but to be advised on the general conduct of the scheme by the existing committee.

CORNELL UNIVERSITY SUMMER SCHOOL OF BIOLOGY

A SUMMER school of biology will be established at Cornell University this year. It will be conducted under the joint auspices of the university's regular summer session and the New York State College of Agriculture. Intensive courses of study designed particularly for teachers and graduate students will be given during the six weeks' summer session from July 7 to August 17, and facilities will be provided for research throughout the summer.

This will be a fresh-water school of biology, as distinguished from several coastwise summer schools in which marine forms of plant and animal life are necessarily the principal objects of study and demonstration. Teachers and investigators in the interior states have felt the need of a summer school where the materials for the study of biology are the same as those which they find available for use in their own class rooms and laboratories. The neighborhood of Cornell University is said to have an extraordinary wealth of such materials in both plants and animals. Within easy reach of the laboratories are fresh-water lakes and marshes, salt springs, marl springs, marl bogs, peat bogs, extensive and deep ravines with numerous waterfalls and upland woods and fields overlying either sandy or heavy soils. Some of these soils are impregnated with lime and some are not. Within a radius of two miles of the Cornell campus there is a variation of more than a thousand feet in altitude, so that the plants and animals in this small area belong to several different life zones.

Biology has been studied intensively at Cornell ever since the time of Louis Agassiz, who was a teacher there fifty-five years ago. One result of this sustained interest has been to assemble there a wealth of laboratory material, including some unique collections of plant and animal specimens, and a complete working library, all of which will be available for those students who are prepared to use them.

As far as possible the staff of the school will be composed of professors who are members of the regular faculty of the university. The teachers will include Professors O. F. Curtis, A. J. Eames, H. M. Fitzpatrick, A. C. Fraser, W. C. Muenscher, H. H. Whetzel and Karl M. Wiegand in botany, plant pathology and plant breeding; Professors J. C. Bradley, O. A. Johannsen and Robert Matheson in entomology; Dr. B. F. Kingsbury in animal histology and embryology; Dr. W. A. Hagan in pathology and bacteriology, and Professors Hugh D. Reed and Albert H. Wright in zoology.

THE MEDALS OF THE AMERICAN GEOGRAPHICAL SOCIETY

THE American Geographical Society announces the award of the Charles P. Daly Medal for 1922 to two recipients: Major General Adolphus Washington Greely and Ernest de Koven Leffingwell. The Cullum Geographical Medal for 1922 has been awarded to Edward A. Reeves, map curator of the Royal Geographical Society, London, and director of the School of Surveying. The inscriptions upon the medals themselves briefly indicate the reasons for the award in each case. They are as follows:

ADOLPHUS WASHINGTON GREELY
1922

He commanded an Arctic expedition the results of which are among the imperishable records of polar discovery; and he subsequently rendered distinguished public service as chief of the United States Signal Corps.

ERNEST DE K. LEFFINGWELL
1922

For producing the first accurate chart of a part of the Arctic coast of Alaska and for sustained and original investigations in Arctic physiography.

EDWARD A. REEVES
1922

In honor of his substantial achievements in geographical surveying. By devising and improving instruments and methods he created new standards in the field of scientific exploration.

SCIENTIFIC NOTES AND NEWS

DR. EDWARD E. BARNARD, professor of astronomy in the University of Chicago and astronomer of the Yerkes Observatory, died on February 7 at his home at Williams Bay, aged sixty-five years.

BERNHARD EDUARD FERNOW, first chief forester of the United States, died at Toronto on February 6, aged seventy-three years. In 1898 he became dean of the School of Forestry at Cornell University. After the closing of the school by the legislature in 1907, he became dean of the faculty of forestry at the University of Toronto, retiring as professor emeritus in 1919.

WILHELM KONRAD ROENTGEN, professor of physics in the University of Munich, who obtained in 1895 a world-wide reputation by the discovery of the X-rays, has died in Munich at the age of seventy-seven years.

DR. JOHANNES ORTH, the distinguished pathologist, and successor of Virchow at the Berlin Pathological Institute, died on February 13 within a few hours of his seventy-sixth birthday.

PROFESSOR A. A. MICHELSON, of the University of Chicago, was awarded the gold medal of the Royal Astronomical Society for the "application of the interferometer to astronomical measurements," at the annual meeting of the society in Burlington House, London. Professor Michelson, being unable to attend personally, was represented by Post Wheeler, chancellor of the American embassy.

DR. J. PAUL GOODE, of the University of Chicago, was presented with the Helen Culver gold medal at a meeting of the Geographic Society of Chicago on January 26.

