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A HISTORY OF THE DIVISION OF VERTEBRATE
PALEONTOLOGY IN THE UNITED STATES NATIONAL
MUSEUM

By CHARLES W. GILMORE

THE National Museum's Division of Vertebrate Paleontology, a branch of the Department of Geology, has had a long and distinguished record of service to the Nation and to science. In the pages that follow there is presented for the first time an extended history of this Division, beginning with the establishment of the Smithsonian Institution in 1846 and covering a span of more than 90 years (including the year 1940). The account describes the beginnings and growth of the Division and shows to what extent it has fulfilled its mission as a national institution in assembling, caring for, and rendering available to both students and the general public the fossil specimens entrusted to its keeping.

The data included have been compiled from an exhaustive search of the early records of the Smithsonian Institution, as well as an examination of its published papers and annual reports, supplemented by information resulting from the writer's 37 years of service in the Division (1903-40). In order to make the record as complete as possible, all phases of its development, organization, personnel, explorations, exhibits, and records are discussed.

I wish to express my great appreciation for the assistance rendered by many members of the National Museum staff, and especially to thank Dr. Charles Schuchert, of the Peabody Museum, Yale University, for reading the manuscript and offering many helpful criticisms. As the only surviving member of the Department of Geology of the period

prior to 1900, he was able to furnish information that otherwise would have been irretrievably lost.

EARLIEST VERTEBRATE COLLECTIONS, 1846 TO 1886

The history of the Division of Vertebrate Paleontology may be said to date from the year 1846, when by act of Congress the custody of the National Cabinet of Curiosities, then in the Old Patent Office Building, was transferred to the Smithsonian Institution. The act provided that "all objects of natural history, plants, and geological and mineralogical specimens belonging or hereafter to belong to the United States," and which were then in the city of Washington, should be delivered to the Regents of the Smithsonian Institution, and together with new specimens obtained by exchange, donation, or otherwise, should be so arranged and classified as best to facilitate their examination and study. A subsequent act (Sundry Civil Act of March 3, 1879), decreed that "all collections of rocks, minerals, soils, fossils, and objects of natural history, archaeology, and ethnology, made by the Coast and Interior Survey, the Geological Survey, or by any other parties for the Government of the United States, when no longer needed for investigations in progress, shall be deposited in the National Museum."

The vertebrate paleontological material brought together under these acts prior to 1886 was relatively small in quantity and of a miscellaneous character, though of much scientific interest because of the number of type and figured specimens it contained. It consisted mainly of fossils collected by the early exploring expeditions, such as the surveys under the direction of the General Land Office, 1849-58; the surveys for the Pacific Railroads, 1854-55; the surveys west of the 100th meridian under the direction of the Engineer Corps of the United States Army, 1874; and the United States geological and geographical surveys under the direction of Dr. F. V. Hayden, 1856-72.

In 1849 Dr. John Evans, an assistant to the eminent geologist Dr. David Dale Owen, was directed to visit the *Mauvais Terres* of South Dakota and make a collection of the fossil vertebrate remains that up to that time were known only to the Indians, trappers, and a few explorers. Among the fossils obtained, which were later submitted to Dr. Joseph Leidy for study, was the *Merycoidodon* (*Oreodon*) of that time.

In 1853 Dr. Evans, accompanied by Dr. B. F. Shumard, again visited the Badlands while on his way to Oregon for the purpose of making a geological survey of that territory. At this time he made a collection of fossil mammals and turtles, all of which were sent by the Commissioner of the Land Office to the Smithsonian In-

stitution, whence they were transferred to Professor Leidy in Philadelphia for study. Dr. Evans died in Washington in 1861 while engaged in the preparation of a report on the Badlands fossils that he and others had collected.

The vicissitudes attending the custody of vertebrate fossils by the Government in these early days are well illustrated by an account published in one of the early reports of the National Museum. Sometime between 1850 and 1860 an "enlightened" Commissioner of Patents, who was annoyed by the presence of a collection of fossil bones in one of the rooms of the Patent Office, without consulting anyone sent them to a mill at Georgetown, where they were transformed into commercial fertilizer. A contemporary commented, "Once for thought they there became food for the farmer's plants."

Among the early collections of fossil vertebrates received was a small one made under the auspices of the Smithsonian Institution by Thaddeus A. Culbertson on an expedition to the *Mauvaises Terres* (Badlands) and the Upper Missouri in 1850. He was allotted \$200 by the Smithsonian Institution to cover the transportation costs of collections made.

Culbertson was a graduate of Princeton University, and he visited this region for his health. He was accompanied by his brother Alexander, who had long been connected with the American Fur Co. and so was familiar with the whole country, and had indeed sent valuable specimens of fossil mammals to the Academy of Natural Sciences of Philadelphia. Thaddeus A. Culbertson made collections of the recent fauna and flora of the regions visited, and, though he was constantly searching for fossils, he met with no success except in the Badlands at the locality where his brother had previously found the remains of the fossils sent to the Philadelphia Academy. According to his journal, published in the Annual Report of the Smithsonian Institution for 1851 (pp. 93-95), he spent only a few days collecting in the Badlands. The fossil portions of the collection were sent to Dr. Joseph Leidy for study, the results of whose investigations were published in volume 6 of the Smithsonian Contributions to Knowledge, 1854. Thaddeus A. Culbertson returned to his home from this expedition in August 1850 with renewed health, but soon afterward he succumbed to a prevalent disease after a few weeks' illness.

Secretary Henry pointed out in the Fifth Annual Report of the Smithsonian Institution that Dr. Joseph Leidy, in a study of the Oligocene collections made by Thaddeus A. Culbertson, was able to characterize the following animals: *Rhinoceros nebrascensis*, *Rhinoceros occidentalis*, *Palaeotherium bairdii* (= *Mesohippus bairdi*), and *Agriochaerus antiquus*. The type specimens of the second and third

of these are now in the collections of the National Museum, but the fourth has never been definitely located.

A history of the type specimen of *Rhinoceros nebrascensis*,¹ Leidy (*Hyracodon nebrascensis* of modern nomenclature) by Drs. Horace and Albert Wood² is so interesting that it is worth incorporating here. I have extracted freely from their account as follows:

Abel (1926)³ discusses and figures a skull of *Hyracodon* "nebrascensis" with badly worn teeth. This bears the "original" label:

"Skull of *Rhinoceros nebrascensis* (Leidy) Loc: Coryell County, Texas A. R. Roessler collected 1863."

Abel states that this is the original of Leidy's figured specimen (1853, Pl. 15, Figs. 1-2) from the "Big Bad Lands," and that the label as to collector and locality is, therefore, wrong. There have been unpublished intimations that this is not Leidy's specimen, belonging to the Smithsonian Institution (Leidy, 1853, p. 14), collected by Dr. D. D. Owen. However, comparison of the specimen with Leidy's figures, which are of his usual high standard of accuracy, leaves no possible doubt that they are the same, even the breaks being identical. This specimen was part of a shipment of allegedly Texas fossils sent to k. k. geologische Reichsanstalt of Vienna (now the geologische Bundesanstalt) by A. R. Roessler in 1868 (Schloenbach, 1868).

What happened may be summarized from the Wood brothers' account as follows:

Dr. B. F. Shumard, who had been on the Owen survey, was appointed State geologist of Texas in 1858, and among his subordinates was A. R. Roessler. In 1860 Shumard announced the discovery in Washington County, Tex., of fossil materials equivalent in age to those of the Big Bad Lands, and, as stated by the Wood brothers, "It is entirely reasonable to suppose that he borrowed typical Badlands material for comparison from the collection of the Owen survey with which he had been associated, although there is no direct proof that he did so." On the outbreak of the Civil War, Shumard, Roessler, and others went north. From the evidence presented it appears clear that Roessler removed certain specimens and maps from the Texas survey and that about October 1868 Roessler, who was an Austrian, sent a collection of vertebrate specimens to the Geologische Reichsanstalt, among which was the type of *Hyracodon nebrascensis*.

Professor Abel has since presented the *Hyracodon* skull to the American Museum of Natural History, where it bears the catalog number 22617.

¹ Merrill, George P., Catalogue of the type and figured specimens of fossils, minerals, rocks, and ores in the Department of Geology, United States National Museum. U. S. Nat. Mus. Bull. 53, pt. 2 (Fossil vertebrates, etc.), p. 60, 1907. The type is listed, but there was some doubt that the specimen was the one that Leidy had described and figured. It is now known not to be the type.

² Wood, Horace Elmer, 2d, and Wood, Albert Elmer, Mid-Tertiary vertebrates from the Texas Coastal Plain: Fact and fable. Amer. Midl. Nat., vol. 18, pp. 129-146, illus., 1937.

³ Abel, O., Paleont. Zeitschr., vol. 8, pp. 241-242, 1926.

These same authors (p. 141) call attention to two other Oligocene specimens of this same collection in the paleontological collections of Columbia University. Through the generosity of Prof. G. Marshall Kay, these have since been returned to the National Museum.

Other parts of these early collections were a very long time in reaching the national collections. In the Annual Report of the National Museum for 1888, it is recorded that a small collection of White River fossils, including the type of *Testudo culbertsoni* Leidy, was deposited by Indiana University. The record is not complete, but it appears quite certain that after these specimens had been studied by Leidy they were returned to Dr. David Dale Owen, who was then State Geologist of Indiana, where he died in 1860. Although it is clearly evident that these specimens were Government property, the following statement from the Report of the National Museum for 1891 (p. 10), is at least of interest.

