RECENT DEATHS

HARRY BURR FERRIS, since 1933 professor emeritus of anatomy of the School of Medicine of Yale University, died on October 12 at the age of seventy-five years. He had been a member of the faculty of the School of Medicine for forty-one years.

MORRIS B. CRAWFORD, professor emeritus of physics at Wesleyan University, who until his retirement in 1921 had been a member of the faculty for forty-four years, died on October 9. He was eighty-eight years old.

DR. CHARLES NICOLL BANCKER CAMAC, consulting physician of New York City, died on September 20 at the age of seventy-two years. He was from 1910 to 1937 assistant professor of clinical medicine at the College of Physicians and Surgeons, Columbia University.

DR. ALBERT BUELL LEWIS, curator of Melanesian ethnology at the Field Museum, Chicago, died on October 10 at the age of seventy-three years.

SIR WILFRED THOMASON GRENFELL, founder of the Labrador Medical Mission, died on October 9. He was seventy-five years old. Sir Wilfred was rector of St. Andrews University, Scotland, in 1929.

SIR ROBERT ABBOTT HADFIELD, London, metallurgist, the inventor of manganese and silicon steel and of other metallurgical improvements, died on September 30 at the age of eighty-one years.

DR. HENRY STROUD, emeritus professor of physics at the University of Durham, died on September 3 at the age of seventy-nine years.

DR. R. T. HEWLETT, emeritus professor of bacteriology at the University of London, died on September 10 at the age of seventy-five years.

DR. VITO VOLTERRA, formerly professor of mathematics at the University of Rome, died on October 11 at the age of eighty years.

DR. JULIUS WAGNER-JAUREGG, of the University of Vienna, who in 1927 was awarded a Nobel Prize for his work in the use of malaria and other fevers in treating syphilitic paralysis, died on October 1. He was eighty-three years old.

SCIENTIFIC NOTES AND NEWS

PROFESSOR GEORGE D. BIRKHOFF, Perkins professor of mathematics at Harvard University, has been elected a foreign associate of the National Academy of Sciences of Lima.

DR. WALTER B. CANNON, George Higginson professor of physiology at the Harvard Medical School, has been appointed Charles M. and Martha Hitchcock professor at the University of California for February, 1941.

DR. GUSTAV EGLOFF, director of research for the Universal Oil Products Company, has been awarded the Octave Chanute medal, given annually for the best paper on mechanical engineering read during the year before the Western Society of Engineers. The paper was entitled "Motor Fuels of the Present and the Future."

THE doctorate of laws was conferred at the autumn convocation of Queen's University, Kingston, Ontario, on Dr. J. B. Tyrrell, consulting mining engineer of Toronto, president of the Kirkland Lake Gold Mining Company.

The Experiment Station Record reports that, following service as agricultural adviser to the Government of Haiti, Dr. Atherton Lee, director of the Puerto Rico Federal Station, was tendered the decoration by the President of Haiti as an officer in the Legion of Honor and Merit of that country. Since his work in Haiti, Dr. Lee has served as agricultural adviser to the Governments of Ecuador and Colombia.

PROFESSOR LANCELOT HOGBEN, of the University of Aberdeen, author of "Mathematics for the Millions," has become for the present academic year a member of the faculty of the University of Wisconsin. He is giving a course on the history and significance of science, and is conducting a seminar in genetics.

ACCORDING to *Nature*, Dr. Ivor Jenning has been appointed principal of the University College of Ceylon, and Stanley A. A. Hammond educational adviser on the staff of the West Indian Comptroller.

DR. H. P. NEWSHOLME has resigned his professorship of public health in the University of Birmingham. Dr. G. A. Auden has been elected acting professor for the duration of the war.

DR. RICHARD J. LUND, editor of the *Mining Congress Journal*, has been made assistant group executive in the Mining and Mineral Products Division of the Advisory Commission to the Council of National Defense. He will coordinate work relating to a variety of minerals in the defense program. In this work he is closely associated with Dr. C. K. Leith, consultant on minerals to the commission, and with R. C. Allen, H. K. Masters, H. C. Sykes and E. Vogelsang, specialists on various strategic mineral commodities.

E. W. ENGSTROM, director of general research of the Radio Corporation of America Manufacturing Company, has been appointed manager of all research activities for the company.

