show that much of the land is better suited to timber than to farming; at least timber raising would be just as profitable. Land use studies at the Georgia station will enable the state to set up new agricultural programs where much of the land has been abandoned. In Kentucky the suggestion has been made that enlargement of private forests into good sized tracts would make protection against fires easier, would promote greater skill in the care of growing trees and would make harvesting of timber more economical.

The Minnesota station is participating in soil erosion control in the rolling lands in the southeastern part of the state and much unproductive peat and bog land is being converted into good pasture and hay land through the planting of reed canary grass. In Nevada farm land is being classified in the Walker River Irrigation District, the information to be used in keeping some districts from financial ruin. The Ohio station found that in Vinton County more than a fourth of the land once in farms now lies idle and that the public funds going into the county from state and federal governments in a ten-year period equal the value of the farm land. Soil surveys in Rhode Island will provide information for reforestation and back-to-the-land movements, and determine areas suitable for subsistence farming. The Wisconsin station and others have entered on systematic programs for utilizing lands so as to adjust production to consumption.

These are examples and not a summary of the work being done. They illustrate the national effort to solve the problem of land utilization.

### SUMMER MEETING OF THE BOTANICAL SOCIETY OF AMERICA AT TORONTO

THE summer meeting of the Botanical Society of America at Toronto on June 18 to 20 was attended by about a hundred and twenty-five botanists. The program in Toronto included inspection of the botanical laboratories at the university and the displays in the Royal Ontario Museum, a dinner at Hart House, and an address by Professor M. L. Fernald, of Harvard University, on the persistence of pre-glacial species of plants in the northeastern states and southeastern Canada.

An excursion to the Scarborough Bluffs east of Toronto afforded a view of the various glacial deposits of the region, which were explained in detail by Dr. A. P. Coleman, veteran glacial geologist, by a field lecture in a pouring rain. The fossil remains of plants, which occur abundantly at various levels in these deposits, have proved that interglacial climates were at times warmer than those of the present and brought such austral plants as the papaw and the osage orange as far north as Toronto.

Nearly a hundred persons left Toronto by automobile on the morning of June 19 for the excursion to the Bruce Peninsula, situated between Lake Huron and Georgian Bay. A brief stop was made at Hi-Pot-Lo Park to observe the rich natural vegetation and the numerous pot-holes. Luncheon was served in the dining hall of Ontario Agricultural College, where the extensive range of greenhouses was inspected. The party reached Owen Sound in the evening and visited a colony of the rare hart's-tongue fern, *Scolopendrium vulgare*. The following day the excursion was continued among the bogs, dunes and limestone ridges near the Lake Huron shore of the Bruce Peninsula. Among the plants collected here were several species, such as *Pinguicula villosa, Carex scirpoidea* and *Anemone multifida*, whose presence supports the belief that the peninsula was not covered by the Wisconsin ice sheet.

## SCIENTIFIC NOTES AND NEWS

IT is announced in *Nature* that on July 2 the following were elected honorary fellows of the Royal Society of Edinburgh to commemorate the completion of its one hundred and fiftieth year: *Foreign,* Björn Helland-Hansen, Geophysical Institute, Bergen; Professor Bernardo Houssay, professor of physiology, National University of Buenos Aires; Professor Frank R. Lillie, professor of zoology and embryology, University of Chicago; Professor T. H. Morgan, professor of biology, California Institute of Technology; Professor Paul Sabatier, professor of chemistry, University of Toulouse; Dr. Theobald Smith, formerly director of the department of animal pathology of the Rockefeller Institute for Medical Research, Princeton. *British,* Professor H. E. Armstrong, emeritus professor of chemistry, Imperial College of Science and Technology, City and Guilds (Enginering) College, London; Professor J. S. Haldane, director of the Mining Research Laboratory, and honorary professor, University of Birmingham; Professor Karl Pearson, emeritus Galton professor of eugenics, University of London; Professor E. B. Poulton, lately Hope professor of zoology, University of Oxford; Sir G. Elliot Smith, professor of anatomy, University College, London; Professor W. W. Watts, emeritus professor of geology, Imperial College of Science and Technology, London.

THE Board of Trustees of the University of Illinois has made an appropriation to the Graduate School for the publication of the first volume of the works

of Dr. G. A. Miller, who retired as professor of mathematics in 1931. A committee has been appointed to collaborate with Professor Miller in preparing the manuscript and in seeing it through the press. It is expected that this volume will be published during the first half of the year 1935. It will contain about five hundred pages and will cover Professor Miller's publications prior to 1900. It is estimated that six volumes of approximately five hundred pages each will be required for the collected scientific works.

