut Convention with Canada, and a generous five-year construction and maintenance program for the Bureau of Fisheries, with special support for its strictly scientific work. He also obtained, after an active struggle, authority for the Secretary of Commerce to say when, where and how salmon and other fishes were to be taken in the waters of Alaska. In exercising this authority, Mr. Hoover placed great dependence on the advice of the late Dr. C. H. Gilbert, one of the country's greatest fishery scientists, as well as his assistant in charge of salmon research, Dr. W. H. Rich.

The Bureau of Mines, transferred in 1925 from the Department of the Interior to the Department of Commerce, was enabled, with the active sponsorship of the Secretary of Commerce, to expand materially its scientific investigations of fundamental problems in the extraction of shale oil and in the extraction of potash from ores occurring in the various parts of the United States.

Mr. Hoover's special interest in aeronautics led to large expansion of the scientific work of the aeronautics branch of the Department of Commerce. The total appropriation for the work of this branch in the year 1927 was $500,000, while in the year 1929 it was over $5,000,000. With this large increase in

funds available, the division was able to develop a comprehensive and far-reaching constructive research program.

While Mr. Hoover was Secretary of Commerce, radio broadcasting was begun. He took great interest in the scientific development of radio and realized the future possibilities of broadcasting. He presided over four national radio conferences and took a lively interest in the proceedings of the International Radio-Telegraph Conference held in Washington in 1927.

In 1925 Mr. Hoover negotiated the transfer of the seismological investigations from the Weather Bureau of the Department of Agriculture to the Coast and Geodetic Survey in the Department of Commerce. A direct attack is being made by the survey on the problem of obtaining complete information about all earthquakes occurring in the United States or regions under its jurisdiction, and special investigations are being conducted to discover fundamental facts which may be made available to engineers and builders in connection with building for earthquake resistance. The Coast and Geodetic Survey undertook a survey of the Mississippi River area from Cairo to New Orleans, thus making available basic data touching fundamental problems of flood control.

Mr. Hoover has shown his special interest in promoting scientific care of child health and protection by his organization in 1922 of the American Child Health Association, of which he was the first president, and by the organization of the White House Conference on Child Health and Protection.

But a catalogue of the scientific undertakings encouraged and materially supported by Secretary and, later, President Hoover would be a long one—much too long a one to print here.

As Secretary of Commerce and President, Mr. Hoover's relation to scientific work has been that of encourager, supporter and administrator, necessarily not that of laboratory or field man. As such supporter and administrator of science he has made much and great scientific work possible; and for this he should have the gratitude of scientific men.

What President Hoover said of Dr. W. H. Welch in his impressive address at the celebration, in April, 1930, of Dr. Welch's eightieth birthday may well be said of Mr. Hoover:

> Our age is marked by two tendencies, the democratic and the scientific. In Dr. Welch and his work we find an expression of the best in both tendencies. He not only represents the spirit of pure science but constantly sees and seizes the opportunities to direct its results into the service of humankind.

OBITUARY

MEMORIALS

THE centenary of the birth of James Clerk Maxwell is to be celebrated in the University of Cambridge on October 1 and 2, following on the Faraday celebration and the centenary meeting of the British Association in London. Addresses are to be given at Cambridge by Professors Einstein, Langevin, Larmor, Planck, Sir James Jeans and Sir J. J. Thomson.

As its contribution to the celebration of the hundredth anniversary of the discovery of electromagnetic induction by Michael Faraday in England and Joseph Henry in America, two lectures have been given at the Massachusetts Institute of Technology. Faraday was the subject of the first lecture, which was given on February 13 by Dr. W. F. G. Swann, director of the Bartol Research Foundation of the Franklin Institute, and Dr. W. F. Magie, Henry professor of physics, emeritus, of Princeton, lectured on February 18 on the life of Joseph Henry. Both lectures were open to the public.

THE Hunterian Society of London commemorated the two hundred and third anniversary of the birth of John Hunter by a banquet at the May Fair Hotel on February 19.

AT a recent meeting of the Board of Health of New York City the following resolutions were adopted:

WHEREAS, Dr. Charles Krumwiede, an assistant director in the Bureau of Laboratories, has passed to the great beyond at the early age of fifty-one years, and

WHEREAS, Since his connection with the laboratory in 1909, Dr. Krumwiede was an invaluable, resourceful and most painstaking worker, and

WHEREAS, His studies on the types of tubercle bacilli, on bacilli of the typhoid-colon group, on psittacosis and on many other important bacteriological problems added lustre to the work of the Bureau of Laboratories, be it therefore

Resolved, That the Board of Health record on its minutes its very great appreciation of the work of this distinguished scientist and its great sorrow at the passing of so talented an investigator and able administrator, and be it further

Resolved, That a copy of these resolutions be sent to the bereaved family with an expression of the board's deep sympathy in its irreparable loss.

RECENT DEATHS

DR. VERANUS A. MOORE, from 1908 to 1929 director of the New York State Veterinary College at Cornell University, died on February 11, at the age of seventy-two years.

HANDEL T. MARTIN, assistant curator of the University of Kansas Museum of Paleontology, died in Lawrence on January 15. He was sixty-eight years old.

JOHN H. LIGGETT, assistant professor of psychol-