DR. GANO DUNN, president of the J. G. White Engineering Corporation; Dr. David Sarnoff, president of the Radio Corporation of America, and Dr. Harry Woodburn Chase, president of New York University, are included among sixty-two leaders in the commercial, financial, educational, labor and other activities of New York City, who have been appointed by Mayor La Guardia, at the request of Governor Lehman, members of the Local Defense Committee.

DR. CARLYLE W. BENNETT, pathologist in the Division of Sugar Plant Investigations of the Bureau of Plant Industry, who is stationed at Riverside, Calif., sailed for Argentina on September 20 on a scientific mission of six months' duration. Dr. Bennett will investigate virus diseases of sugar beet as they occur in Argentina, giving special attention to the properties of the Argentine curly top known to exist in the Tucuman Province. The investigations will be conducted in collaboration with the Tucuman Experiment Station, and with the Ministry of Agriculture at Buenos Aires. Dr. Bennett expects to return to Riverside in March.

DR. DONALD K. TRESSLER, professor of agricultural chemistry at Cornell University, chief in research and head of the Division of Chemistry of the Agricultural Experiment Station at Geneva, has leave of absence this year in connection with research on the quick freezing of food products. He will visit fruit utilization plants on the Pacific coast, and will study the methods of freezing, canning and dehydrating, and use of by-products.

DURING the past summer Professor A. M. Bateman, a member of the department of geology of Yale University, investigated a deposit of asbestos in Venezuela; Professor R. F. Flint continued his study of glacial features in central Washington, to which he has devoted several earlier seasons; Professor and Mrs. A. Knopf resumed their work on the intrusion and the contact-metamorphic effects of the Boulder batholith, in the vicinity of Helena, Mont.; Dr. G. E. Lewis conducted an expedition to collect vertebrate fossils in parts of Montana, Wyoming, New Mexico and Colorado; Professor C. R. Longwell revisited localities in southern Nevada and western Arizona; George Switzer completed a field study of a problem involving glaucophane schist in the northern Coast Ranges of California. In January, 1941, Professor Longwell will return to Nevada and Arizona for several months of field work, chiefly in the Muddy Mountains and the southern part of the Virgin Mountains. John S. Shelton, instructor in the department last year, during the fall and winter will study and map the northern part of the Virgin Mountains.

DR. W. F. G. SWANN, director of the Bartol Research Foundation of the Franklin Institute at Swarthmore, Pa., gave an address on October 17 before the Washington Academy of Sciences entitled "The Laws of Nature."

DR. C. P. RHOADS, director of the Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, will address a joint meeting of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine on Monday evening, October 28, at the Palmer House. His subject will be "Physiological Aspects of Vitamin Deficiency."

PROFESSOR GREGORY PINCUS, of Clark University, gave an address entitled "The Developmental Physiology of Rabbit Eggs" before the Section of Biology of the New York Academy of Sciences on the evening of October 14.

AS the outcome of a conference on the problems of maintaining pure genetic strains of animals and plants needed for laboratory studies in medicine, genetics and related fields the Division of Biology and Agriculture of the National Research Council has set up a committee charged with facilitating the maintenance of needed cultures of various groups of organisms, with the following members: L. T. Webster, *chairman;* M. Demerec, W. Landauer, E. Brand, R. A. Emerson, C. C. Little, Myron Gordon and P. W. Whiting. The committee will welcome information as to the problems of the maintenance of laboratory cultures in the fields which it covers.

AT the installation on October 25 and 26 of Dr. Howard Landis Bevis as seventh president of the Ohio State University, Dr. James Bryant Conant, of Harvard University, will be one of the speakers. The title of his address will be "The University and the Advancement of Learning." In connection with the installation on October 24 there are planned conferences on "The University and Agriculture," with Dean John F. Cunningham, of the Agricultural College, presiding, and on "The University and the Professions," with Chief Justice Carl V. Weygandt, of the Supreme Court of Ohio, as the presiding officer. Speakers at the agricultural conference will be Dr. Albert R. Mann, vice-president of the General Education Board, New York, and Dean Walter Coffey, of the College of Agriculture of the University of Minnesota. Dr. Roscoe Pound, dean emeritus of Harvard Law School, and Dr. Morris Fishbein, secretary and editor of the *Journal* of the American Medical Association, will speak at the conference on the professions.

ABSTRACTS for papers to be presented before the December meetings of Section I of the American Association for the Advancement of Science should be in the hands of the secretary of the section, Dr.

