mental similarities between himself and the lower organisms, the latter represented by his laboratory specimens.

Next the student is given an "unknown" vertebrate to study. For the most part the student is placed on his own responsibility and judgment in handling the new specimen, his problem being to determine and record facts in the best possible manner, and to make intelligible to any one unfamiliar with it, the appearance and organization of the new animal. Having been given a method with the earlier specimen he is expected to apply it to the second. A large majority of the students give a ready response to this appeal to their individual initiative and to the opportunity for making discoveries for themselves. In some cases an interest which may have been lagging is stimulated into renewed and sustained activity.

The compound microscope is next introduced by a special problem on the use of the microscope, and this is followed by the study of cells and tissues. Then follow in succession studies on embryology, cell division, maturation and fertilization, with especial attention to the behavior of the chromosomes. But since the complex behavior of the chromosomes in mitosis, maturation, and fertilization is most satisfactorily explained as the mechanism for the behavior of mendelian factors, the subject of heredity, and especially mendelism, is considered along with these morphological studies. A book on heredity, such as that of Conklin[8] or that of Guyer[9] is read by the student and he also carries out a breeding experiment with *Drosophila*.

Next an evolutionary series is presented consisting of representatives of the protozoa, cœlenterates, flat worms and annelids, followed by other studies illustrating evolution. In addition to furnishing evidences for organic evolution, the series is made to illustrate a variety of biological principles, further details about which will, for the sake of brevity, be omitted here.

These objective studies are handled in the form of problems based upon the scientific method previously outlined. As the course develops and the student gains in experience he is placed more and more on his own responsibility as to methods of procedure and record, thus permitting him to apply the lessons in method that have been learned. In addition to training in method, the student gains through these studies much of the information that he is supposed to acquire, and gains it in a way that will make it of the most value and permanency for him. Additional information is conveyed through lectures, quizzes, and assigned readings, so selected and arranged as to emphasize general principles and to contribute to the "unity and balance" of the course.

Since the scientific method is more time-consuming than other methods, its use imposes rather definite limitations upon the amount of ground which may be covered in any given time. But the results have been so much more satisfactory than those secured by other methods that the instructors giving the course feel that its use is thoroughly justified.

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[8] "Heredity and Environment," Princeton, Princeton University Press.

[9] "Being Well Born," Indianapolis, Bobbs-Merrill Co.

LOUIS ALBERT FISCHER

LOUIS ALBERT FISCHER, physicist and chief of the Division of Weights and Measures of the United States Bureau of Standards, died at his home in Washington on July 25, aged fifty-seven years. Early in life he joined the old weights and measures office of the U. S. Coast and Geodetic Survey. During this period he compared the standards of length in the custody of the national government with the standards submitted for test by manufacturers, educational institutions, and the various state weights and measures bureaus. The duties of this position also included the standardization of weights, the ordinary weights of commerce as well as the weights

used in the most precise work of the analytical chemist, and the standardization of thermometers and of surveyors' tapes used in precise geodetic measurements. This early work laid the foundation for the establishment of the National Bureau of Standards in 1901, in the creation of which he took a conspicuous part. At the organization of that Bureau, he was chosen as chief of the Division of Weights and Measures, a position which he has since filled with distinguished honor. In a life, crowded with important administrative responsibilities, he had, nevertheless, found opportunity to carry on scientific researches which have won for him recognition as one of the leading American metrologists. He built up in the Bureau of Standards a strong division of weights and measures, from which have come many valuable scientific and technical contributions. Owing to the limitation of space, I can only refer to a few of these here, but many will recall the investigations and papers relating to the densities of aqueous alcoholic solutions, the standardization of chemical glassware, the thermal expansivities of metals, alloys, and dental amalgams, the testing of clinical thermometers, the comparison of the national prototype meter with the international meter, the testing of watches, model laws for state weights and measures services, specifications for railroad track scales, the standardization of screw threads, gauges, etc. In many of these papers he shared the honors of authorship and all of them bear the impress of his inspiring and forceful leadership.

In 1905 Fischer organized the Annual Conference of Weights and Measures of the United States and he has since been the secretary of that organization which includes national, state, and municipal officials and others interested in the promotion of wise and uniform legislation and regulations relating to weights and measures. His advice and opinions have been sought by officials dealing with these matters in every state in the Union and probably no man in this country has had so profound and far reaching an influence in all matters appertaining to weights and measures in the past decade. He has for many years been annually designated by the president to serve on the commission entrusted with the responsibility of testing the "fineness" of the coinage, and he has, on numerous occasions, been invited to testify before Congressional Committees on Coinage, Weights and Measures.