"The Owen type specimens of fossils, mentioned on page 759 of the report of the National Museum for 1888 as having been 'presented' to the Museum by the Indiana State University through the courtesy of the university, will be retained in the National Museum as a 'deposit' subject to the order of the board of trustees of the university."

A fire that occurred in the Smithsonian Building in January 1865 burned some stored duplicate Museum materials belonging to other divisions, but nowhere in the records is it found that vertebrate fossils were destroyed. Nevertheless, this conflagration has for years served as a convenient explanation for the absence of certain specimens that were missing from the collections.

In 1858, Dr. James Deane, of Greenfield, Mass., made a request to Secretary Baird for the Smithsonian Institution to publish his manuscript on the fossil footprints of the Connecticut Valley. On account of the expense involved, and the fact that the manuscript was unfinished, the Secretary was unable to approve the project. Through the generosity of friends and the cooperation of the Smithsonian Institution, this work was privately published in 1861, shortly after Dr. Deane's death, under the title "Ichnographs from the Sandstone of Connecticut River."

In 1859, Dr. J. S. Newberry, as geologist, accompanied the topographic expedition for the exploration of the San Juan River and Upper Colorado under the leadership of Capt. J. N. Macomb, U. S. Army. The type specimen of the sauropod dinosaur *Dystrophacus viamalai* Cope was collected by Newberry in southern Utah, and it, with other vertebrate fossils obtained, was deposited in the Smithsonian paleontological collections.

The Museum's early records regarding the fossils collected by Dr. F. V. Hayden and his geological exploring parties are very in-

complete. In some instances it cannot now be determined whether the specimens recorded from this source were vertebrate or invertebrate fossils.

In 1856, Dr. Hayden accompanied Lt. Gouverneur K. Warren's expedition for the exploration of the Missouri and Yellowstone Rivers. It was on this journey that the first vertebrate materials were collected from the Judith River formation. These vertebrates were described and illustrated by Leidy under the title "Extinct Vertebrata from the Judith River and Great Lignite Formations of Nebraska".⁴ A few of these specimens (*Thespesius occidentalis*, *Ischyrotherium antiquum*, *Compsemys victus*, and *Trionyx joveatus*) were deposited in the National Museum, but for some reason now unknown the others were retained in the Academy of Natural Sciences in Philadelphia.

In the Annual Report of the Smithsonian Institution for 1856 mention is made that Dr. Hayden revisited the *Mauvais Terres* of the White River and "procured some forms of fossil mammals not previously discovered." In 1857 the Museum received two boxes of fossils collected by Dr. Hayden while acting as geologist for Lt. G. K. Warren's exploring expedition in the Niobrara Valley. Many of these specimens were later described by Dr. Joseph Leidy⁵ and are now in the Museum's collections.

In 1858, Lieutenant Warren deposited 21 boxes containing collections of animals, plants, minerals, and fossils from the valley of the Platte, gathered chiefly by Dr. Hayden, but the records do not disclose whether vertebrates were included in this accession.

In 1870, Hayden collected some vertebrates along the Big and Little Sandy Creeks to Green River and from the Bridger formation in southwestern Wyoming. Cope and Leidy reported on these collections, all of which were finally transferred to the National Museum. So much of these materials was fragmentary that many of the specimens have subsequently been discarded as valueless.

The bulk of the collections of the National Institute were transferred to the Smithsonian Institution in 1858. The National Institute, known first as the National Institution, contained the earlier collections of the Columbian Institution for the Promotion of Arts and Sciences transferred to it in 1841. For a time it had custody of the governmental collections, assembled and exhibited in a large hall in the Old Patent Office Building, from which they were transferred to the Smithsonian Institution in 1858 and 1862, in accordance with the congressional act of 1846. No list of the vertebrate fossils that were transferred has been found in the archives of the National

⁴ Trans. Amer. Philos. Soc., vol. 11, pp. 139-154, 1860.

⁵ Leidy, J., Proc. Acad. Nat. Sci. Philadelphia, 1858.

Museum, but in a catalog of the National Institute the following vertebrate specimens were listed as being exhibited in case 18:

Vertebrae of fossil Cetacea.

4 specimens of fossil fish from near Astoria, Oreg. (fossil fish well worthy of the attention of the curious).

Mastodon tooth.

Fossil skull and fishes.

Bronze bust of Cuvier.

Mastodon tooth from Marianna, Fla. Walter Younge, N. C.

Large ox horn from Missouri.

Fossil remains of the Arctic or North American elephant or mastodon found in the State of Missouri, 1843.

Numerous tusks (10 to 12 feet long), good preservation.

100 teeth, many of them, weight being 20 to 30 pounds.

In addition to the specimens listed above Leidy⁶ enumerated the bones of a *Megatherium* from Skidaway Island, Ga., which he examined in the National Institute collections.⁷ They are as follows: Lower jaw (nearly complete) with teeth; isolated tooth; temporal portion of cranium; annular metacarpal bone; axis; cervical vertebra; 2 dorsal centra; spinous process of dorsal vertebra; 2 rib fragments; head of femur; proximal extremities of two tibia; os calcis and several tooth fragments.

It is assumed that all these specimens were transferred to the Smithsonian Institution in 1858, at the time the bulk of the other collections of the National Institute was received. These materials were incorporated in the private collections of the Institution in accordance with the terms of its charter, thus becoming the property of the Government. Now, however, only a few of the specimens can be recognized, and in all probability many of them have long since been discarded because of the lack of data as to their origin, locality, and geological occurrence.

One of the important specimens of this collection, which only recently reached the Smithsonian Institution, was the type of *Delphinus calvertensis*, for 90 years in the Museum of Comparative Zoology, Cambridge, Mass. Its history is as follows: In October or November 1841, Francis Markoe, Jr., corresponding secretary of the National Institute, made a geological excursion in Calvert and St. Marys Counties in Maryland. From a cliff in the vicinity of Cove Point, with the help of Dr. Tongue, a cetacean skull was collected. In 1842 this specimen was described by Richard Harlan,⁸ who named it *Del-*

⁶ Smithsonian Contr. Knowl., vol. 7, p. 51, 1855.

⁷ Under date of April 2, 1851, a letter from Professor Baird to John Varden, curator of the National Institute, made a request for the *Megatherium* bones in case 18, presumably for Dr. Leidy.

⁸ Description of a new extinct species of dolphin from Maryland. Proc. Nat. Inst., vol. 2, pp. 195-196, figs. 1-4, 1842.

phinus calvertensis. On April 29, 1846, the National Institute was directed by Congress to deposit its collections in the Smithsonian Institution. In 1850 Jeffries Wyman⁹ announced that Louis Agassiz (who was appointed professor of natural history in Lawrence Scientific School of Harvard University in 1846) was commencing a study of the Cetacea. At a meeting of the American Academy of Arts and Sciences in October 1848 Professor Agassiz¹⁰ exhibited skulls of fossil cetaceans, including the type of *Delphinus calvertensis*. In 1858 and 1862 the collections of the National Institute were transferred to the Smithsonian Institution. From this chronological record, it appears quite evident that the *Delphinus* skull was lent to Professor Agassiz for use in his studies of the Cetacea and was probably in his custody when the actual transfer of the National Institute collections to the Smithsonian took place.

Recently the chronologic events in the history of this specimen were laid before Dr. Thomas Barbour, director of the Museum of Comparative Zoology in Cambridge, by Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution, and the former acted promptly in having the specimen returned to the national collections. The type is in excellent condition and shows every evidence of careful handling throughout its unusual history. As an example of true scientific interest and generous cooperation this recovery of an important type, whose ownership was obscured by the lapse of time and by the passing of an earlier generation of naturalists, is an event of more than ordinary significance.

In 1868 a complete skeleton of *Megaceros hibernicus* ("Irish elk"), from the peat bogs of Ireland, was purchased from Thomas & Sons in Philadelphia, and a fine head with antlers of this animal was received as a gift from Prof. O. C. Marsh.

In 1872 Prof. E. D. Cope collaborated with the Hayden survey and explored the Bridger, Green River, Washakie, and Wasatch horizons in Wyoming, and large collections of fossil vertebrates were made. Some of these specimens reached the National Museum's collections, but I have been unable to learn from the published records what the precise arrangement was between the Interior Department and Professor Cope concerning the disposition of the fossils collected. In a letter to his father, dated May 24, 1872, Cope remarked: "I will have every facility furnished by the Interior Department, expenses paid, orders for men, wagons, beasts, provisions, etc."¹¹ This statement implies that, since the expenses for the trip were borne by the Government, all the specimens collected

⁹ Amer. Journ. Sci., vol. 10, p. 230, footnote, 1850.

¹⁰ Proc. Amer. Acad. Arts and Sci., vol. 2, p. 5, 1852.

¹¹ Osborn, H. F., Cope: Master naturalist, p. 183, 1931.

should have become its property. Schuchert, however, offers the information that Cope received no salary, and for that reason claimed the fossils as his own. This was not an unusual practice in those days, as I am told that some of the early ornithologists and biologists worked under similar arrangements. Some of the Bridger and Green River fossils of this year are in the National Museum's paleontological collections, but an unknown number were evidently retained by Cope and are now in the American Museum of Natural History, New York City.