DR. T. D. A. COCKERELL, since 1906 professor of zoology at the University of Colorado, having reached the age limit, retires this summer, with the title of professor emeritus.

AN account of the life and work of Dr. Arthur H. Compton, professor of physics in the University of Chicago, is printed in the issue of *The New York Herald Tribune* for July 22. This is the first of a series of articles on distinguished American men of science, to be printed each Sunday.

AT the one hundred and twelfth annual commencement of the Philadelphia College of Pharmacy and Science the degree of master of pharmacy was conferred on Dr. Walter A. Bastedo, president of the U. S. Pharmacopoeial Convention, member of the eleventh revision committee of the Pharmacopoeia, New York physician and teacher of medicine; on Dr. Horatio C. Wood, Jr., professor of pharmacology and therapeutics in the School of Medicine of the University of Pennsylvania; on Edmund N. Gathercoal, professor of pharmacognosy in the College of Pharmacy of the University of Illinois, Chicago, chairman of the sixth revision committee of the National Formulary and of the National Pharmaceutical Research Conference, and on Dr. Oscar W. Bethea, professor of clinical medicine in the School of Medicine of Tulane University.

BOWDOIN COLLEGE conferred on June 21 the degree of doctor of science on Dr. Benjamin F. Kingsbury, head of the department of embryology and histology of the Cornell Medical College at Ithaca. The citation said: "Eminent scientist, distinguished both for research and teaching, which has placed many students of biology and many students of medicine in his debt."

SIR HENRY WELLCOME, head of the Wellcome Research Foundations of London, England, was granted the degree of doctor of science at the annual commencement exercises of the Marquette University, Milwaukee, on June 13. Sir Henry Wellcome is a native of Wisconsin.

DR. JAMES ANGUS DOULL, professor of hygiene and public health in the School of Medicine of Western Reserve University, has been elected to honorary membership in the Royal Sanitary Institute of Great Britain. This membership is limited to thirty, of whom seven are Americans.

THE *Journal* of the American Medical Association states that the Japanese Academy Prize for 1933, which is the highest prize for scientific work, was given to Dr. Hiroshi Kon, of the pathologic section of the medical department of the Hokkaido Imperial University for his research on the silver reaction of protoplasm.

AT the Ithaca meeting of the Society for the Promotion of Enginering Education, Professor C. C. Williams, of the State University of Iowa, was elected its president for the coming year. Professor Williams succeeds Professor W. E. Wickenden, president of the Case School of Applied Science. Other officers elected were Professor H. P. Hammond, of the Brooklyn Polytechnic Institute, and Dean G. C. Shaad, of the University of Kansas, as vice presidents. Professor F. L. Bishop, of the University of Pittsburgh, was reelected secretary, a position he has held for the last twenty years, and W. O. Wiley, of John Wiley and Sons, New York, was elected treasurer.

THE American Section of the Society of Chemical Industry announces the election of the following officers to serve for the year ending June 1, 1935. *Chairman,* Robert J. Moore; *Vice-chairman,* W. D. Turner; *Honorary Secretary,* Foster D. Snell; *Honorary Treasurer,* J. W. H. Randall, and in addition, five new members were elected to the executive committee to take the place of retiring members. Those newly elected are Lincoln T. Work, Wallace P. Cohoe, Albert E. Marshall, James G. Vail and Charles A. Lunn.

DR. WALTER S. RITCHIE, assistant professor of agricultural chemistry in the College of Agriculture of the University of Missouri, has been appointed professor and head of the department of chemistry at the Massachusetts State College. During the past year Dr. Ritchie has directed the work of the analytical laboratory at the University of Missouri.

DR. M. STANLEY LIVINGSTON, for the past two years reesarch associate in physics at the University of California, has been appointed instructor in physics at Cornell University.

DR. P. CALIXTE DAGNEAU, professor of clinical surgery in the Faculty of Medicine at Laval University, Quebec, has been appointed dean, to succeed the late Dr. J. M. Arthur Rousseau.

PROFESSOR S. E. WHITNALL has been appointed to the chair of anatomy at the University of Bristol in

succession to Professor Edward Fawcett, who retired at the end of the academic year. Professor Whitnall at present holds the chair of anatomy at McGill University and will be unable to fill the chair in Bristol until January, 1935. Dr. Fawcett has been asked to take charge of the department as emeritus professor for the autumn term. Professor Brocklehurst has been appointed dean of the faculty of medicine in succession to Professor Fawcett, and Professor A. E. Trueman, dean of the faculty of science in succession to Professor W. E. Garner.