Leonard Carmichael, Tufts College, Massachusetts, by November 4. The abstracts should be about one hundred and fifty words.

THE issue of *Nature* for September 14 contains the following announcement: "For the time being the printing and publication of *Nature* may be delayed. Readers may be assured, however, that such delay, if any, will be kept to the minimum."

THE program of the meeting of the New York State section of the American Physical Society, which will be held at Syracuse University on October 26, includes a paper by Professor P. J. W. Debye, of Cornell University, on "The Influence of Atomic Motion on Interference Diagrams" and one by W. H. Carrier, entitled "Physics in Air Conditioning." On the previous evening Dr. Robley Evans, of the Massachusetts Institute of Technology, will deliver the Sigma Pi Sigma public lecture. He will speak on "Some Medical Applications of Nuclear Physics."

THE Society of Rheology meets at the American Museum of Natural History on October 18 and 19. Technical sessions were planned for both days. After the annual dinner on Friday evening Dr. Roy Waldo Miner, curator of living vertebrates at the museum, was expected to give a lecture entitled "Beneath the Seas for Museum Exhibits."

THE twentieth annual meeting of the Highway Research Board of the National Research Council will be held in Washington at the building of the National Academy of Sciences during the week beginning December 2. Sessions will be held on Wednesday, Thursday and Friday, December 4 to 6. According to the tentative schedule released by Roy W. Crum, director of the board, the Departments of Design, Materials and Construction, Maintenance, Economics and Soils and the Committee on Roadside Development will hold meetings on December 3 which will be open to the public. Board sessions will start on Wednesday morning, with the discussions centered about materials and soils investigations. On Wednesday afternoon topics relating to highway economics will be discussed; on Thursday morning, traffic; on Thursday afternoon, design and roadside development, and on Friday morning, finance and maintenance.

A SPECIAL dispatch to *The New York Times* states that the Pan American Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere was signed at the Pan American Union on October 12 by the United States and six Latin American republics. Diplomatic representatives of Cuba, El Salvadore, Nicaragua, Peru, Venezuela and the Dominican Republic joined Cordell Hull, Secretary of State, in affixing their signatures. The new agreement would bind the signatories to create national parks, wilderness reserves and wild life sanctuaries in their territory. It is open for the signature of all other countries in the Western Hemisphere. The governments pledge themselves to preserve natural scenery, striking geological formations and regions containing objects of esthetic, scientific or historic interest. The convention also urges the granting of permits for the killing and capturing of certain species to scientific expeditions only.

IT has been announced that the 1941 convention of the American Association of Cereal Chemists will be held in Omaha, Nebr., from May 19 to May 23. R. M. Sandstedt, of the Nebraska Experiment Station, is chairman of the program committee. J. M. Doty, Omaha Grain Exchange, is chairman of the local committee. The officers of the association as elected at the recent New York convention are as follows: *President,* Claude F. Davis, Noblesville Milling Company, Ind.; *Vice-president,* Charles N. Frey, The Fleischmann Laboratories, New York; *Secretary,* Jim Doty, Omaha Grain Exchange Building; *Treasurer,* Perie Humold, Southwestern Milling Company, Kansas City, Kan.; *Editor-in-chief of Cereal Chemistry,* M. J. Blish, Berkeley, Calif.; *Managing Editor of Cereal Chemistry,* R. M. Sandstedt, Agricultural Experiment Station, Lincoln, Nebr.

THE "Graduate Fortnight" of the New York Academy of Medicine opened on October 14. The course consists of twenty-seven evening addresses on the origin, diagnosis and treatment of infections, involving the principal systems and organs of the body, with special reference to chemo-therapy. Clinics and clinical conferences are being held in twenty-one of the leading hospitals of the city. The scientific exhibit is at the New York Academy of Medicine. It includes items on the history of infections affecting various parts of the body. Dr. Malcolm Goodridge, president of the New York Academy of Medicine, gave the address of welcome on the evening of October 14 to visiting physicians and fellows of the academy.

IT is reported that the late William J. Wollman, securities broker, left a net estate of $7,233,926, of which a residuary estate of approximately $6,000,000 is left in trust for the benefit of his sister, Kate Wollman, the principal to be used after her death for "public, charitable, educational or scientific uses and purposes." The William J. Wollman Foundation was set up in 1938 for the purpose of administering this trust.