After Cope's death, on April 12, 1897, his entire collection of vertebrate fossils was purchased and presented to the American Museum of Natural History. Included were many specimens collected by the Hayden survey that were in Cope's hands at that time. Obscurity in the proof of ownership led the National Museum authorities to accept a compromise settlement whereby in 1908 a selected collection of 99 duplicate specimens, including a mounted skeleton of the type of *Hoplophoneus robustus* and having an estimated value of \$3,250, was sent by the American Museum of Natural History to Washington, D. C. This collection consisted of representative specimens from the following formations: Puerco, Torrejon, Bridger, Oligocene, Miocene, and Permian of North America; Pampean and Santa Cruz of South America.

In 1874, Prof. E. D. Cope was engaged by the War Department as paleontologist to accompany the United States geographical and geological survey west of the 100th meridian under the leadership of Lt. George M. Wheeler. It was on this expedition that he assembled the classic materials from the Upper Miocene and Lower Pliocene of the Santa Fe marls in the Rio Grande Valley and the Wasatch Eocene specimens from along the course of the Gallinas River in New Mexico. All these fossils were shipped to Philadelphia for Cope to study, but after publication of his report¹² they were transferred by the War Department to the custody of the National Museum. They formed a most important contribution to the paleontological collections of that time because of the considerable number of type and figured specimens included.

In 1877, Dr. A. C. Peale, who acted as geologist for the Green River division of the Hayden survey, was instrumental in bringing together a considerable collection of Eocene Green River fishes. These were transferred to the National Museum but later were sent to Professor Cope at Philadelphia for study and description.¹³ The collection remained there until after his death, being returned to the National Museum by the executors of his estate in 1898.

¹² Rep. U. S. Geogr. and Geol. Surv. West of the 100th Meridian (Wheeler), vol. 4, pt. 2, 1877.

¹³ Rep. U. S. Geol. Surv. Terr. (Hayden), vol. 3, 1884.

ORIGIN OF THE DEPARTMENT OF VERTEBRATE FOSSILS AND ITS LATER ORGANIZATION

In the formative years of the Smithsonian Institution there was no separate unit that dealt exclusively with vertebrate fossils, their custody apparently falling to the lot of workers interested in other subjects. With the establishment of the United States National Museum, however, vertebrate fossils were placed in the custody of the Department of Comparative Anatomy, and such preparatory and exhibition work as was carried on at that time was done by the osteologists of that department.

This arrangement persisted until 1887. In that year Prof. O. C. Marsh, of Yale University, was appointed honorary curator of the Department of Vertebrate Fossils.¹⁴ Professor Marsh had been vertebrate paleontologist on the United States Geological Survey staff since 1882, and during that time, under liberal allotments from the Powell administration and with the aid of a large staff of assistants, he had made notable progress in collecting, preparing, and describing vertebrate materials. The first report of progress of the Department of Vertebrate Fossils appears in the Annual Report of the United States National Museum for 1891, p. 223, by Frederic A. Lucas, Assistant Curator.

A general reorganization of the department was inaugurated by Assistant Secretary G. Brown Goode in 1894, when all the fossil collections were administered under the title "Department of Paleontology," with Dr. Charles D. Walcott, Director of the United States Geological Survey, as honorary curator and Charles Schuchert as assistant curator.

The appointment of Mr. Schuchert was of more than passing importance, since for the first time in their history the paleontological collections were placed in charge of an official paid by the Museum. Mr. Schuchert, although primarily more occupied with invertebrate fossils, nevertheless made notable contributions to the upbuilding and care of the vertebrate collections during his administration of the section. The new Department was divided into three sections: (1) Vertebrate fossils, with O. C. Marsh as honorary curator and Frederic A. Lucas as acting assistant curator; (2) invertebrate fossils; and (3) fossil plants. On this reorganization Goode commented: "It will now also be possible to bring the work incident to installation of all paleontological material under one uniform system."

In 1897, with the advent of the head curator system, a further change in the Museum's organization placed all paleontology under the Department of Geology, Vertebrate Paleontology becoming a

¹⁴ Ann. Rep. U. S. Nat. Mus. for 1887, p. 4, 1889.

section under the Division of Stratigraphic Paleontology, but with no change in personnel.

The rapid growth of the collection, incident to the receipt of the Marsh collections from New Haven, and the death of Professor Marsh in 1899 led to the appointment of F. A. Lucas as acting curator in 1901, a position he held until his resignation from the Museum staff in 1904. From that time until 1908 the collections were administered by Dr. George P. Merrill, head curator of geology.

In 1898 J. W. Coleman and in 1900 Alban Stewart were employed as preparators, being the first paid employees to devote all their time to the preparation of vertebrate fossils. On account of failing health Coleman resigned in June 1903, and Stewart severed his connection with the Museum in the spring of 1904. In the meantime, through the energetic interest of Dr. Merrill, James W. Gidley (1905) and Charles W. Gilmore (1903) were employed as preparators, and Norman H. Boss (1904) as assistant preparator. The first mentioned came from the American Museum of Natural History, New York City, the other two from the Carnegie Museum in Pittsburgh, Pa., all men with previous experience in paleontologic work.

In 1908 there was a further change in the organization of the Department of Geology, when three divisions corresponding to former sections were substituted for the Division of Stratigraphic Paleontology. The administration of the Division of Vertebrate Paleontology was divided, James W. Gidley becoming custodian of the mammalian collection and Charles W. Gilmore custodian of the reptilian collection.

On June 16, 1911, the Division of Vertebrate Paleontology again became a section of the Division of Paleontology, administered by Dr. Ray S. Bassler. In March of this same year Thomas J. Horne, an experienced preparator and ironworker from the American Museum of Natural History, was added to the staff.

On June 30, 1924, the final change was made in the organization, which has since been known as the Division of Vertebrate Paleontology, with Charles W. Gilmore as curator and James W. Gidley as assistant curator, Norman H. Boss as chief preparator, Thomas J. Horne as preparator, and John M. Barrett as junior scientific aide. This staff continued intact until the death of Dr. Gidley on September 26, 1931. He was succeeded by Dr. C. Lewis Gazin on March 1, 1932. Mr. Barrett reached retirement age on March 1, 1936, and was succeeded in August 1936 by Henry Comack, who resigned on June 30, 1937. This position was again filled by the appointment of William E. Moran in June 1938.

In the 42 years that paid personnel has been engaged in fossil vertebrate work in the National Museum, 28 persons have been employed, of which only 14 were on a permanent status. All others

were temporary employees engaged to do special items of work. In table 1 is given a complete list of these employees, with the dates of their appointment and separation:

TABLE 1.—*Employees of the Division of Vertebrate Paleontology and their terms of service*

Name	Title	Appointed or assigned	Separated
Amateis, Louis.....	Modeler.....	May 2, 1910	Sept. 30, 1910
Barrett, John M.....	Junior scientific aide.....	Spring 1919...	Feb. 29, 1936
Boss, Norman H.....	Chief preparator.....	Apr. 1, 1904	
Boyd, W. P.....	Blacksmith.....	Nov. 4, 1910	Dec. 7, 1910
Bressler, C. V.....	Preparator.....	June 1, 1911	Mar. 12, 1915
Cole, John L.....	do.....	Jan. 8, 1913	June 11, 1917
Coleman, J. W., Jr.....	do.....	Feb. 1, 1898	June 30, 1903
Comack, Henry.....	Junior scientific aide.....	Aug. 1, 1936	June 30, 1937
Eastman, Charles R.....		1914.....	1914.
Giles, Gustavus B.....	Preparator.....	Jan. 13, 1913	July 14, 1916
Gazin, Charles L.....	Assistant curator.....	Mar. 1, 1932	
Gidley, James W.....	do.....	Feb. 15, 1905	¹ Sept. 26, 1931
Gilmore, Charles W.....	Curator.....	Nov. 2, 1903	
Goldberg, Louis.....	Preparator.....	July 16, 1916	Feb. 29, 1920
Hannan, E. Elmer.....	Modeler.....	Jan. 10, 1911	June 30, 1911
		Aug. 16, 1911	Jan. 23, 1912
		Feb. 8, 1913	June 30, 1913
Hatcher, John Bell.....	Assistant.....	Dec. 1, 1890	Jan. 31, 1891
Horne, Thomas J.....	Preparator.....	Mar. 27, 1911	
Hughes, J. T.....	Blacksmith.....	Mar. 13, 1911	Mar. 25, 1911
Lucas, Frederic A.....	Assistant curator.....	Oct. 1888.....	June 30, 1904
Marceiron, William.....	Preparator.....	Mar. 23, 1914	June 30, 1914
Marsh, O. C.....	Honorary curator.....	May 10, 1887	Mar. 18, 1899
Millhauser, Samuel.....	Preparator.....	July 12, 1917	June 15, 1918
Moran, William E.....	Junior scientific aide.....	June 16, 1938	
Neeb, Paul.....	Preparator.....	Jan. 11, 1932	July 9, 1932
Nickles, Edward B.....	do.....	Feb. 11, 1913	Oct. 10, 1916
Schuchert, Charles.....	Assistant curator.....	1894.....	Sept. 8, 1904
Stewart, Alban.....	Preparator.....	Dec. 1, 1900	Mar. 12, 1904
Wade, William H.....	Blacksmith.....	Mar. 7, 1910	Sept. 6, 1910

¹ Died.