PROFESSOR S. W. HUNTON, who for fifty-one years has been head of the department of mathematics at Mount Allison University, Sackville, New Brunswick, retired at the close of the academic year.

DR. JAMES P. LEAKE, senior surgeon, U. S. Public Health Service, who has been relieved from duty in the division of sanitary reports and statistics, has been assigned to duty in the division of scientific research.

DR. ORLO H. MAUGHAN, extension assistant in farm management at Cornell University, has taken up his work in Washington as a statistical assistant for the Farm Credit Administration.

DR. RALPH L. MILLER, stationed for four years at the laboratory of the Bureau of Entomology at Orlando, Florida, has resigned to accept a position with the Freeport Sulphur Company, of New Orleans.

DR. HAROLD C. TAYLOR, formerly assistant in psychology, Institute of Human Relations, Yale University, has joined the staff of the Industrial Relations Division of The Proctor and Gamble Company as technical assistant on research.

DR. WILLIAM K. GREGORY, professor of vertebrate paleontology at Columbia University, and Dr. George E. Brewer, formerly professor of surgery there, have been appointed official representatives of the American Museum of Natural History to the International Congress of Anthropology and Ethnology, which will meet at London from July 30 to August 4.

DR. HOWARD T. KARSNER, director of the Institute of Pathology of Western Reserve University, plans to go to Europe, where he will attend the triennial conference of the International Society for Geographic Pathology, meeting in Utrecht, Holland, of which he is a member of the executive committee of five members. Later he will visit laboratories in London, Cambridge, Hamburg, Freiburg and Strasbourg.

PROFESSOR T. G. YUNCKER, of the department of botany of DePauw University, who spent 1933–1934 in botanical research in the Hawaiian Islands, is spending this summer with several of his students in Yucatan.

DR. JOHN WISHART, reader in statistics at the University of Cambridge and statistician for the Rothamsted Experimental Station, on July 16 delivered a lecture in the U. S. Department of Agriculture on "Statistics in Agricultural Research."

AT the annual meeting of the District of Columbia Alumni Chapter of the Society of Sigma Xi, held on May 21, the following scientific men were presented as members-elect, each delivering an address bearing on his special field: Leason Heberling Adams in chemistry, physical chemist, Geophysical Laboratory, Carnegie Institution of Washington; Adam Giede Böving in zoology, senior entomologist, Bureau of Entomology; David James Price in engineering, principal engineer in charge of the Division of Chemical Engineering, Bureau of Chemistry and Soils.

THE tenth National Shade Tree Conference will be held at the Carnegie Institute, Pittsburgh, on August 30 and 31. Nationally known authorities will present papers in their respective fields. Each paper will be followed by discussion. The program is so arranged as to be of value to both practical and scientific workers. Educational and commercial exhibits will be shown. It is hoped that the conference will prove of interest to commercial shade tree experts, and to entomologists, physiologists, horticulturists, pathologists and other scientific workers whose problems are in the shade tree field.

YENCHING UNIVERSITY, Peiping, has been granted a three-year subsidy of $45,000 by the British Boxer Indemnity Fund in support of the ceramics research program in the department of chemistry. At the same time a sum of $100,000 was granted the Peiping Research Institute toward new laboratory buildings for physics and chemistry.

THE trustees of the Bernhard Baron Charitable Trust have informed the British Empire Cancer Campaign, through its chairman, Lord Reading, that they have made a grant of £10,000 to the Empire Day Appeal. The money will be put in a special fund to be called the "Bernhard Baron Cancer Fund."

ACCORDING to the *Journal* of the American Medical Association, a fund of about $200,000 has been created by anonymous donors to establish and maintain a department at the Hebrew University, Jerusalem, for cancer research. Study will be directed first toward radiobiology, physiologic chemistry and the study of cells and tissues. At a recent meeting of the American members of the board of governors of the institution in New York, it was voted to nominate Dr. Ludwig Halberstaedter, formerly of the staff of the Cancer Institute of Berlin, now with the Rothschild Hadassah Hospital in Jerusalem, as head of the department of radiobiology; Dr. Georg Goldhaber, for-

merly Dr. Halberstaedter's assistant, as his assistant in the new department; Dr. H. A. Krebs, formerly of Berlin and now at the University of Cambridge, England, as head of the department of physiologic chemistry, and Dr. Leonid Doljansky, formerly of the Institute of Pathology, of the University of Berlin, and now at the University of Copenhagen, as head of the new department to be devoted to tissue culture research and morbid anatomy.

