FRANK A. WARDLAW and his son, Frank A. Wardlaw, Jr., have recently presented to the U. S. National Museum the only cast now known to exist from a life mask of Thomas A. Edison. The mask was made in 1878, the year of the invention of the phonograph and the year before the invention of the incandescent lamp. As this was the only mask of Edison ever made, it will be of value as a record. The same donors presented original Edison lamps of the first types of paper filament and bamboo filament lamps, a galvanometer used by Joseph Henry, and several models of locomotives and marine engines.

THE executive committee of the sixth International Congress for Industrial Diseases and Accidents, held at Geneva last year, has instituted a prize of 1,000 Swiss francs for the best essay on the estimation of the consequences of an industrial accident. The typescript of the essay, which may be written in English, French, German or Italian, should be sent to the general secretary of the congress, Geneva, before December 31, 1934.

AT a recent meeting of the American Institute of Nutrition—Dr. H. C. Sherman, president, and Dr. John R. Murlin, secretary-treasurer—*The Journal of Nutrition,* owned by the American Institute of Nutrition, was transferred to The Wistar Institute. Beginning in January, 1934, this journal will be published by the institute under the same editorial management. Announcement of an increase in the number of yearly issues will be made later. The acquisition of *The Journal of Nutrition* is the first step in the creation of a department of nutrition at The Wistar Institute.

THE return of a permanent American delegate to the International Institute of Agriculture at Rome is probable as the result of action by the Senate Foreign Relations Committee, which has approved a bill by Senator Hiram Johnson, of California, to finance representation at a cost of $48,500 a year. The institute is the nucleus for world planning in crop production. Seventy-four nations participate and America had a permanent delegate at the institute up until four years ago.

THE New York Botanical Garden is now conducting a school for gardeners modeled on those of Kew and Edinburgh. In the past the gardening profession in the United States has been recruited almost entirely from Europe. Student-gardeners are temporary employees remaining at the garden for two years. During the day-time they perform the duties of gardener, being moved as opportunity permits from one department to another to broaden their experience. They attend a two-year course of evening lectures, including such subjects as general and systematic botany, physics and chemistry, soils and fertilizers, plant pathology, entomology, genetics and plant breeding. They also attend demonstrations by the staff and visit other gardens. On satisfactory completion of the two years course a certificate is awarded, also a year's extension of employment at the garden during which time the student is expected to seek employment elsewhere. Appointment as student-gardener is limited to those prepared to do the work without remuneration. The New York Botanical Garden, in cooperation with the Horticultural Society of New York and the National Association of Gardeners, is also conducting a course for professional gardeners in the basic sciences underlying gardening practise.

DISCUSSION

THE CRISIS IN SCIENTIFIC RESEARCH AND THE WAY OUT

WE find ourselves, to-day, faced with a crisis in scientific research, especially in biology and medicine. Professor Krogh has already referred to it at the Thirteenth International Congress of Physiology, held at Boston in 1929.

The causes of this difficulty would seem to lie in a discrepancy between the efforts and the results of research work. The effects of collective scientific endeavor are to-day quantitatively so vast that the possibility of surveying and applying them with complete assurance and certainty becomes ever more remote. From this results a constant increase in specialization; one perceives the various connections less and less clearly, the great clear directing lines and historical points of view tending to disappear. Or, one is obliged to undertake a quite incredible amount of labor, in fact, to devote one's entire life, so to speak, to the subject, without even being certain that the results will prove worth the trouble.

This often only half perceived, almost unconsciously felt, recognition discourages many young scientists so that they turn more willingly towards those forms of activity which promise more practical results, and this constitutes the chief danger to scientific research and its traditions.

The principal cause of all this lies, in my opinion, in the fact that in the technique of publication and survey of scientific results, in the method of mental and scientific synthesis, the old established customs still hold sway, but these are no longer suited to the pace and necessities of our time. We are, to-day, accustomed to the scientific organization of work in every sphere of industry, commerce and administration, one may even say in politics and political propa-

ganda. Only in the realm of science one fails to trace any kind of scientific organization worthy of the importance of science; and in this way much time, energy and economy of means is wasted.

This is especially conspicuous in the production of scientific literature. Science, whilst it is one and international, appears in publications in more than twenty languages, in hundreds of magazines, in thousands, even tens of thousands of pamphlets, in a year. The themes of research work are left mostly to chance, thousands of problems are worked up without any logical discrimination, without intrinsic power, often occasioned by purely external circumstances, for reasons which have nothing to do with the research itself. And these millions of pages are poured out over us like a flood, they cover and swamp us, they inundate us so that we stand continually in a despairing struggle to keep our heads above this sea of papers.

The way out of this chaos is the same as that taken by economics and by the state, namely, rationalization or so-called scientific management. One need not think that through rationalization intuition, the creative faculty, will be suppressed; on the contrary, it will then first obtain a real facility for its awakening, and will then first be able to develop itself satisfactorily. The less energy required to be expended on overcoming difficulties, the more there will be for creation, for invention, and the higher will be the quality of its output.

I have tried for some years to apply to the realm of science the principles of scientific management in industry, administration and politics, and have worked out a system for the means of rationalizing the scientific institutes for research activities and for the collective scientific institutions.

The whole refers to the following system of subjects:

I. Scientific laboratory management:
  (1) Administration of scientific institutes.
  (2) Application of specific scientific activities:
    Practical arrangements.
    Economy of time.
II. Work of research-workers:
  (1) Physical and psychic hygiene of mental work.
  (2) Systematic method in research, especially time- and plan-schedules.
  (3) Application of the card system for collecting scientific data and ideas.
III. Collective scientific activities:
  (1) Congresses—their organization and general plan of research.
  (2) Scientific literature—systematization of periodicals, libraries, reports, scientific treatises, schedules and card indices.
  (3) Scientific language and standardization of expert expressions.

I suggest that an International Committee might consider these problems systematically and make definite propositions.

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COOPERATION AMONG AMERICAN ZOOLOGISTS TOWARD A COMPENDIUM OF CULTURE METHODS FOR INVERTEBRATE ANIMALS

AT the Atlantic City meeting of the American Association for the Advancement of Science, this matter again came up. Vice-president Zeleny, chairman of Section F—Zoology, appointed as a committee to consider it Dr. Frank E. Lutz, of the American Museum of Natural History, Dr. Paul S. Welch, of the University of Michigan, and Dr. J. G. Needham, of Cornell University.

At the present time there is difficulty in finding information about culture methods. Much more experience has been gained by individuals than has ever been made available through publication. Much also undoubtedly exists in papers whose titles give no clue of its presence. Such information if gathered together and made available to the many whose work nowadays demands the use of living materials in continuous supply would be a great aid to biological research.

The committee has found a very general feeling of need for such a compendium and is proceeding with plans for it. Its plans are as yet wholly tentative. A book is contemplated, to contain the information that is needed by the one who is trying to rear and maintain cultures. It is proposed to have a short introductory chapter on general principles of management, with the main body of the book made up of signed articles, volunteered by individual workers and based on their own practical experience.

It is hoped that for at least one species of each considerable group of invertebrates there may be included a fairly complete account of maintenance requirements, covering collecting methods and devices, cages and breeding quarters, plans for feeding and watering, cleaning and aerating quarters, breeding management, and all else that enters into the maintenance of the species through successive generations. Such full accounts, however, will be few, and less comprehensive items will be welcome.

The committee reserves the right to condense and to combine where necessary to avoid duplication. An effort will be made to include bibliographical refer-