Shortly after the entrance of this country into the World War, Fischer was chosen and commissioned a major in the Ordnance Department of the U. S. Army and was placed in responsible charge of the important section of gauge design. Here again his remarkable abilities as an administrator and organizer, combined with his tireless energy, enabled him to make a highly efficient organization out of a hastily assembled personnel, that was necessarily built up on the basis of quick but discriminating judgment. The value to the nation of his broad scientific grasp of his subject, of his engineering and technical training, of his unerring judgment, and of his untiring devotion to duty in this position can hardly be overestimated.

Fischer was a graduate of the George Washington University, a member of the American Physical Society, of the Physical Society of France, of the American Society of Mechanical Engineers, of the Washington Academy of Sciences; member and past-president of the Philosophical Society of Washington, and fellow of the American Association for the Advancement of Science. For many years he has been an active member of the Cosmos Club and of the Columbia Country Club.

He was a lover of clean and manly sports and achieved distinction as an athlete. In his early manhood he was a noted oarsman, winning many honors for the Potomac and Analostan Boat Clubs in local and national regattas. Rather late in life he took up tennis and soon won recognition as one of the leading tennis players of Washington, representing the Bachelors', the Dumbarton, and the Columbia Country Clubs in many local, intercity, and interstate tournaments.

Fischer, like his distinguished colleague Rosa, who died only a few weeks before, be-

longs to that group of public officials, growing increasingly prominent in the scientific and technical services of the government, who willingly forego the rewards and comforts that their brilliant abilities might easily win for them in other walks of life, in order that they may follow the highest ideals of their profession. In the example of his splendid life, in the influence of his wise and unerring judgment and counsel, and in his splendid idealism, Fischer will continue to live on, in the years that stretch out before, in the memory of those whose lives were enriched by his friendship.

C. W. WAIDNER

SCIENTIFIC EVENTS

THE BRITISH NATIONAL PHYSICAL LABORATORY

THE report of The British National Physical Laboratory for 1920, which was recently issued, gives a survey of the work carried out in the various departments during that year, and also a statement of the program for 1921–22.

From the abstract in the London *Times* we learn that in regard to testing work, the charges for which have been revised owing to increased cost, the number of tests made in some departments was considerably smaller than in the preceding year and even than in the year before the war, though in others an increase is recorded. Of clinical thermometers no fewer than 1,598,100 were tested, and it is interesting that there has been a steady improvement in the quality of the instruments since the introduction of the order requiring them to be submitted to test.

In spite of the falling off in the routine work of certain sections, the activities of the laboratory continue to grow, and the demands upon it are likely to be increased in consequence of the steps taken by the government for the establishment of coordinating research boards for physics, chemistry, engineering, and radio research. The Radio Research Board has drawn up and approved a scheme of research to be carried out at the laboratory, and the Physics Research Board has also indicated certain lines of research which it is considered desirable the laboratory should take up. Some additions to the buildings have been authorized and others are under consideration. The space available for extension is, however, very limited, and accordingly measures have been taken to secure land for building purposes immediately adjoining the laboratory grounds.

As usual, in addition to researches of a general character, the laboratory has in hand various special investigations for government departments and other bodies. The Photometry Divison, for example, has undertaken experiments on ships' navigation lamps for the Board of Trade, on miners' lamps for the Home Office, and on motor-car head lamps for the Ministry of Transport. It is assisting the Office of Works in connection with the lighting of government offices, museums, and other buildings. Experiments have been made for the purpose of securing adequate illumination on the walls at the National Gallery, while avoiding direct sunlight and of diminishing as far as possible reflection of objects and people in the glass covering the pictures. Measurements in the Houses of Parliament have shown that, especially in the House of Commons, the illumination is very low—less on the average than the equivalent of one candle at a foot, whereas it is usually considered that three or four times as much should be provided for the easy reading of such matter as manuscript notes.

RESOLUTIONS OF THE MEDICAL BOARD OF THE JOHNS HOPKINS HOSPITAL

THE resolutions limiting the fees of surgeons operating at the Johns Hopkins Hospital to $1,000 and fees for hospital visits to $35 weekly, recently passed by the trustees on the recommendation of the Medical Board, are as follows:

WHEREAS, the trustees of the Johns Hopkins Hospital desire that all patients may leave the hospital feeling that they have received not only proper professional, nursing and administrative service, but also that they have been dealt with fairly in every particular, including charges for medical and surgical service; and