ACCORDING to *Nature*, in the House of Commons on June 29, Mr. W. Ormsby-Gore, first commissioner of works, moved the second reading of the bill for the setting up of a National Maritime Museum in the buildings recently occupied by the Greenwich Hospital School. The cost of adapting the vacant school buildings is estimated at £29,000 and Sir James Caird has generously offered to defray this sum. Sir James has already given large sums towards the restoration of H.M.SS. *Victory* and *Implacable* and presented the museum with the Macpherson Collection of naval prints. There is nowhere, said Mr. Ormsby-Gore, where one can study the history of our maritime adventure and development, and no attempt has yet been made to illustrate conveniently for the general public the immense field of British maritime endeavor, historical, technical, geographical and commercial, including not only the exploits of the Royal Navy but also of the mercantile marine. A Board of Trustees with the Earl of Stanhope as chairman has been appointed and the post of director has been offered to Professor G. A. R. Callender, of the Royal Naval College, Greenwich.

# DISCUSSION

## THE PLEISTOCENE LONG VALLEY LAKE IN EASTERN CALIFORNIA[1]

THE object of this notice is to place on record some observations concerning part of the Pleistocene and Recent history of a basin that is soon to become a reservoir site for the City of Los Angeles. If present plans are completed, a portion of the basin floor will be flooded and thus concealed from further investigation.

Long Valley, situated in southern Mono County, California, about 15 miles southeast of Lake Mono, occupies the lower part of a wide reentrant in the eastern front of the Sierra Nevada. This mountain-circled embayment, in which are located the headwaters of Owens River, appears on the topographic map[2] to be a northwestward extension of Owens Valley, that deep, narrow graben between the Inyo Range and the Sierra Nevada.[3] Structurally, however, the two basins are distinctly separate units. At present, the floor of Long Valley is at an elevation of about 6,900 feet above sea level, and "hangs" more than 2,400 feet above the bottom of the Owens graben, from which it is separated by an extensive, uplifted and tilted fault block, known as the Volcanic Tableland. Across the tableland, Owens River has cut an imposing gorge. Headward erosion in this canyon, and consequent lowering of the outlet of Long Valley, has brought an end to the existence of an ancient lake that once occupied the valley floor. By constructing a dam across the upper entrance to the Owens River canyon, the engineers of the City of Los Angeles plan to restore in part the original conditions and create a reservoir on the site deserted by the Pleistocene waters.

Professor C. F. Tolman has noted the former existence of a lake in Long Valley.[4] He was probably the first to report the presence of wave-cut terraces at about the 7,100 foot level along the valley sides. Since Tolman's observations were made, some interesting evidence concerning the existence and age of the extinct lake has accumulated. Although the investigation has not been completed in the desired detail, it is proposed to present briefly the evidence and some conclusions.

The former existence of the lake is established beyond doubt by the presence of lacustrine deposits, at least 100 feet in maximum thickness, on the floor of Long Valley. The significance of these sediments was probably first appreciated by Professor Blackwelder.[5] The lowest exposed lacustrine beds, consisting of clay, silt and marl, with some diatomite, have an exposed thickness of about 50 feet, but they have not been completely dissected, because the outlet of the valley has not yet been sufficiently lowered. These materials are so easily eroded that Owens River has been able to establish a broad, meadow-carpeted valley in them since the disappearance of the lake.

Overlying the finer, weakly consolidated sediments, is from 5 to 50 feet of coarse, cross-bedded, tuffaceous sandstone, usually with opaline cement. This rock has been deposited in deltas, built out into the lake by tributary streams that were fed, in part, by copious thermal springs, a few of which are still extant. The formation is quite resistant to erosion, but since it probably never completely covered the valley floor, it may not have been a serious obstacle to the removal

[1] Published by permission of the California State Division of Mines.

[2] Mt. Goddard, Mt. Morrison and Bishop Sheets, U. S. Geol. Survey.

[3] Adolph Knopf, "Geologic Reconnaissance of the Inyo Range and Eastern Slope of the Southern Sierra Nevada, California," U. S. Geol. Surv., Prof. Paper 110, pp. 90–91, 1918.

[4] C. F. Tolman, unpublished manuscript.

[5] Eliot Blackwelder, personal communication.