two groups we may use the facts, in the works above referred to, to explain conditions in the Cretaceous plesiosaurs which are inexplicable on any other grounds.

The limb bones of adult plesiosaurs are solid. Young bones nearly always exhibit the canal, cavity and one or more of the foramina above referred to. The fact that the bones are first hollow and later become solid would seem to indicate that the osteolytic elements present in the limb bones of mammals and most reptiles were almost absent, or present in small numbers, in the plesiosaurs and many of the larger dinosaurs.

If the comparison between the developing limb bones of mammals and reptiles is a safe one, then we have here in the young aquatic plesiosaurs of the Cretaceous a condition which persisted until late in life and which recurs in the young of all mammals at the present day. One species of plesiosaur, based on an immature skeleton of an animal some fifteen feet in length, exhibits these conditions in a well-marked manner. Through the openings in the edges of the limb bones of the plesiosaurs, as in the mammals, migrated the osteoblasts or bone-forming cells, the blood vessels and other elements.

The peripheral or perichondral bone was formed first in the plesiosaurs as in the modern mammals, and, through the migration of the bone-forming cells inward, the so-called endochondral bone was a secondary formation. The formation of bone within the endochondrium of the plesiosaurs was, apparently, retarded by some osteolytic agent, possibly the osteoclasts, until the bone-forming elements for some unknown reason attained the supremacy and completely filled the medullary cavity, canal and foramen with solid bone. During this process of filling there resulted, in young bones, a sharp line of separation of the perichondral from endochondral bone, resulting in the formation of curious conical end pieces, formerly called epiphyses, but now known to be the result of bone growth and not epiphyses at all.

Bidder[4] has offered an interesting explanation of the formation of epiphyses in mammals, by the migration of the osteoblasts through special vascular canals (*Canalis vasculosis perforans*) which traverse the space between the medullary cavity and the cartilaginous caps at the ends of the limb bones.

It is interesting to observe in broken and sectioned plesiosaurian propodials an exactly similar condition for this ancient group of aquatic reptiles. The canals are found extending from the medullary cavity to the ends where the bone has been formed in the shape of small conical mounds around the vascular openings, so that in the plesiosaurs the process resulted not in the production of new growths at the ends of the limb bones (epiphyses) but in the elongation of the bone. It is hoped in another place to give a fuller explanation and figures of these interesting relics of Mesozoic osteogenesis.

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THE COLUMBUS MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The regular meeting just held at Columbus (December 27 to January 1) was one of the most successful of the recent meetings of the association. All of the sessions were held in the buildings on the campus of the Ohio State University and members of the association who attended the Columbus meeting of 1899, and who had not visited the university since were surprised and delighted at the enormous growth of the institution and at the character of the many new buildings which had been built since that day. The local committee in charge of the arrangements was extremely efficient and the compactness of the group of buildings and the exceptional meeting room facilities made everything easy for members in attendance.

The opening night for addresses of welcome and for the annual address of the retiring president was in many respects the most impressive function of the kind held under the auspices of the association in the recollection of the writer. In spite of a stormy night the college chapel, seating about 1,200 persons, was completely filled. The address of welcome by President W. O.

Thompson, of the university, and Dr. T. C. Mendenhall, past-president of the association, were extremely happy. Dr. Thompson welcomed the association on the part of the university, city and the commonwealth, and Dr. Mendenhall, finding that his predecessor had included practically all Ohio of to-day in his address, welcomed the association on the part of the shades of deceased Ohio men of science, sketching briefly the career of a number of Ohio's great men of science of the past century. President Eliot's address entitled "The Fruits, Prospects and Lessons of Recent Biological Science" was published in the last number of SCIENCE.

Following the opening meeting a crowded reception was held in the beautiful new library building.

Owing to the death of Retiring Vice-president F. W. Taylor, of Section D, and the absence of Retiring Vice-presidents U. S. Grant, of Section E, and Edgar F. Smith, of Section C, there were no vice-presidential addresses delivered before these sections. The address of Retiring Vice-president Clark Wissler, of Section H, on "Psychological and Historical Interpretations of Culture" and that of R. M. Pearce, of Section K, on "The Work and Opportunities of a University Department for Research in Medicine" were read by title and will be published in SCIENCE.

Addresses by retiring vice-presidents were delivered as follows:

Section A: H. S. White, "Poncelet Polygons."

Section B: Anthony Zeleny, "The Dependence of Progress in Science upon the Development of Instruments."

Section F: F. R. Lillie, "The History of the Fertilization Problem."

Section G: G. P. Clinton, "Botany in Relation to American Agriculture."

Section I: Elmer E. Rittenhouse, "Upbuilding American Vitality, the Need for a Scientific Investigation."

Section L: Paul H. Hanus, "City School Superintendents' Reports."

Section M: L. H. Bailey, "The Forthcoming Situation in Agricultural Work."

There were three public lectures complimentary to the citizens of Columbus. On Tuesday night, Dr. Douglas W. Johnson, "Surface Features of Europe as a Factor in the War." Wednesday night, by Dr. Raymond F. Bacon, Mellon Institute of Pittsburgh, "The Industrial Fellowships of the Mellon Institute: Five Years' Progress in a System of Industrial Service." Friday night, by Dr. Frank K. Cameron, of the Bureau of Soils, Washington, "The Fertilizer Resources of the United States."

The council after an extended discussion adopted the recommendation of the committee on policy to the effect that members of the affiliated societies including the component societies of the old Pacific Association of Scientific Societies, not now members of the Amerian Association, be invited to join the American Association during the year 1916, without payment of the usual entrance fee of $5.00.

Two amendments to the constitution were introduced and will be acted upon at the next annual meeting.