In addition to those of the regular staff there have been several volunteer collaborators who have rendered invaluable service in the development of the Government vertebrate collections. The earliest of these was Dr. Joseph Leidy. At intervals during the period from 1850 to about 1873, most of the vertebrate material brought together under governmental auspices was transmitted to him in Philadelphia for scientific investigation. These collections were later returned to the Smithsonian and, as many of the specimens had been described and illustrated, their importance was greatly enhanced.

In the early seventies Prof. E. D. Cope began his collaborative work with the Hayden survey. His entry into the western fossil fields in 1872 led to an immediate break in the hitherto friendly relations between Cope and Marsh, and eventually to the exclusion of Leidy from

further governmental work, Cope practically superseding him in that respect. Cope was a prodigious worker, as is attested by his many volumes and reports on vertebrate fossils published by various branches of the Government. As he also accompanied expeditions, the Government collections were greatly enriched by his specimens as well as by his paleontological studies and publications.

Cope was superseded by Prof. O. C. Marsh in 1882, who became vertebrate paleontologist for the United States Geological Survey, and for 10 years he brought together collections and described materials that together form the most notable contribution ever made to the development of the Division of Vertebrate Paleontology in the National Museum.

Dr. Oliver P. Hay, although never officially connected with the National Museum, nevertheless contributed much to the development of vertebrate paleontology in this Institution (1912-30). Appointed research associate in the Carnegie Institution of Washington in 1912, he was provided office space in the Division of Vertebrate Paleontology, which he occupied until his death on November 2, 1930. His bibliography contains no less than 29 papers that were based wholly on Museum specimens. In addition to his research, he made many gifts to the collections and was responsible for the acquisition of a number of unique specimens. It was during this period that he compiled his Second Bibliography and Catalogue of the Fossil Vertebrata of North America and the three volumes on the Pleistocene of North America and Its Vertebrated Animals.

Dr. Remington Kellogg, while still a member of the Biological Survey staff of the Department of Agriculture (1920-28), undertook the scientific investigation of the fossil cetacean collections of the National Museum, this work being done outside of his official duties and supported to some extent by grants from the Carnegie Institution of Washington. These studies have been continued since his affiliation with the Museum in 1928, and his energetic interest has been a very important factor in developing the marine fossil mammal collection to a point where it ranks first among American collections of these animals.

Dr. Charles R. Eastman, under the auspices of the Smithsonian Institution, spent a year (1914) in the study of the fossil fish collection, rendering valuable service in publication,¹⁵ identification, and rearrangement.

Dr. Alexander Wetmore began the study of fossil birds prior to his appointment as Assistant Secretary of the Smithsonian Institution in 1925, and since then he has published continually, much of his work being based on the Museum's collections. Through his

¹⁵ Proc. U. S. Nat. Mus., vol. 52, pp. 235-304, pls. 1-23, 1917.

interest there has been a steady growth of these rarest of fossil remains, until at the present time the collection ranks high among the fossil-bird assemblages in this country.

MARSH COLLECTION, PERIOD OF MOST RAPID EXPANSION,
1886-1900

The greatest impetus to the growth of the collections of vertebrate fossils in the National Museum was the transfer from the United States Geological Survey of the materials brought together under the direction of Prof. O. C. Marsh¹⁶ and known as the "Marsh Collection." Professor Marsh, as United States paleontologist, worked under the auspices of the Survey from 1882 to 1892, and during that period he assembled the fossil materials that were destined to form a most important part in the development of a national collection of vertebrate fossils. According to Schuchert,¹⁷ "the Powell survey was liberal in allotments for this work, and he (Marsh) was given about \$15,000 each year to pay salaries for himself and his numerous assistants—collectors (about 35), preparators (9), scientific aides (8), and artists—and for field and laboratory expenses, including large freight bills."

The specimens as they were collected were sent from the field directly to Marsh at the Peabody Museum of Natural History of Yale University for preparation and study. The first consignment returned to Government custody consisted of 72 large boxes, shipped to the National Museum in 1886 and there placed in storage unopened; in July 1891 a second shipment, consisting of 380 prepared specimens in 33 boxes weighing 6,960 pounds, was received. These were placed on exhibition in a case especially made for them in preparation for the International Geological Congress meeting held that year in Washington.

In April 1896 a third consignment, consisting of 115 boxes of rhinoceros (*Teleoceras*) skeletal remains from Kansas, was received and placed in storage. In 1898, a fourth portion of this assemblage consisting of two carloads was transferred to Washington. At the time of Professor Marsh's death (March 18, 1899), the largest part of the collection still remained in New Haven. Shortly thereafter, the rest of the collections, five carloads in all, was packed and shipped to the National Museum, formal transfer being made by Dr. Charles D. Walcott, then Director of the United States Geological Survey, under date of December 8, 1899. His letter and that of Secretary Langley in reply are given herewith in abstract.

¹⁶ For full-length biography of Marsh, see Schuchert, Charles, and Le Vene, Clara M., "O. C. Marsh: Pioneer in Paleontology," 541 pp., illus. New Haven, 1940.

¹⁷ Schuchert, Charles, Nat. Acad. Sci. Biogr. Mem., vol. 20, 1st mem., p. 26, 1939.

U. S. GEOLOGICAL SURVEY,
Washington, D. C., December 8, 1899.

Prof. S. P. LANGLEY,
Secretary, Smithsonian Institute,
Washington, D. C.

DEAR SIR: I have the honor to state that all the vertebrate collections of the late Prof. O. C. Marsh, belonging to the Government, have been shipped from New Haven, Conn., and are now transferred to the custody of the U. S. National Museum, subject only to the use of such material as may be necessary for study and illustration in the completion of the monographs that were in course of preparation by Professor Marsh at the time of his death.

The actual number of specimens represented in this collection cannot be stated. They range in size from minute teeth of fossil mammals to individual specimens weighing from 500 to 2,000 pounds each. The collections are rich in Dinosauria, especially in examples of *Triceratops* and *Stegosaurus*, while the series of Titanotherium skulls is one of the best, if not the best, in existence. It contains fifty or more complete examples cleaned, and a number in the rough, besides many hundred bones.

Among the specimens transferred are the types of forty or more species, including dinosaurs, of Jurassic, Cretaceous, and Tertiary mammals. Among the types are the following:¹⁸

DINOSAURS	SNAKES
Diplodocus longus ¹⁹	Coniophis precedens
Labrosaurus ferox	JURASSIC MAMMALS
Camptosaurus nanus	Paurodon valens
Triceratops sulcatus	Menacodon rarus
Triceratops calicornis	Enneodon affinis
Triceratops obtusus	Enneodon crassus
Pleurocoelus nanus	Laodon venustus
Ceratosaurus nasicornis	CRETACEOUS MAMMALS
Ceratops montanus	Priconodon crassus ^{20a}
Ceratops alticornis	Cimolodon agilis
CROCODILES	Telacodon praestans
Rhytinodon rostratus	Oracodon conulus
	Allacodon pumilus

The transfer of these great collections to Washington without the loss of any material, either through imperfect recording or through misunderstanding as to ownership of specimens, reflects the greatest credit on the businesslike methods and the integrity of Professor Marsh. The addition of the material to the National Museum places it in the front rank among museums in its collection of vertebrate fossils. It is necessary that some gaps in the collections be filled, and I sincerely trust that it will be possible for the museum to do this at an early date.

Yours respectfully,

(Signed) CHAS. D. WALCOTT,
Director.

¹⁸ This list is incomplete, as there were 50 original types, of which 21 were reptilian and 29 were mammalian. Less than half of the types of the rare Jurassic and Cretaceous mammals are listed here, as there were 12 of the first and 10 of the second.

¹⁹ An error, as the type is in the Peabody Museum of Natural History.

^{20a} Wrongly listed, as this is a dinosaur, not a mammal.

SMITHSONIAN INSTITUTION,

December 22, 1899.

DEAR SIR:

I take pleasure in acknowledging the receipt of your letter of the eighth instant, advising me that you have transferred to the National Museum all the vertebrate fossils collected by the late Professor O. C. Marsh belonging to the United States Government, subject only to the condition that such material as is required may be used for study and illustration in completing the monographs which were in preparation by Professor Marsh at the time of his death.

The addition of this immense collection of the most important American fossil remains to the treasures already assembled in the National Museum will, I am sure, afford the greatest satisfaction to all workers in the field of paleontology both at home and abroad, and you will permit me to add a personal word in appreciation of your untiring efforts to facilitate in every way possible the great task connected with the removal of the collection from New Haven to Washington.

During the coming year I expect to have two preparators engaged in working out the matrix specimens still uncleaned, and confidently hope that it may be possible in a few years to have the entire collection made available for study and a selected series for public exhibition. From this latter series the public will be able to form a correct idea as to the number, variety and great size of these wonderful extinct creatures of the western country, and will undoubtedly be impressed with the extent and importance of the work of the paleontological divisions of the Geological Survey and the marvelous industry and intelligence displayed by Professor Marsh in bringing together this great collection.

Yours respectfully,

(Signed) S. P. LANGLEY.

