ony and lack of stimulation physiologically. The easy tendency is an attempted compensation in spicy food and strong drinks. A vicious circle arises, increased by insufficient exercise. Predisposition is established for infectious, contagious and deficiency diseases.

Man's greatest health enemies are ignorance, indifference, poverty and certain religious systems. Contact with a different and often inferior native race leads to mental isolation and distorted perspectives of social values. Poor communications and enervated physiology weaken moral stamina and lower social and intellectual standards. Mental slackness follows on physical slackness. Latent weaknesses become patent. Adaptation and acclimatization require clear understanding of the dangers, improved communications and rigid maintenance of personal standards. The British dinner jacket has become a symbol of morale.

Understanding of the environment is necessary to avoid disaster. Food, clothing and housing must combine local facilities and customs with the requirements of medical knowledge. Balance of work, rest, play and intellectual interests must be attained. Mental and sex habits must be coordinated with the program. Such complete control of and adaptation to tropical surroundings has seldom been fully achieved. But in proportion to the completeness of this adaptation rests the ability of the white man to live in the tropics. It is becoming easier as medicine leads the way. The culture of higher standards must always prevail by absorbing the proved virtues of the indigenous native culture. Such synthesis is the hope of the future, in world civilization, in religion, in all human activities.

The value of organized study in the field of tropical medicine has been recognized by the governments of England, Germany, Italy, France, Belgium and more lately of the United States. The army and navy medical corps and the federal Public Health Service have a brilliant record worthy of the pride of every American. The field, however, is broader than these services, and to-day we find some thirty-five universities, numerous public health bodies, various foundations and other government agencies actively engaged in the study and practice of tropical medicine. The American Academy and the American Society of Tropical Medicine correlate and strengthen all these activities under the American flag, worthily matching similar organizations abroad. The practical work is in three divisions, research, clinical care and study of the sick, and education of doctors, nurses and non-medical persons. The three chief geographic centers are in New York, New Orleans and San Francisco. In the University of California, the Pacific Institute of Tropical Medicine is a cooperative Pacific coast enterprise, supported by commerce which recognizes the foundation necessity of medicine, which has community pride and which joins with the American government in recognizing the international values of tropical medicine in joining nations in a program of common advantage.

Four thousand five hundred years before Christ, the physician Iemhetep in Egypt served the third dynasty of pharaohs. His name is translated, "He who comes in peace." His successors to-day are ambassadors of peace. They open international doorways of friendship. Those dedicated to this service find satisfaction and reward beyond the measurement of gold and more lasting than can be expressed in words.

OBITUARY

HENRY FAIRFIELD OSBORN[1]

OUR beloved former president, Henry Fairfield Osborn, died suddenly of heart failure at his home at Garrison-on-Hudson, on Wednesday, November 6, 1935, at the age of seventy-eight years. It is exceedingly difficult to express adequately our sorrow in losing this steadfast friend and great leader. His human contacts were so numerous and so uniformly helpful to others that a great many people will deeply mourn for him. In fact, his good deeds on every side were so manifold that we know not where to begin. Nevertheless we must attempt a brief outline of his life, as follows:

He was born on August 8, 1857, at Fairfield, Connecticut, the son of William Henry Osborn and Virginia Reed Sturges Osborn. His ancestry on both sides was of the best and his very able and devoted parents left nothing to be desired in the influences that moulded his childhood. While he was still quite young (1881) his father built a house, "Wing-and-Wing," near his later residence, "Castle Rock," at Garrison, N. Y., overlooking the Hudson River, opposite West Point. In this delightful home and environment the young Fairfield early showed his interest in natural history. As a student at Princeton he came under the influence of the famous Dr. McCosh and was so much attracted by the subject of philosophy that he undertook several studies in psychology and philosophy which were published as brief papers at intervals from 1880 to 1884.