1. Amend Article 22 of the constitution by omitting after the word "Chemistry" in the second line, the words "including its application to Agriculture and Arts."

2. Amend Article 9 of the constitution by adding in line 8 after the words "Permanent Secretary," the words "and the Secretaries of Sections." This amendment, if adopted, will permit the reelection of secretaries of sections, after the expiration of the five-year term and seems especially desirable in case of secretaries who are willing to continue the work.

Dr. Chas. Henry Hitchcock, Dr. Eugene W. Hilgard and Rev. Louis C. Würtele were made life members under the Jane M. Smith fund.

Dr. J. McK. Cattell, Dr. W. J. Humphreys and Professor H. L. Fairchild were reelected members of the committee on policy.

There was, unfortunately, only a small attendance at the meeting of the committee of one hundred on research, and but one report was presented, namely, that by Professor C. R. Cross, chairman of the subcommittee on research funds.

The societies which meet at Columbus in affiliation with the American Association were: American Association of Economic Entomologists; American Mathematical Society; American Microscopical Society; American Nature Study Society; American Physical Society; American Phytopathological Society; American Society of Naturalists; Association of Official Seed Analysts of North America; Botanical Society of America; Entomological Society of America; Society for Horticultural Science; Southern Society for Philosophy and Psychology; Students and Collectors of Ohio Archeology; Wilson Ornithological Club.

The total registration at the association office was seven hundred and fifty, making the meeting one of the largest of the second group. The geo-

graphic distribution of members and attendants was interesting, Ohio naturally leading with one hundred and eighty-one. The other figures are as follows: New York, 59, Michigan 27, Massachusetts 24, Minnesota 18, Missouri 14, District of Columbia 32, Illinois 63, Indiana 34, Iowa 22, Kansas 17, Pennsylvania 31, Wisconsin 25, West Virginia 10, and other states represented by less than 10.

Owing to the impossibility of securing perfect registration, the accurate number of scientific men and women in Columbus can not be stated, but it is safe to say that it approximated nine hundred.

Much interest was shown at the meeting by the citizens of Columbus, and the meetings of all the sections and affiliated societies were extremely well attended. The smokers and dinners were all successful.

The symposia of the meeting were as follows:

Before Section F and the American Society of Zoologists on the topic "The Basis of Individuality in Organisms," the speakers being C. M. Child, E. G. Conklin, O. C. Glaser, C. E. McClung and H. V. Neal.

Before the American Society of Naturalists on the topic "Recent Advances in the Fundamental Problems of Genetics," the speakers being H. H. Bartlett, W. L. Tower, E. M. East, H. S. Jennings and C. B. Davenport.

Before Section I, topic "National Defense and Development," there being twelve speakers.

Before Section K, topic "The Energy Content of the Diet," the speakers being H. P. Armsby, Ruth Wheeler, E. B. Forbes, Carl Voegtlin and C. F. Langworthy.

Before Section M, topic "The Relation of Science to Meat Production," the speakers being W. O. Thompson, H. J. Waters, L. D. Hall, H. W. Mumford and A. R. Ward.

In spite of the fact that the Geological Society of America was meeting in Washington with the Pan-American Congress at the same time, Section E held a very important meeting at which twenty-nine papers were presented, topics relating to the geology of Ohio and adjoining states predominating.

The council passed a resolution to hold a special meeting of the American Association for the Advancement of Science in Washington on January 4, 1916.

Two grants were made by the council, one of one hundred dollars to R. C. Benedict, of Brooklyn, to assist in his investigation of the plants of the fern genus *Nephrolepis*, and one of two hundred and fifty dollars to the Concilium Bibliographicum Zoologicum of Zurich.

A list of the fellows elected will appear in a near number of SCIENCE.

The arrangements for the entertainment of the visiting ladies were exceptionally pleasant and in the resolutions of thanks, which were passed by the council, especial attention was drawn to the admirable work of the ladies' committee, of which Mrs. W. O. Thompson, wife of the president of Ohio State University, was chairman. A very interesting feature was a twilight musical recital with a MacDowell program, which was given on Wednesday afternoon.

Election of officers by the General Committee resulted as follows:

President: C. R. Van Hise, University of Wisconsin.

Vice-presidents as follows: Mathematics, L. P. Eisenhart, Princeton University; physics, H. A. Bumstead, Yale University; engineering, E. L. Corthell, Brown University, Providence, R. I.; geology and geography, R. D. Salisbury, University of Chicago; zoology, G. H. Parker, Harvard University; botany, T. J. Burrill, University of Illinois; anthropology and psychology, F. W. Hodge, chief of the Bureau of Ethnology, Washington, D. C.; social and economic science, Louis I. Dublin, New York; education, L. P. Ayres, of the Russell Sage Foundation, New York; agriculture, W. H. Jordan, director of the New York State Experiment Station, Geneva, N. Y.

The vice-presidents of Sections C and K were not elected, but power was given to the sectional committees to elect. Professor W. E. Henderson, of Ohio State University, was elected general secretary and Dr. C. Stuart Gager was made secretary of the council. Dr. A. F. Blakeslee was elected secretary of Section G and Mr. S. C. Loomis, secretary of Section I.

New York was selected as the place for the Convocation Week meeting of 1916–17, the opening meeting to be held on the night of December 26, and the first council meeting on the morning of December 27, 1916.

The general committee recommended to the general committee of next year the selection of Pittsburgh as the meeting place for 1917–18.

In the absence of the general secretary, Dr. Henry Skinner, of Philadelphia, Dr. Henry B. Ward, of Urbana, acted as general secretary, but the present brief report of the meeting has been drawn up by the permanent secretary.

L. O. HOWARD