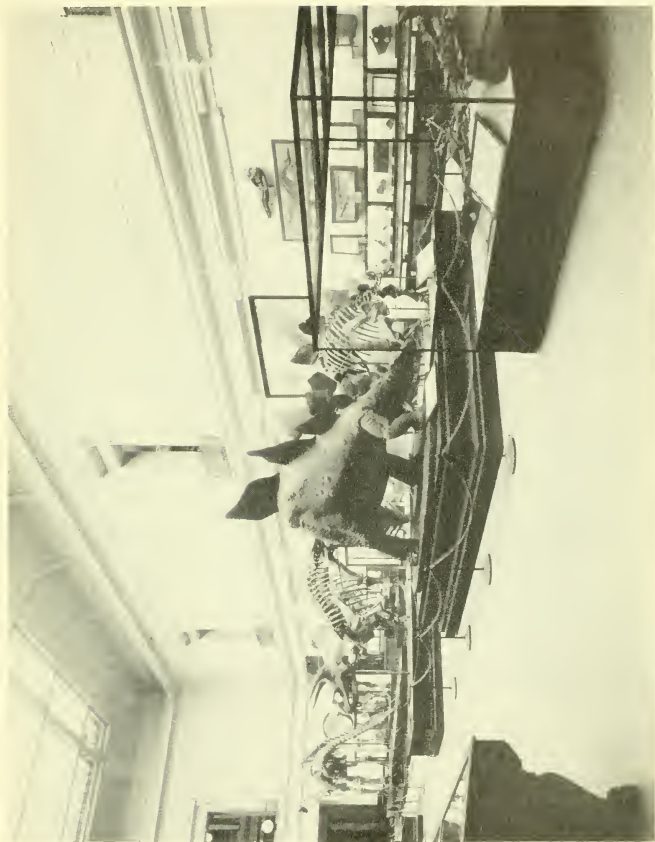
The Honorable CHAS. D. WALCOTT,

Director, U. S. Geological Survey.

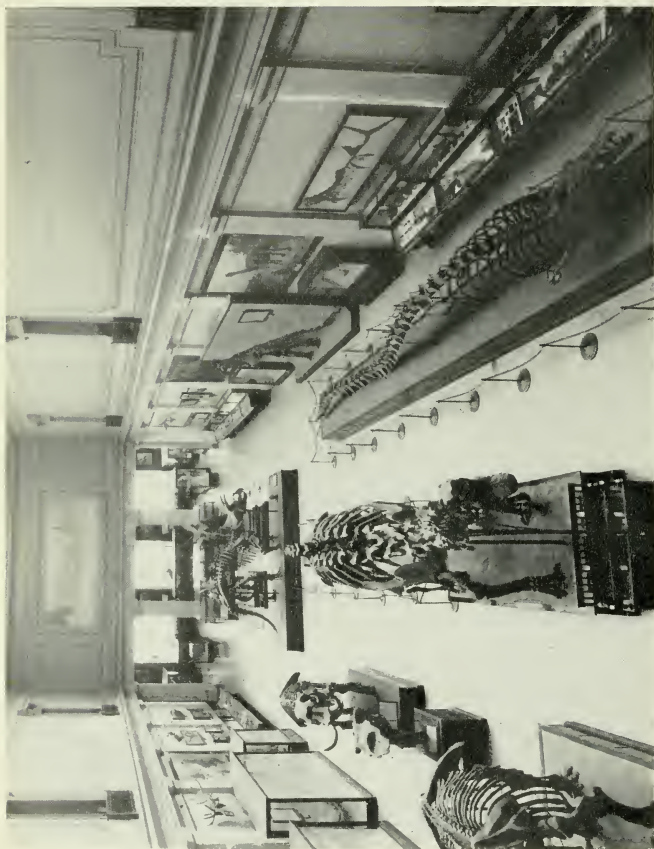
The bulk of this collection consisted of specimens from the Jurassic (Morrison), Upper Cretaceous (Lance), Oligocene (Chadron), and Pliocene (Republican River) deposits of western North America. Lesser lots deemed worthy of special mention were from the Triassic of North Carolina, Cretaceous (Arundel) of Maryland, Upper Cretaceous of Montana (Judith River), Upper Cretaceous of Colorado (Denver and Arapahoe), Upper Cretaceous of Kansas (Niobrara), and Miocene and Oligocene of Oregon (John Day and Mascall), besides numerous other small miscellaneous lots.

Many of the specimens came to the Museum either fully or partially prepared, but the bulk of the material was in the same condition as when received from the field. In fact, three years' collections are still in the original field boxes (49) and have never been opened. In transmitting the fifth and final portion of the Marsh collection, Dr. Walcott in 1900 estimated it as comprising 15,000 specimens having a value of not less than \$150,000.

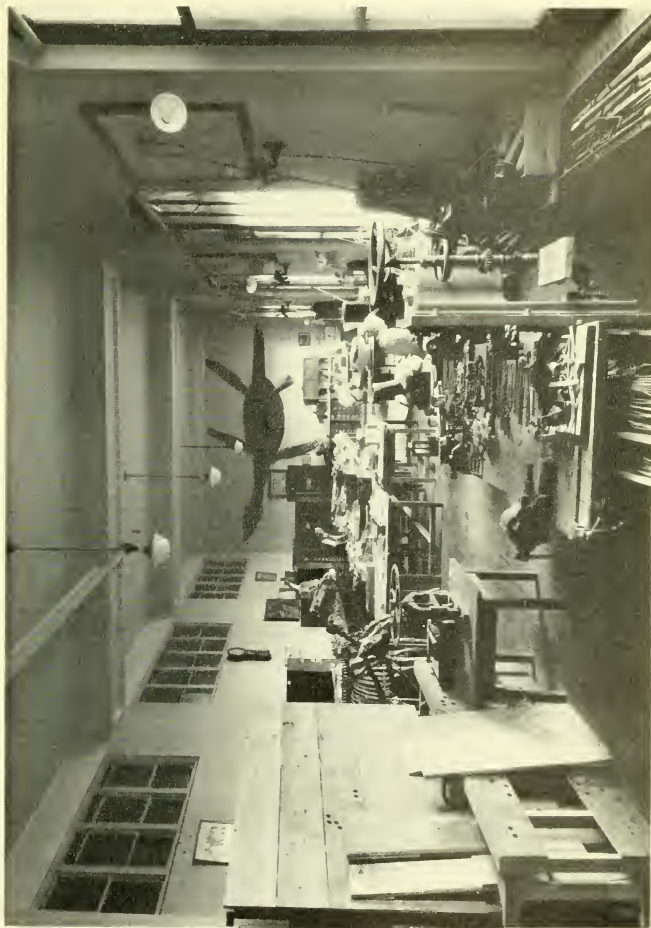
The Jurassic part of the collections, which exceeded all others in bulk and weight, was especially rich in the remains of *Stegosaurus*,



Main exhibition hall for fossil vertebrates. Diagonal view from the southeast.



Main exhibition hall for fossil vertebrates. View from the west, second floor.



General view of the vertebrate palaeontology laboratory.

Camptosaurus, *Ceratosaurus*, and *Antrodemus* (*Allosaurus*). These Morrison dinosaurs came from two widely separated regions: Garden Park in the vicinity of Canyon City, Colo., and near Como, Albany County, Wyo. In both instances fossil quarries were developed that produced specimens for several successive seasons. At Canyon City the fossils occurred in a thick sandstone layer, and this deposit was worked from 1883 to 1887, inclusive, under the direction of M. P. Felch. It was from this quarry that the articulated type specimens of *Ceratosaurus nasicornis* and *Stegosaurus stenops* and an articulated skeleton of *Antrodemus fragilis* were obtained.

In the Como region the famous Quarry 13 and Quarry 13½ were found by William H. Reed, in 1879. The former was worked for the Government for a part of 1882 by Mr. Reed; in 1883 by J. L. Kenney; and from 1884 to 1887 by Fred Brown. It is one of the few known quarries that have produced quantities of stegosaurian and camptosaurian bones. The following types were obtained here: *Stegosaurus sulcatus* Marsh, *Diracodon laticeps* Marsh, *Camptosaurus nanus* Marsh, and *C. browni* Gilmore, all in the National Museum.

Quarry 9 at Como Bluff, famous because of the occurrence of Jurassic mammals, was worked for a number of seasons by Professor Marsh's parties, but for the Government from 1883 to 1885 by Ed. Kennedy and W. Beck. The specimens obtained are, therefore, divided between the Peabody Museum of Natural History and the United States National Museum.

The Upper Cretaceous part of the collection was largely from the Lance Creek area of Converse (now Niobrara) County, Wyo., made under the direction of John B. Hatcher during the years 1889 to 1892, inclusive, and consisted principally of skulls and skeletal parts of the large horned ceratopsian and hadrosaurian dinosaurs. Even more valuable scientifically was the large series of teeth and jaws of the small mammals of this period, among which were many types.

Of lesser importance were small collections made by Mr. Hatcher in 1887 from the Upper Cretaceous of the Denver Basin, and in 1888 from the Upper Cretaceous Judith River formation in Montana and Arundel formation in Maryland, each of which contained several type specimens.

The Oligocene part of the collection made under the direction of Mr. Hatcher covered the period from 1886 to 1890, and the greater number of specimens came from the Chadron formation of western Nebraska (Sioux County) and the Badlands of Washington County, S. Dak. Of the Brontotheres alone there were 158 skulls and jaws representing many types, besides much skeletal material. The fauna of the Brule was scantily represented. The Miocene and Oligocene were represented by a season's collection of 15 boxes of materials

from the Mascall and John Day formations in eastern Oregon collected by L. S. Davis in 1882.