Meantime, however, through Professor Guyot of Princeton, he became interested in paleontology and in 1877 he, together with his friends W. B. Scott (who was destined to remain as his life-long colleague) and Francis Speir, Jr., organized and carried to a very

[1] Read at a meeting of the Scientific Staff of the American Museum, on November 7, 1935.

successful conclusion the Princeton scientific expedition of 1877; this expedition explored the Bridger Basin in Wyoming and brought back many important specimens of new and little known Eocene mammals. From 1878 to 1880 he worked as a graduate student and instructor (1881–1890) at Princeton. In those days evolution was the burning topic of interest in all universities and, before paleontology had supplied the direct evidences of evolution, embryology and comparative anatomy were looked to as its principal supports. Osborn at that time, as later, saw that all three sources of evidence should be studied together.

In 1879–80, therefore, he went to England for advanced graduate work at Cambridge University with the great embryologist Balfour. Later he went to the Royal College of Science, where he became the pupil of T. H. Huxley and ardently studied comparative anatomy under that inspiring teacher. We see in his early study on the foetal membranes of the opossum and other marsupials signs of his ability to choose subjects of strategic importance. The same is true of his studies on the origin of the corpus callosum of the mammalian brain; in his rather extended paper on the principal fiber tracts of the brains of amphibians he opened up a line of investigation which has been carried on by, among others, Professor C. J. Herrick, who gladly acknowledges the importance of Osborn's pioneer studies. In fact, between 1883 and 1887 comparative neurology may be said to have been his principal subject and, with the assistance of Dr. Oliver S. Strong, he planned to write a general work on comparative neurology.

Gradually, however, his papers in vertebrate paleontology became more numerous and after another extended residence in England he completed his memoir on Mesozoic Mammals (1888), which again demonstrated his ability to choose a subject of major importance and to extract from it far-reaching results. For it was the Mesozoic Mammals that carried back the history of the mammalian molar teeth to a very distant date, when the triangular or so-called tritubercular molar crown was in its initial stages. He therefore endorsed Professor Cope's theory of the origin of the tritubercular molar, adding many original evidences and observations of his own and early developing an ingenious system of naming the principal cusps of the upper and lower molars, which system has since been adopted by the paleontologists of the world. While giving every due credit to Cope, he proceeded to apply his own nomenclature in detail to the complex molar patterns of ungulates and showed how, with this tritubercular key, as he called it, one could unlock and open up the most complicated molar patterns, analyzing their parts and reading the history of the group.

In 1891, through the cooperation of President Seth Low of Columbia University and of President Jesup of this museum, Professor Osborn was invited to take up his residence in New York and to become, on the one hand, Da Costa professor of zoology at Columbia University and, on the other, founder and curator of the department of vertebrate paleontology in this museum.

At Columbia he was the leader in organizing the new department of zoology. With the assistance chiefly of Drs. E. B. Wilson, Bashford Dean and Oliver S. Strong, he soon developed a very progressive and successful department. During this period he founded the Columbia University Biological Series and brought out therein his book "From the Greeks to Darwin," which attracted wide attention. He also arranged the publication in the same series of Willey's "*Amphioxus* and the Origin of the Vertebrates," Dean's "Fishes, Living and Fossil" and Calkins's "The Protozoa." For almost a decade he served actively as dean of the School of Pure Science, and as the time came nearer for Columbia to move to its new site at Morningside Heights, he became responsible for the planning of the lecture rooms, laboratories and offices of the department of zoology in Schermerhorn Hall, the cornerstone of which was laid in 1896. Meanwhile he was conducting courses in neurology, comparative anatomy and paleontology in the department. Drs. Gary N. Calkins, J. H. McGregor, Henry E. Crampton and the present writer were all his own graduate students. About 1903 he began to transfer to the museum the greater part of the lectures and laboratory work of his graduate courses "Evolution of the Vertebrates" and "Mammals, Living and Fossil." In 1907 he handed over these courses to the writer for further development and they are still being conducted at the museum. His regular teaching work at Columbia ceased in the year 1910, when he was appointed research professor in zoology and generously turned back his salary into the department.

Chiefly through his efforts the museum acquired (1895) the private collection of fossil vertebrates which had been amassed by his friend, Professor E. D. Cope of Philadelphia. He soon gathered around him an able staff, Dr. J. L. Wortman as assistant curator, Mr. Adam Hermann as chief preparator, and others. Then under his vigorous and efficient direction was begun that great series of field explorations for fossil vertebrates which has never ceased to this day. To make a very long story short, the building up of the department of vertebrate paleontology through forty-five years of his continuous activities is regarded by some as his greatest single achievement.

