there were many changes, for physiology was prospering. With the growth of the Medical School at Michigan the physiology department was moved to larger quarters, which it shared with pharmacology. In this building Dr. Lombard's ingenuity stood him in good stead in developing an effective equipment for teaching and research. Lombard's main contributions were in the field of muscle and nerve physiology, reflexes, particularly the knee-jerk, the finer mechanics of muscles, tendons and joints in coordinated contractions, blood pressure, the pulse and the cardiac cycle and sensory endings. One of Lombard's first pieces of research appeared from Ludwig's laboratory in 1885. It dealt with the sequence and strength of contraction of the muscles of the lower extremity of the frog following on various forms of irritation applied to the skin. The simultaneous recording of contractions of as many as twenty muscles with the aid of a most ingenious mechanical system led to significant findings on the integration of spinal reflexes. Later studies of a purely mechanical nature complemented his earlier finding on nervous integration and revealed many unexpected uses of muscles, *e.g.*—"The fact that a two-joint muscle can make use of the tendon action of another two-joint muscle on the opposite side of the leg accounts for the paradox that a two-joint muscle, when in a position to have a stronger extensor than flexor leverage, may extend a joint of which it is a flexor." These studies were followed by the construction of models showing various complicated actions of two-joint muscles. Lombard was the first to construct a sensitive balance large enough to record the minute changes in weight accompanying each respiratory act in man, a method of investigation which has proven to be of value and of continuing promise. Another outstanding contribution was the visual inspection of the capillary circulation of man, a forerunner of innumerable important investigations in the field of circulation. The topographical localization of sensory endings in the skin with tattoo marks and plaster of paris impressions and their later identification at the original location is a striking example of the precision of his methods.

Historically Lombard's name will always be linked with American physiology. He not only brought the newer methods of investigation from abroad, but he was one of the charter members of the American Physiological Society. These incidents in his life were of unending satisfaction to him.

Dr. Lombard was married to Caroline Cook, of Staten Island, N. Y., on June 21, 1883. She died in 1923, the year that he retired. Her death was a great blow to him. He dropped physiology. He gave his valuable library to the Department of Physiology, set aside sufficient endowment to continue the subscriptions to the journals and turned his thoughts to art—drawing, water color and etching. Etching was his favorite, which he mastered with extraordinary ability. Those of the art colony at Monhegan, Maine, who saw his work each summer marvelled at his progressively increasing skill. Those who knew of his experimental ability understood. His work was shown in general exhibits and in one-man shows. In his later years art became his absorbing interest.

Friends who had the good fortune to know Dr. Lombard intimately will never forget his friendly and generous nature, which remained with him to his very last days. In "The Musings of an Old Man," written at the age of 84 and presented to a small scientific club at the University of Michigan, he makes the following statement:

> I have always been an optimist, and I can not claim to have ever been religious. I have thoroughly enjoyed life and feel that the finest one can do is to bring pleasures into the lives of others. In this I find a worthy reason for living, and shall be glad to live as long as I can enjoy life and help others to do so.

To those who admit the mechanistic forces of life and have faith in evolution, men like Warren Plimpton Lombard shine as rays of hope for the future happiness of mankind.

ROBERT GESELL

UNIVERSITY OF MICHIGAN

RECENT DEATHS

DR. HARVEY CUSHING, Sterling professor of neurology at Yale University from 1933 until his retirement with the title emeritus in 1937, died on October 7 at the age of seventy years. Dr. Cushing was Moseley professor of surgery at Harvard University from 1912 to 1932, when he was made Moseley professor emeritus.

DR. CHARLES STAPLES MANGUM, successively professor of physiology and materia medica, pharmacology and anatomy and from 1933 to 1937 dean of the Medical School of the University of North Carolina, died on September 29. He was sixty-nine years old.

DR. OSCAR HENRY PLANT, professor of pharmacology and head of the department at the State University of Iowa, died on October 2 at the age of sixty-four years.

DR. E. VICTOR SMITH, professor of physiology at the University of Washington, died on September 28 at the age of seventy-two years.

PROFESSOR JOHN RAYMOND LAPHAM, dean of the department of engineering of George Washington University, died on October 3 at the age of fifty-three years.