The lower Pliocene collections made by Hatcher in 1884 and 1885 near Long Island, Phillips County, Kans., consisted principally of *Teleoceras fossiger*, of which there were more than 10,000 bones representing all parts of the skeleton. Upper Pliocene was represented by small lots of material from Hay Springs, Nebr., and from Archer and Williston, Fla.

At the time of my affiliation with the National Museum in 1903, the bulk of the Marsh collection was stored in rented buildings in southwest Washington. The first floor of a three-story brick building on the west side of Tenth Street near C Street, SW., was then in use as a paleontological laboratory, the cellar and two upper floors being completely occupied by boxes and crated trays of vertebrate material. The study collections of this period were kept in standard trays arranged in tiers on a balcony in the southeast corner of the present Arts and Industries Building and in the lower parts of the A-topped exhibition cases in use at that time. These collections in storage from 1903 on were rapidly reduced in bulk through preparation and condemnation of worthless material, so that in 1910, with the occupancy of the New Natural History Building, the widely scattered storage collections were assembled as a unit for the first time. On this occasion the offices and laboratory were newly furnished and equipped, new exhibition cases replaced the old, and steel storage cases replaced the wooden racks of a previous period. These commodious quarters permitted a more systematic arrangement of the study collections, and for the first time the preparators were provided with a well-lighted, well-equipped, roomy laboratory (27 by 77 feet) (pl. 51). These improvements in facilities were almost immediately reflected in an improved quality as well as quantity of output.

The study collections have more than doubled in size since the Division moved into the Natural History Building in 1910. There are now 477 three- and six-foot storage units in use, but in addition their tops are covered with the larger specimens that cannot be cared for in standard trays. These storage cases now occupy practically every inch of case room that can be found in offices, laboratory, and adjoining corridors (pls. 52, 53), in addition to the gallery erected in 1930 in the main storage room, which practically doubled its capacity.

At the present time (1940) all the Marsh collection, except 49 boxes from the Morrison of Canyon City, have been prepared, and with this exception all the collection is now available.

EXPEDITIONS

Since the inception of the Division of Vertebrate Paleontology, it has profited from no less than 68 major²⁰ collecting expeditions, of which about 30 were financed and directed by the Smithsonian Institution or the National Museum. Funds for the others were furnished by private sponsors or by other Government agencies. Of the latter, the United States Geological Survey has been the outstanding contributor.

The first expeditions organized by the United States National Museum exclusively for the collection of fossil vertebrates were those of 1894 and 1896 to the Eocene of Alabama for *Basilosaurus* remains. Reports of an abundance of archaeocete remains in the Gulf States instigated the 1894 expedition, and Dr. Charles Schuchert was detailed to investigate these and to collect if possible a specimen for exhibition. He was successful in finding a much fragmented skull and a fine ramus of one and the forward half of the articulated skeleton of a second individual of *Basilosaurus*, together with other less important specimens. This material formed the basis for the restoration of the *Basilosaurus cetooides* skeleton exhibited at the Cotton States and International Exposition at Atlanta in 1895. In November 1896 Schuchert again visited the Eocene of Alabama and collected additional materials of *Basilosaurus*, including an articulated series of vertebrae of the hinder portion of the skeleton. From these specimens was assembled the mounted skeleton that for 28 years has formed a unique feature of the exhibition series.

In 1904, under A. G. Maddren, and again in 1907, under Charles W. Gilmore, expeditions were dispatched to Alaska by the Smithsonian in the hope of securing a mountable skeleton of the northern mammoth (*Elephas primigenius*). Although neither expedition was successful in getting an elephant skeleton, important collections of Pleistocene fossils resulted.

This quest for elephant remains was further pursued in 1915, when Benno Alexander was employed by the Smithsonian to accompany the Koren expedition to the Kolyma River Valley, Siberia. Mr. Alexander obtained a nearly perfect skull of *Elephas primigenius* and a large miscellaneous collection of Pleistocene bones.

Scarcely a year has passed since 1912 when there has not been at least one expedition in the field in quest of fossil vertebrates. Beginning in 1929, however, the Smithsonian Institution has provided the means for carrying on annual expeditions, and it has thereby been possible to plan a definite program. Geographically the ex-

²⁰ By major expeditions is meant those collecting parties that have spent 2 or more months in the field and whose energies were wholly devoted to the collection of fossil vertebrates.

peditions have covered a wide area, collections having been made in Alabama, Alaska, Arizona, Cuba, Florida, Idaho, Indiana, Maryland, Montana, Nebraska, New Mexico, Oklahoma, Siberia, South Dakota, Utah, Virginia, and Wyoming.

Although much of the exploratory work of later years has been done in well-known fossil-producing areas, these collecting activities have also resulted in the development of important new fossil areas and faunas. The more important of these are: Jackson, Eocene fauna, near Melvin, Choctaw County, Ala. (1894, 1896, 1929); the Cumberland Cave Pleistocene fauna near Cumberland, Md. (1912, 1913, 1914, 1915); Paleocene fauna from Sweet Grass County, Mont. (1908, 1909, 1910, 1911, 1934); Pliocene and Pleistocene faunas of the San Pedro Valley, Ariz. (1921, 1936); footprints from the Permian of the Grand Canyon, Ariz. (1924, 1926, 1927); fauna of the Upper Cretaceous, Two Medicine formation, Mont. (1913, 1928, 1935); Pliocene fauna and development of the famous *Plesippus* Quarry near Hagerman, Idaho (1929, 1930, 1931, 1934); fauna of the Upper Cretaceous, North Horn formation, and Paleocene, Dragon formation of the Wasatch Plateau region of central Utah (1937, 1938, 1939, 1940); Miocene fauna of the Chesapeake Bay area (1905-1940).

Although early collecting was intermittent and consisted largely in accepting opportunities as they arose, with the exception of the Marsh collecting parties for the Geological Survey the work of recent years has been planned with the idea of filling in gaps and of rounding out the permanent collections, so that they will be more fully representative of all the better-known North American faunas and fossil-producing areas. As a result of this planned collecting, the vertebrate collections of the National Museum are gradually reaching a standard that is in keeping with the national character of the Institution.

CHRONOLOGICAL LIST OF EXPEDITIONS, OUTSIDE OF THE SMITHSONIAN INSTITUTION AND NATIONAL MUSEUM, FROM WHICH THE DIVISION OF VERTEBRATE PALEONTOLOGY HAS BENEFITED

1849. U. S. Land Office. Oligocene (Brule), South Dakota, "Bad Lands," John Evans in charge.
1850. Thaddeus Culbertson (allotted \$200 for freight by the Smithsonian). Oligocene, South Dakota, "Bad Lands," Thaddeus Culbertson in charge.
1853. U. S. Land Office. Oligocene (Brule), South Dakota, "Bad Lands," John Evans in charge.
1856. War Department, U. S. Geographical Exploration of the Yellowstone and Missouri Rivers. Upper Cretaceous (Judith River), Gouverneur K. Warren in charge. F. V. Hayden made the collections.
1857. War Department. Oligocene and Miocene, South Dakota and Nebraska, Niobrara River. Gouverneur K. Warren in charge. F. V. Hayden made the collections.

1870. U. S. Geological Survey, Hayden Survey. Eocene, Bridger, and other Tertiary deposits, Wyoming. F. V. Hayden made the collections.
1872. U. S. Geological Survey, Hayden Survey. Eocene, Bridger, and other Tertiary basins, Wyoming. E. D. Cope made the collections.
1874. War Department, U. S. Geographical Surveys West of the 100th Meridian. Eocene (Wasatch), Miocene and Lower Pliocene, New Mexico, G. M. Wheeler in charge. E. D. Cope, assisted by H. C. Yarrow, made the collections.
1882. U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 13," W. H. Reed in charge.
1883. U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 13," 6 miles from Como, J. L. Kenney in charge.
U. S. Geological Survey. Jurassic (Morrison), Colorado, "Garden Park," near Canyon City, M. P. Felch in charge.
1884. U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 13," 6 miles from Como, Fred Brown in charge.
U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 9," Como Bluff, Ed Kennedy in charge, assisted by W. Beck.
U. S. Geological Survey. Jurassic (Morrison), Colorado, "Garden Park," near Canyon City, M. P. Felch in charge.
U. S. Geological Survey. Lower Pliocene (Republican River), Kansas, Phillips County, Long Island, "*Teleoceros* Quarry," J. B. Hatcher in charge.
1885. U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 13," 6 miles from Como, Fred Brown in charge.
U. S. Geological Survey. Jurassic (Morrison), Colorado, "Garden Park," near Canyon City, M. P. Felch in charge.
U. S. Geological Survey. Lower Pliocene (Republican River), Kansas, Phillips County, Long Island, "*Teleoceros* Quarry," J. B. Hatcher in charge.
1886. U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 13," 6 miles from Como, Fred Brown in charge.
U. S. Geological Survey. Jurassic (Morrison), Colorado, "Garden Park," near Canyon City, M. P. Felch in charge.
U. S. Geological Survey. Oligocene (Chadron chiefly), Nebraska and South Dakota, J. B. Hatcher in charge.
1887. U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 13," 6 miles from Como, Fred Brown in charge.
U. S. Geological Survey. Jurassic (Morrison), Colorado, "Garden Park," near Canyon City, M. P. Felch in charge.
U. S. Geological Survey. Upper Cretaceous (Denver), Colorado, near Denver, J. B. Hatcher in charge.
U. S. Geological Survey. Oligocene (Chadron), South Dakota and Nebraska, J. B. Hatcher in charge.
U. S. Geological Survey. Cretaceous (Arundel), Maryland, near Beltsville, J. B. Hatcher in charge.
1888. U. S. Geological Survey. Jurassic (Morrison), Colorado, "Garden Park," near Canyon City, M. P. Felch in charge.
U. S. Geological Survey. Oligocene, South Dakota and Nebraska, vicinity of Chadron and Hermosa, J. B. Hatcher in charge.
U. S. Geological Survey. Cretaceous (Judith River), Montana, Cow Island and vicinity of Dog Creek and Judith River, J. B. Hatcher in charge.