PROFESSOR DOUGLAS W. JOHNSON, of Columbia University, has been elected a foreign member of the Swedish Society for Anthropology and Geography.

PHYSICIANS, graduates of Northwestern University and students under Dr. Winfield Scott Hall, professor of physiology at Northwestern University School of Medicine, Chicago, gave a dinner in his honor at the Plaza Hotel, Danville, on January 17.

DR. T. WAYLAND VAUGHAN has been elected president of the Washington Academy of Sciences.

HENRY SOLON GRAVES, dean of the forestry school of Yale University, was elected president of the American Forestry Association at its meeting in Boston.

DR. A. S. HITCHCOCK, of the Bureau of Plant Industry, has been elected president of the Biological Society of Washington for 1923.

THE following officers of the State College, Pennsylvania, Branch of the American Association for the Advancement of Science have been elected for 1923: *Chairman,* C. R. Orton; *vice-chairman,* R. D. Anthony; *treasurer,* J. E. DeCamp; on the *executive committee,* Miss Edith P. Chace and D. C. McFarland. The tenure of office of secretary is for four years and the present term does not expire until 1924. The other offices are filled each year.

PROFESSOR W. P. WYNNE has been nominated to fill the office of president of the Chemical Society, London, which will be vacated by Sir James Walker.

DR. W. H. ECCLES, professor of electrical engineering at the City and Guilds of London Technical School, and vice-chairman of the Wireless Telegraphy Commission, who succeeds Admiral of the Fleet Sir Henry Jackson as president of the Radio Society of Great Britain, delivered his presidential address to the society at the Institution of Electrical Engineers on January 24.

PROFESSOR FILIBERT ROTH, head of the department of forestry of the University of Michigan, whose resignation from the faculty has been accepted with regret by the regents, will remain with the university until the close of the present academic year.

PROFESSOR WILLIAM NIKOLAI BOLDYREFF has taken a position at the Battle Creek Sanitarium, where he will conduct research along lines similar to those followed by him with Pawlow in Petrograd. Professor Boldyreff was an assistant to Pawlow from 1902 to 1912. From 1912 to 1917 he was professor of pharmacology in Kazan, Russia.

DR. J. C. MCLENNAN, professor of physics at the University of Toronto, has been granted a leave of absence for the remainder of the school year. He will visit important laboratories of Great Britain, France and Holland, returning in September in time for the meeting of the British Association for the Advancement of Science, which meets this year at the University of Toronto.

DR. WILLIAM WALTER CORT, associate pro-

fessor of helminthology in the Johns Hopkins School of Hygiene and Public Health, has been appointed exchange professor in parasitology in the Peking Union Medical College for the academic year beginning October, 1923. Professor Cort will also study hookworm disease in South China. Dr. Ernest C. Faust, associate professor of parasitology at the Union Medical College, will exchange professorships with Dr. Cort.

DR. BÉLA SCHICK, professor of pediatrics at the University of Vienna, gave the Cutter lecture on preventive medicine at Harvard University on February 8. His subject was "The prevention and control of diphtheria."

THE seventh Harvey Society lecture to be given at the New York Academy of Medicine on Saturday evening, February 24, 1923, will be delivered by Dr. Leon Asher, professor of physiology in the University of Berne. His subject will be "The building up of the organism by chemical and nervous coordination and regulation." The lecture by Dr. E. V. Cowdry, of the Rockefeller Institute for Medical Research, on "The significance of the internal reticular apparatus of golgi in cellular physiology," has been postponed until Saturday evening, March 10.

PROFESSOR SOMMERFELD will give the following course of lectures at the Bureau of Standards from March 2 to 9: "Introduction to quantum theory and its place in modern physics," March 2; "Quantum theory of spectroscopy, Balmer spectrum of H, etc.," March 3; "Atomic structure of the chemical elements," March 5; "Wave theory and quantum theory," March 6; "The significance of quantum numbers, azimuthal, radial, equatorial, inner, etc.," March 7; "Zeeman effect, theory of magneton," March 8; "Line structure in complicated spectra," March 9.

PROFESSOR R. A. EMERSON, head of the department of plant breeding at Cornell University, lectured before the Ohio chapter of the Sigma Xi Society on January 31 on "The mechanism of organic heredity."

DR. EVARTS A. GRAHAM, professor of surgery in the Washington University School of Medicine, has accepted an invitation from the California Academy of Medicine to speak on the "New phases of thoracic surgery." He held a clinic at the Leland Stanford University on February 9 on thoracic surgery, and a clinic on gall bladder surgery at the University of California on February 10.