F. L. MUSBACH, professor of soils in the University of Wisconsin, who had charge of soil investigations at

the branch experiment stations, was killed in an automobile accident on September 14. He was sixty-three years old. Professor Musbach was a member of the American Association for the Advancement of Science and other scientific societies.

DR. CHARLES JASTROW MENDELSOHN, of the College of the City of New York, cryptographer, known for his work on the mathematics of code-word structure and the theory and structure of the cable codes, died on September 27 at the age of fifty-eight years.

SCIENTIFIC EVENTS

THE ARNOLD ARBORETUM EXPEDITION TO NORTHWESTERN CANADA

THE Arnold Arboretum expedition of 1939 to the Mackenzie basin of northwestern Canada returned to Boston on September 28. It left for the field on May 20, and arrived on June 9 at Fort Simpson on the Mackenzie River. On June 16 a chartered airplane was used for the journey to Brintnell Lake, approximately 200 miles west of Simpson. This lake lies at about 2,600 feet above sea-level and is surrounded by mountains ranging from 6,000 to 9,000 feet above the sea. Its position is in lat. 62° 5′ N., long. 127° 35′ W. The party remained there until August 20, when they returned to Simpson by plane. The boat journey southward was begun on September 8.

Approximately 1,000 field numbers of vascular plants, 620 of lichens and 60 of fungi, altogether about 15,000 herbarium specimens, were collected, mainly at Brintnell Lake and in the vicinity of Fort Simpson. The chief objectives of the trip were collections and notes on local vegetation in the Mackenzie Mountains of the South Nahanni River region, in which Brintnell Lake is situated. The lake is at the margin of the Snyder Range, a group of high mountains about the headwaters of the South Nahanni, and lies in one of the least known regions, biologically speaking, in boreal America. In fact, practically no botanical material from the whole Mackenzie Mountain system had been collected prior to this summer; and it was especially desirable in view of projected plans for a new floristic work on the northern parts of the continent.

The 1939 expedition was supported by the Arnold Arboretum and by liberal grants from the Milton Fund of Harvard University, the American Academy of Arts and Sciences and the National Academy of Science. The National Museum of Canada contributed substantially by the loan of field equipment. The party consisted of Dr. and Mrs. Hugh M. Raup, their two sons and James Soper, of Hamilton, Ontario.

HUGH M. RAUP

THE BISHOP ORNITHOLOGICAL COLLECTION

THE Field Museum of Natural History, Chicago, has recently concluded arrangements to acquire the Bishop collection of more than 50,000 North American birds, one of the largest and most important private collections ever assembled and the last of its kind which had not passed to a public institution. The negotiations to obtain this collection were recently completed by Dr. Wilfred H. Osgood, chief curator of the department of zoology, on a visit to Dr. Louis B. Bishop at Pasadena, California. Dr. Osgood is an old friend of Dr. Bishop's, and in 1899 they conducted an expedition together to the Yukon and Alaska.

The Field Museum will obtain possession immediately of the major part of the collection, which is now housed at New Haven, Conn. The rest of it will remain in Los Angeles, where Dr. Bishop will continue work towards its improvement. It includes representatives of nearly all known forms of birds found in every section of North America north of Mexico, representing forty years of constant and intensive effort, both on the part of Dr. Bishop and of numerous professional ornithologists who have been associated with him at various times. According to Rudyerd Boulton, curator of birds at the museum, the specimens are distinctly superior to the average in quality of preparation. An important item is the inclusion of thirty type-specimens. Included also are specimens of various birds which are now extinct, such as the Carolina parokeet, the ivory-billed woodpecker, the Eskimo curlew and the passenger pigeon. Many others are of species which have become scarce and difficult to obtain.

Hitherto the principal efforts in ornithological research made by the museum have been devoted to the birds of Central and South America, Africa and other foreign localities. Although it has a collection in the North American field, this has been left largely to other institutions. The acquisition of the Bishop collection now gives to the museum one of the most comprehensive North American bird collections either in this country or abroad. It is estimated that it has cost its owner nearly $100,000, and it is doubtful if it could be reproduced at this time for double this amount.

THE LALOR FOUNDATION FELLOWSHIP AWARDS

THE Lalor Foundation has announced its fourth series of fellowship awards, authorizing grants of $20,000 for the academic year 1940–41. The individual awards range between $1,800 and $2,500 or according to the special needs of the candidate.

Six fellowships of the 1939–40 series are being ad-