- U. S. Geological Survey. Cretaceous (Arundel), Maryland, near Beltsville, J. B. Hatcher in charge.
- U. S. Geological Survey. Jurassic (Morrison), Wyoming, Albany County, "Quarry 9," Fred Brown in charge.
1889. U. S. Geological Survey. Triassic, North Carolina, Egypt, J. B. Hatcher in charge.
- U. S. Geological Survey. Oligocene, South Dakota, J. B. Hatcher in charge.
- U. S. Geological Survey. Upper Cretaceous (Lance), Wyoming, Niobrara County, Lance Creek, J. B. Hatcher in charge, assisted by C. E. Beecher and O. A. Peterson.
1890. U. S. Geological Survey. Upper Cretaceous (Lance), Wyoming, Niobrara County, Lance Creek, J. B. Hatcher in charge, assisted by W. H. Utterback, A. L. Sullins, and T. A. Bostwick.
- U. S. Geological Survey. Oligocene (Chadron), South Dakota, "Bad Lands," J. B. Hatcher in charge, assisted by W. H. Utterback, E. B. Willson, O. A. Peterson, C. E. Beecher, and Gus Craven.
- U. S. Geological Survey. Upper Cretaceous (Niobrara), Kansas, Handel T. Martin in charge.
- U. S. Geological Survey. Triassic, North Carolina, J. B. Hatcher in charge.
- U. S. Geological Survey. Pliocene, Florida, Levy County, near Archer and Williston, J. B. Hatcher in charge.
1891. U. S. Geological Survey. Upper Cretaceous (Lance), Wyoming, Niobrara County, J. B. Hatcher in charge, assisted by A. L. Sullins, W. H. Utterback, A. E. Burrell, and O. A. Peterson.
1892. U. S. Geological Survey. Upper Cretaceous (Lance), Wyoming, Niobrara County, J. B. Hatcher in charge.
1899. Union Pacific Railroad. Jurassic (Morrison), Wyoming, Albany County, Freeze Out Mountains, Charles Schuchert in charge.
1900. U. S. Geological Survey. Triassic (Chinle), Arizona, "Tanner's Crossing," Barnum Brown in charge.
1902. U. S. Geological Survey. Eocene (Bridger), Wyoming, W. D. Matthew and Walter Grainger in charge.
1908. U. S. Geological Survey. Paleocene (Fort Union), Montana, Sweet Grass County, A. C. Silberling in charge.
1909. U. S. Geological Survey. Paleocene (Fort Union), Montana, Sweet Grass County, A. C. Silberling and J. W. Gidley in charge.
1913. U. S. Geological Survey. Upper Cretaceous (Two Medicine), Montana, Blackfeet Indian Reservation, C. W. Gilmore in charge, assisted by Floyd Strayer.
1914. U. S. Geological Survey. Upper Cretaceous (Judith and Claggett), Montana, vicinity of Judith P. O. C. W. Gilmore accompanied party.
1916. U. S. Geological Survey. Paleocene (Puerco and Torrejon) and Upper Cretaceous (Kirtland), New Mexico, San Juan Basin. J. B. Reeside made the collections.
1921. U. S. Geological Survey. Pliocene (Cochise) and Pleistocene, Arizona, San Pedro Valley, J. W. Gidley and Kirk Bryan.
- National Park Service. Miocene (Santa Fe marl), New Mexico, near Espanola, C. W. Gilmore in charge.
1924. National Park Service. Permian (Coconino), Arizona, Grand Canyon, footprints, C. W. Gilmore in charge, assisted by A. Metzger.
1926. National Park Service. Permian (Coconino and Hermit), Arizona, Grand Canyon, footprints, C. W. Gilmore in charge, assisted by Glen Sturdevant.

1927. National Academy of Sciences. Permian (Hermit and Supai), Arizona, Grand Canyon, footprints, C. W. Gilmore in charge, assisted by Glen Sturdevant.
1929. Carnegie Institution of Washington. Eocene (Jackson), Alabama and Mississippi. Remington Kellogg in charge, assisted by N. H. Boss.

CHRONOLOGICAL LIST OF EXPEDITIONS ENGAGED IN THE COLLECTION OF FOSSIL VERTEBRATES FOR THE UNITED STATES NATIONAL MUSEUM AND SMITHSONIAN INSTITUTION

1894. Eocene (Jackson), Alabama, Choctaw County, *Basilosaurus* remains principally, Charles Schuchert in charge.
1896. Same.
1904. Pleistocene, Alaska, Old Crow and Yukon River Valleys, A. G. Maddren in charge.
1907. Pleistocene, Alaska, Yukon Valley, C. W. Gilmore in charge, assisted by Benno Alexander.
1912. Pleistocene, Maryland, "Cumberland Cave," J. W. Gidley in charge, assisted by Raymond Armbruster.
1913. Pleistocene, Maryland, "Cumberland Cave," J. W. Gidley in charge.
1914. Same.
1915. Same.
- 1914-15. Pleistocene, Siberia, Kolyma Valley, Benno Alexander in charge.
1915. Pleistocene, Indiana, Pulaski County, "Winamac Mastodon," J. W. Gidley in charge.
1921. Miocene (Harrison), Nebraska, "Agate Springs," slab of *Dicrathidium* bones, J. W. Gidley in charge.
1923. Jurassic (Morrison), Utah, "Dinosaur National Monument," *Diplodocus* skeleton, C. W. Gilmore in charge, assisted by Norman H. Boss, J. A. Kay, E. M. York, and Golden York.
1924. Triassic, Virginia, Loudoun County, dinosaur tracks, C. W. Gilmore in charge, assisted by N. H. Boss.
1924. Pleistocene, Florida, Melbourne, in cooperation with the Bureau of American Ethnology, J. W. Gidley in charge.
1925. Pleistocene, Florida, Melbourne, investigation of occurrence of man with Pleistocene fossils, J. W. Gidley in cooperation with Amherst College.
- Pleistocene, Oklahoma, Long Horn Spring deposit, J. W. Gidley in charge.
1927. Pleistocene, Florida, Melbourne, J. W. Gidley in charge, assisted by C. P. Singleton.
- Pleistocene, Oklahoma, near Curtis, J. W. Gidley in charge.
1928. Upper Cretaceous (Two Medicine), Montana, Blackfoot Indian Reservation, C. W. Gilmore in charge, assisted by G. F. Sternberg and Edwin Cooke.
- Pleistocene, Florida, Melbourne and New Smyrna, J. W. Gidley in charge, assisted by C. P. Singleton.
1929. Pliocene (Hagerman Lake beds) and Pleistocene, Idaho, American Falls beds, "Plesippus Quarry," J. W. Gidley in charge, assisted by C. P. Singleton, Elmer Cook, and F. V. Conklin.
- Pleistocene, Florida, Melbourne, J. W. Gidley in charge, assisted by C. P. Singleton.
- Pleistocene, New Mexico, Dona Ana County, Aden Crater, in cooperation with Peabody Museum of Natural History, F. W. Darby in charge, assisted by N. H. Boss.
- Upper Cretaceous (Kirtland), New Mexico, San Juan Basin, C. W. Gilmore in charge, assisted by N. H. Boss, G. F. Sternberg, and C. W. Sternberg.