DR. E. F. PHILLIPS, of the U. S. Bureau of Entomology, gave an address on "Research in bee-keeping with practical applications," before a joint meeting of the Purdue Chapter of Sigma Xi and the Purdue Biological Society at Lafayette on February 1.

DR. E. H. STARLING will deliver the Harveian lecture of the Royal College of Physicians, Dr. J. H. Abram, of Liverpool, the Bradshaw lecture, and Lieutenant Colonel William Glen Liston, C.I.E., the Milroy lectures in 1924. The Milroy lectures for this year will be delivered by Dr. W. G. Savage, on "Canned foods in relation to health," on February 22 and 27 and March 1; the Goulstonian lectures, by Dr. Geoffrey Evans, on "The nature of arteriosclerosis," on March 6, 8 and 13, and the Lumleian lectures, by Dr. Arthur J. Hall, on March 15, 20 and 22, on "Encephalitis lethargica."

A COMMITTEE has been formed to establish a memorial to Benjamin Harrison, the village geologist and prehistoric archeologist of Ightham, Kent, England, who died in 1921. The first meeting of the committee was held at the Royal Anthropological Institute in November, 1922, under the presidency of Lord Avebury. Donations will be received by the treasurer, Mr. de Barri Crawshay, Rosefield, Sevenoaks (Kent).

THE Wellcome Historical Medical Museum, London, has arranged a special exhibition of personal relics, pictures, engravings, drawings, documents, manuscripts and letters relating to the discovery of vaccination, in connection with the commemoration, on January 26, of the centenary of the death of Dr. Edward Jenner. The exhibition will be open for some months.

THE centennial of the birth of the surgeon, Friedrich von Esmarch, who died at Kiel in 1908, occurred on January 9, 1923.

ROBERT MORAN, Puget Sound shipbuilder, has given to the University of Washington a $12,000 towing boat, the *Rosario,* to be used at the university's Puget Sound biological station, at Friday Harbor, Washington, in dredg-

ing for deep-sea biological specimens. This is the third offer which Mr. Moran has made to the university. In donating a park at Mount Constitution to the state of Washington, he expressly reserved the right of the university to make use of this tract for scientific and educational purposes. Later when the university was seeking to find a larger and more effective property for its biological station, he offered the regents, as a gift, the valuable property known as Obstruction Island. Meanwhile, the government had given to the university the Point Caution military reservation of four hundred and eighty-five acres, which was more favorable from a scientific standpoint.

DR. LEE DE FOREST, the inventor of the "audion" and other improvements in radio apparatus, has established a fund for the purchase for Yale University of a library devoted to radio matters, which will be of service to those engaged in study and research in this field. He has also established a fund to provide for a course of twelve lectures to be given each year for the benefit of advanced students and members of the staff. It will be possible, with the aid of this fund, to invite to Yale University each year a number of leading experts to supplement the work of the regular courses offered by the university. For the present year, beginning in February, the lectures will be given by the following men: George A. Campbell, American Telephone and Telegraph Company; Lloyd Espenscheid, American Telephone and Telegraph Company; Commander S. C. Hooper, United States Navy; Dr. Albert W. Hull, General Electric Company; Professor John Morecroft, Columbia University, and L. E. Whittemore, Bureau of Standards. Dr. de Forest will speak on "Wireless" at the eighth annual meeting of the Yale Engineering Association, which will be held at the New York Yale Club on February 1. Apparatus will be installed and a demonstration given.

THE New York State Museum is again offering to the public a course of lectures on subjects of general and public interest. They are given in the rooms of the museum in the State Education Building on Friday afternoons at 4 o'clock. The schedule of lectures is as follows: January 12, "A naturalist in the Adirondacks," by Homer D. House, state botanist; January 19, "Indian medicine and medicine men," by Arthur C. Parker, state archeologist; January 26, "Origin and evolution of the insects," by Ephraim P. Felt, state entomologist; February 2, "Are we still living in the glacial period?" by John H. Clarke, state geologist; February 9, "Where are we from?" by John M. Clarke; February 16, "What the salamanders do," by Sherman C. Bishop, state zoologist; February 23, "The story of petroleum in New York," by C. A. Hartnagel, assistant state geologist; March 2, "Insects and wireless," by Ephraim P. Felt; March 9, "The great Devonian forest," by Winifred Goldring, state paleobotanist; March 16, "Mastodons and mammoths," by Sherman C. Bishop; March 23, "The background of New York history," by John M. Clarke; March 30, "Wild flowers and their protection," by Homer D. House.