THE October number of *Current Geographical Publications,* issued by the American Geographical Society of New York, initiates a service of interest to geographers, teachers, writers and workers in many fields. Each number will have as a special supplement a

classified list of photographs contained in publications received in the American Geographical Society's library and indexed in its Photograph Catalogue. The Supplement is sent to all subscribers to *Current Geographical Publications* and can also be obtained separately.

DISCUSSION

THE SPAWNING MIGRATION OF THE SALMON

LITTLE is known concerning the factors guiding the migratory movements of the salmon. However, there are certain facts recognized by all workers in the field. (1) There are definite spawning grounds that are visited by specific species of salmon year after year. (2) Salmon runs have been established where no member of the species could ever have visited before being established.[1] (3) Salmon runs have been developed in virgin streams without having been planted. The best illustration is found in New Zealand, "Not a single individual of the quinnat species has ever been planted in a Canterbury stream, yet the Canterbury rivers now provide the best quinnat fishing in the Dominion, the species having migrated to their mouths from the Waitaki, where the original fry were planted."[1] (4) Efforts to establish salmon runs in certain other streams have failed. (5) Finally and most significant of all, repeated efforts to reestablish salmon runs in rivers now much modified which originally supported the particular species have failed. It is this last fact that has prompted me at this time to give a summary of my investigations on the physico-chemical behaviors of waters as factors in the spawning migration of the salmon, which in due time will be published in *Ecology*. No one doubts that there are regularly recurring cycles in the physiological activity of the salmon, of ocean currents and of physico-chemical conditions of the sea water and of waters of spawning streams that regulate and guide the migratory movements of the salmon. The controversy is over the cause or causes of these movements or the guiding force or factors and the details of the paths over which the salmon travel. Knowledge of these factors in conserving the salmon is of less vital importance so long as the conditions remain *in statu quo*. On the other hand, knowledge of these factors becomes of vital importance when we are faced with the possibility of profound changes in one or more of these regularly recurring chains of events by the building of reservoirs. If any link of the chain of events is broken or misplaced the salmon runs of that particular stream might possibly be doomed.

Carbon dioxide tension of the blood is known to have far-reaching effects upon the physiology of respiration of vertebrates including fishes. In mammals the carbon dioxide tension of the blood is nicely regulated by the rate of ventilation of the lungs. The author has shown in various researches that fishes must of necessity depend more upon the carbon dioxide tension of the water to regulate the carbon dioxide tension of the blood. In view of these facts and the additional fact that volume of stream flow facilitates salmon runs into spawning streams I decided to determine the effect of different mixtures of fresh and sea waters upon the carbon dioxide tension of the mixtures.

The following is a summary of this investigation. It was found that the carbon dioxide holding capacity of a mixture of fresh water with a low alkalinity, and of sea water was always greater than the sum of the carbon dioxide holding capacities of the two waters before they were mixed. This simply means that the carbon dioxide tension of the mixture, without addition or loss of carbon dioxide, is always less than the carbon dioxide tension of the two waters before they were mixed. The lower the alkalinity of the fresh water the greater the reduction of the carbon dioxide tension of the mixture. On the other hand, the higher the alkalinity of the fresh water the less the reduction of the carbon dioxide tension of the mixture. With a very high alkaline fresh water the reduction is nil. It was also found that the increase in the carbon dioxide holding capacity of a mixed fresh water and sea water is greater in the high fresh water-sea water ratios than in the lower ratios and the very high ratios. In other words, there is a peak in the increase in the carbon dioxide holding capacity of mixed fresh and sea waters at high fresh water-sea water ratios. This increase is reduced rapidly as the ratios increase and less rapidly as the ratios are decreased.

The mixing of fresh water from the rivers, spawning streams, with the sea water of the ocean is an ever continuous process. Since the lowering of the carbon dioxide tension is greater in the higher fresh water-lower sea water mixtures than in the lower fresh water-higher sea water mixtures there is an uphill gradient of carbon dioxide tension of the water from near the mouths of rivers out into the ocean as far as there is a fresh water-sea water mixture. There is still another fundamental fact. Just as soon as the carbon dioxide tension of a fresh water-sea water mixture is lowered below the carbon dioxide partial pressure of the atmosphere carbon dioxide will be taken up from the atmosphere by the fresh water-sea water mixture. With a further concentration of sea water

[1] F. A. Davidson and S. T. Hutchenson, *U. S. Dept. Com., Bur. Fish., Bull.* 26: 667–692, 1938.