He derived great inspiration and enjoyment from his numerous paleontological field trips, especially in

the western states, but also in Egypt and Mongolia and in his trip around the world.

At the time of his death he was the author of 940 articles, papers, books, monographs, etc., listed in his bibliography. It is obviously impossible to refer in detail to this astonishing output; but it seems very safe to state that among his most important contributions to science were the following:

(1) His initial studies on the origin of the corpus callosum of the mammalian brain;

(2) His memoir on the Mesozoic Mammals;

(3) His numerous contributions to the study of the evolution of mammalian molar teeth to and beyond the tritubercular type;

(4) His many important papers and monographs on the fossil rhinoceroses, titanotheres, horses and proboscideans;

(5) His great text-book on "The Age of Mammals."

With regard to the theory of evolution, his outstanding principles or laws, as he called them, include the following:

(1) The law of *continental and local adaptive radiation;*

(2) The law of *homoplasy* or parallel but independent evolution in related lines of descent;

(3) The law of *tetraplasy,* whereby evolution results not from the operation of single causes, but as the resultant of forces from four principal directions (external environment, internal environment, heredity, selection).

(4) The law of *alloiometry,* or adaptive modification of dimensions of the skull, feet or other parts, arising independently in different lines of descent.

(5) The law of *rectigradation,* or *aristogenesis; i.e.,* the gradual appearance during long ages of new structural units of adaptive value, predetermined in the germ plasm and in their initial stages independent of natural selection;

(6) The law of *polyphyly; i.e.,* the normal occurrence of many related lines of descent, derived eventually from a common stock, but coexisting throughout great periods of time.

Professor Osborn's contributions to science were recognized by his election as foreign member of the Royal Society of London, as honorary fellow of a long series of other distinguished societies in Great Britain, France, Belgium, Holland, Germany, Russia, Sweden, Italy and other countries of Europe; also of China, Persia, Argentina, Mexico, Cuba. In this country he was an active member of the National Academy of Sciences, of the American Philosophical Society for Promoting Useful Knowledge, the American Academy of Arts and Sciences, the New York Academy of Sciences and many others. He was president of the New York Academy of Sciences in 1898–99, and president of the American Association for the Advancement of Science in 1928. For many years he was chairman of the executive committee and later (1909–1924) the very active president of the New York Zoological Society. He was the recipient of many medals awarded in recognition of his scientific labors, including the Darwin Medal of the Royal Society of London, the Wollaston Medal of the Geological Society of London, the *Prix* Albert Gaudry, awarded by the Geological Society of France, the medal of the Pasteur Institute of Paris and many others.

In 1899 Professor Osborn became closely associated with President Jesup in the administration of the museum, and upon the death of Mr. Jesup in 1908 he was elected president of the Board of Trustees. From that day until his retirement to the position of honorary president in 1933, he carried a vast burden upon his strong shoulders. During this period, and thanks in large part to his able leadership, many buildings were added in response to ever-growing pressure of collections and exhibits. Undoubtedly not even he could have accomplished all this if he had not budgeted his time so effectively and concentrated so intently upon one thing at a time.

On the personal side, Professor Osborn was sincere, benign, urbane, without guile, very loyal in friendship and highly appreciative of loyalty in others, extremely helpful, especially to his students and assistants. He consistently respected the right of his colleagues and assistants to differ with him in the interpretation of scientific problems.

He loved young people and delighted in furthering their education along broad and thorough lines. His wife, Lucretia Perry Osborn, until her death in 1930, was at all times a most able and enthusiastic partner. His children and grandchildren survive to cherish his memory.

WILLIAM K. GREGORY

AMERICAN MUSEUM OF NATURAL HISTORY

SCIENTIFIC EVENTS

SUMMER WORK OF THE DIVISION OF GEOLOGICAL SCIENCES AT HARVARD UNIVERSITY

FORTY members and students of the Division of Geological Sciences at Harvard University were engaged in field work and half a dozen remained in Cambridge to do laboratory and office work. Studies were carried on in many states and countries, including Australia, Africa, Mexico, Chile, Argentina, Peru, Europe, New Mexico, Colorado, Montana, Texas, Min-