ONE HUNDRED THOUSAND DOLLARS of the $200,000 legacy left to Harvard by the late Hiram F. Mills, of Quincy, to establish the Elizabeth Worcester Mills fund with its income devoted to the investigation of the origin and cure of cancer, has been received. This income will aid the work of the Harvard Cancer Commission which is carrying on extensive research in the new John Collins Warren Laboratory adjoining the Huntington Memorial Hospital. It is expected that the bequest will make possible a much more detailed investigation of the constitutional effects of radium and especially of the high-powered X-ray machine designed by Professor William Duane and installed in the new laboratory for the treatment of cancer cases.

DR. G. J. ESSELEN, JR., chairman, cellulose division, American Chemical Society, writes that Dr. C. J. West, chairman of the committee on bibliographies of the Technical Association of the Pulp and Paper Industry, has kindly offered to act for the Cellulose Division of the American Chemical Society as a receiving center for bibliographies relating to any branch of cellulose chemistry. It is hoped that all of those having such bibliographies will send a copy to Dr. West, the National Research Council, 1701 Massachusetts Avenue, N. W., Washington, D. C. Dr. West has kindly offered to assemble all material received and

make it available to any one interested. It is hoped that a large amount of duplication of effort can be avoided in this way.

UNIVERSITY AND EDUCATIONAL NOTES

THE will of the late John McMullen, of Norwalk, Conn., and New York, was upheld by a jury in the Superior Court on February 7. A compromise was reached, but no details were given out. Under the will the bulk of the $2,000,000 estate goes to Cornell University.

MR. DAN RADCLIFFE, the shipowner, of Cardiff, has promised to give £50,000 in 3½ per cents. for the benefit of the University of Wales in honor of the Prince of Wales.

DR. THOMAS STOCKHAM BAKER, formerly professor of German in the Johns Hopkins University and director of the Jacob Tome Institute, has been elected president of the Carnegie Institute of Technology, where he has been since 1919 secretary of the institute and acting president since the resignation a year ago of Dr. A. A. Hamerschlag.

DR. OTTO M. SMITH, formerly in charge of research for the Roseville Chemical Company, Roseville, Indiana, has been appointed assistant professor in quantitative chemistry at Iowa State College.

PROFESSOR F. TRENDELENBURG, of Tübingen, has refused a call to the University of Berlin to serve as the successor of Rubner for the chair of physiology. A call has been sent to Dr. Franz Hofmann, of Bonn.

PROFESSOR H. POLL, of the University of Berlin, has been appointed professor of general biology and the theory of heredity.

DR. POTTEVAN, senator, has been elected professor of general hygiene in its relations to industry in the Paris Conservatoire National des Arts et Métiers.

DISCUSSION AND CORRESPONDENCE

REACTION TIME AND FATIGUE

THE personal equation in star transits is due to the coordination of eye, hand and brain of the observer. Its absolute amount is difficult to determine, as artificial transits must always lack some features of the usual observing conditions. Fortunately it does not affect most of our right ascension results, since they are derived from the differences of transits, in which the effect is eliminated, if it is constant. In longitude campaigns, also, the difference of personal equations can be eliminated by exchanging stations.

We can not determine absolute clock corrections, nor absolute clock rates without taking account of personal equation and its constancy. For the mean daily rate of a clock, derived from successive observations of the same stars, the equation eliminates, if it is constant. For hourly rates, derived from successive clock corrections during a night, the question of variability of personal equation needs consideration. Variation might be produced by fatigue or other physical conditions.

There are traditional stories in astronomical practice of observers who indulged in the excessive use of strong stimulants, such as coffee, in excessive smoking and, possibly, taking into account the origin of these stories, in *Pilsener* for the contrary reflex, and then proceeded to determine the effects upon observations. Large accidental variations would be anticipated, rather than systematic changes, with such abnormal deviations from the habits of rational observing.

In the series of observations recently completed here for the purpose of testing a possible diurnal periodic term in clock performance, the test of change in personal equation emerges as a by-product. The test is a delicate one, and it is only by assembling a relatively large mass of material that a reliable conclusion can be reached.

Six hours of continuous observing have been included on each of twenty-four nights during a complete year, nearly two thousand transits in all. For the usual night of about four hours' interval no sensible amount of physical or mental fatigue is commonly experienced. Perhaps it is the consequence of more than forty years of observing that renders an observer sensitive to real fatigue at the close of six hours of work. Ordinarily it would not be considered wise to continue work when the precision of the results might be affected by physical conditions, but the requirements of this special problem made it advisable to use these long periods.