1930. Eocene (Bridger), Wyoming, Bridger Basin, C. W. Gilmore in charge, assisted by G. F. Sternberg and George B. Pearce.
 Pliocene (Hagerman Lake beds), Idaho, "*Plesippus* Quarry," near Hagerman, J. W. Gidley in charge, assisted by C. P. Singleton, S. P. Welles, Elmer Cook, Frank Garnier, and Y. Young Rogers.
 Pleistocene, Florida, Melbourne, evidence of association of man with Pleistocene fossils, J. W. Gidley in charge, assisted by C. P. Singleton.
1931. Eocene, Miocene, and Oligocene, Wyoming and Montana. Collections made from Eocene: Wasatch, Big Horn Basin; Oligocene: Pipestone Springs; Miocene: Canyon Ferry, White Sulphur Springs, and Deep River. C. W. Gilmore in charge, assisted by G. F. Sternberg and M. V. Walker.
 Pliocene (Hagerman Lake beds), Idaho, "*Plesippus* Quarry," near Hagerman, N. H. Boss in charge, assisted by C. P. Singleton, C. W. Caldwell, Charles Brenner.
1932. Oligocene (Brule), Wyoming, Nebraska, and South Dakota, C. W. Gilmore in charge, assisted by G. F. Sternberg and M. V. Walker.
1934. Pliocene (Hagerman Lake beds) and Pleistocene, Idaho, "*Plesippus*" Quarry and American Falls, C. Lewis Gazin in charge, assisted by G. F. Sternberg, George B. Pearce, and Elmer Cook.
 Paleocene (Fort Union), Montana, Sweetgrass County, George Gaylord Simpson in charge, assisted by A. C. Silberling.
1935. Upper Cretaceous (Two Medicine), Montana, Blackfoot Indian Reservation, and Eocene (Wasatch), Wyoming, Big Horn Basin, C. W. Gilmore in charge, assisted by G. F. Sternberg and George B. Pearce.
1936. Eocene (Wasatch), Paleocene (Puerco and Torrejon), and Pliocene, New Mexico and Arizona, C. Lewis Gazin in charge, assisted by G. F. Sternberg and H. R. Shepherd.
1937. Upper Cretaceous (North Horn), Paleocene (Dragon), and Tertiary (Chinle), Utah, Emery County, and Arizona, vicinity of Petrified Forest, C. W. Gilmore in charge, assisted by G. F. Sternberg and G. B. Pearce.
1938. Upper Cretaceous (North Horn), Paleocene (Dragon), and Eocene (Uinta), Utah, Emery County, and Uinta Basin, C. Lewis Gazin in charge, assisted by G. F. Sternberg and H. R. Shepherd.
1939. Upper Cretaceous (North Horn) and Paleocene (Dragon), Utah, Emery County, C. Lewis Gazin in charge, assisted by G. F. Sternberg and Franklin Pearce.
1940. Upper Cretaceous (North Horn), Paleocene (Dragon), Utah, Emery County, and Eocene (Bridger), Wyoming, Uinta County, C. Lewis Gazin in charge, assisted by G. F. Sternberg and Franklin Pearce.

CHRONOLOGICAL LIST OF COLLECTING TRIPS FOR FOSSIL VERTEBRATES IN THE MIOCENE ALONG CHESAPEAKE BAY AND OTHER LOCALITIES NEAR WASHINGTON, D. C.

COLLECTING WAS CARRIED ON BY A CONSIDERABLE NUMBER OF INDIVIDUALS, WORKING FROM 1 TO 13 DAYS AT A TRIP. THE RECORD OF EARLY COLLECTING IS INCOMPLETE

- 1905-1914. Calvert Cliffs, Md.; F. W. True, collector.
 1908: July 3, 7, 11, 18; August 1, 4, 12, 26; September 7. Plumpoint, Md.; William Palmer, D. B. Mackie, N. H. Boss, James W. Gidley, and Marcus W. Lyon, Jr.
 1912: May 31. Plumpoint, Md.; William Palmer, A. C. Weed, and S. M. Gronberger.
 1913: October. Dares Wharf and Plumpoint, Md.; William Palmer.

- 1914: June 2, 9-13. Dares Wharf and Plumpoint, Md.; N. H. Boss.
1916: March 4. South Chesapeake Beach, Md.; William Palmer.
1918: August 23-26, 30-31; September 4-7. South Chesapeake Beach, Md.; William Palmer and N. H. Boss.
1919: July 16-19. Willows, Md.; N. H. Boss.
1920: May 30-31; June 12, 27-29. South Chesapeake Beach, Md.; N. H. Boss.
1921: July 7-9. Willows, Md.; N. H. Boss.
1921: August 1-3, 8-12. South Chesapeake Beach, Md.; N. H. Boss.
1922: July 8-11, 13. Willows, Md.; N. H. Boss.
1922: July 12. Plumpoint, Md.; N. H. Boss.
1922: October 6-7; November 20-21. South Chesapeake Beach, Md.; N. H. Boss.
1923: December 30. Randle Cliffs to Camp Roosevelt, Md.; N. H. Boss and Remington Kellogg.
1925: June 7. Randle Cliffs, Md.; N. H. Boss and Remington Kellogg.
1925: July 26-27. Nomini Cliffs, Va.; Alexander Wetmore, E. A. Preble, and Remington Kellogg.
1925: August 15. Plumpoint to Governors Run, Md.; Remington Kellogg.
1925: August 22. Governors Run to Solomons Island, Md.; Remington Kellogg.
1925: August 30. Dares Wharf to Plumpoint, Md.; Remington Kellogg.
1925: September 6. Dares Wharf, Md.; Remington Kellogg.
1925: September 12-14. Dares Wharf to Plumpoint, Md.; Remington Kellogg.
1925: September 20. Camp Roosevelt, Md.; Remington Kellogg.
1925: September 27. Plumpoint, Md.; N. H. Boss and Remington Kellogg.
1925: November 22-23. St. Marys County, Md.; C. W. Gilmore, N. H. Boss, and Remington Kellogg.
1926: May 26. Plumpoint, Md.; N. H. Boss and Remington Kellogg.
1926: May 30. Plumpoint, Md.; Remington Kellogg.
1926: July 4. Fair Haven and Randle Cliffs, Md.; Remington Kellogg.
1926: July 18. Plumpoint, Md.; Remington Kellogg.
1926: August 8. Dares Wharf to Plumpoint, Md.; Remington Kellogg and W. Woodring.
1929: August. Governors Run, Md.; A. Lincoln Dryden, Jr., Willard Berry, William L. Jones, A. J. Poole, and Remington Kellogg.
1931: August 14-20. Governors Run, Md.; A. Lincoln Dryden, Jr., and Remington Kellogg.
1931: October 30. St. Marys County, Md.; A. Lincoln Dryden, Jr., and Remington Kellogg.
1933: August 9. Governors Run, Md.; Raymond M. Gilmore, C. Lewis Gazin, and Remington Kellogg.
1935: August 24-31. Governors Run, Md.; N. H. Boss and Remington Kellogg.
1936: July 13. Parkers Creek, Md.; W. F. Foshag, Ed. Mullins, and Remington Kellogg.
1936: July 25. Parkers Creek, Md.; W. F. Foshag, Ed. Mullins, and Remington Kellogg.
1936: July 29. Randle Cliffs, Md.; C. W. Gilmore, Ed. Mullins and Remington Kellogg.
1938: March 27. Spindle farm, Occupacia Creek, Essex County, Va.; Remington Kellogg and C. W. Gilmore. Examined skeleton *in situ*.
1939: July 15-23. Parkers Creek, Md.; W. F. Foshag and Remington Kellogg.
1940: June 6-8. Scientists Cliffs, Md.; W. F. Foshag, C. W. Gilmore, Remington Kellogg, and H. S. Bryant.
1940: August 3-17. Scientists Cliffs, Md.; W. F. Foshag and Remington Kellogg.

STUDY OR RESERVE COLLECTIONS

The collections designated as study or reserve comprise those specimens that have been filed away for study, comparison, and reference purposes. They constitute the bulk of the vertebrate fossils now assembled. They contain many early types of more than ordinary interest, since they are those that formed the basis for much of the scientific work of Leidy, Cope, and Marsh and thus constitute the primary foundation upon which much of modern paleontology of America is based. These types are constantly in demand for examination and comparison by paleontologists from other institutions of the country.

These collections now contain representative faunas of most of the more important fossil-bearing formations of North America, together with a sprinkling of foreign materials. Although some gaps still exist and many assemblages need strengthening, taken as a whole it is now one of the important fossil vertebrate collections in America.

In building up this collection, regular expeditions have been the most prolific source of materials, and the history of these has been covered under the heading "Expeditions," page 323. In the pages to follow, however, it is proposed to review some of the other sources of material in order to give a complete picture of the growth and development of the collection.

Gifts from individual donors have ever been an important source of materials, but next in importance to the specimens obtained by regularly organized expeditions are those received in exchange for duplicate materials with kindred institutions. Such exchanges have been made possible to a great extent by the large suites of duplicate materials of *Brontotheres*, *Teleoceras*, and *Plesippus* of which the Division of Vertebrate Paleontology is the fortunate possessor. Among the more important specimens thus obtained were the following:

DINOSAURIA:

- Gorgosaurus libratus*—articulated skeleton.
- Camarasaurus lentus*—articulated skeleton.
- Edmontosaurus regalis*—skull and lower jaws.
- Prosaurolophus maximus*—skull and lower jaws.

MAMMALIA:

- Stenomylus hitchcocki*—articulated skeleton.
- Scelidodon capellina*—articulated skeleton.
- Diceratherium cooki*—composite skeleton.
- Trigonias osborni*—composite skeleton.
- Moropus elatus*—composite skeleton.
- Equus occidentalis*—composite skeleton.
- Myloodon harlani*—composite skeleton.
- Aenocyon dirus*—two composite skeletons.
- Smilodon californicus*—composite skeleton.

Since 1911 the curator of the Division of Vertebrate Paleontology has endeavored to assemble in the National Museum as many of the



View of storage room for reserve or study collections of fossil vertebrates.



Storage cases and cupboards for vertebrate collections, showing utilization of corridor.

scattered type and figured specimens of fossil vertebrates as could be acquired by deposit, exchange, gift, or otherwise. Various institutions and individuals generously responded to the logic of having these important specimens centralized, their preservation guaranteed, and their availability to students assured. In all, 156 such specimens have now been assembled, of which 94 are original types as listed below.

The institutions and individuals that have contributed to the success of this undertaking are: Geological Survey of Florida, Geological Survey of Maryland, North Carolina Department of Agriculture, Goucher College, Indiana State University, Johns Hopkins University, Columbia University, Colorado Museum of Natural History, Colorado College, Buffalo Society of Natural Sciences, Peabody Museum of Natural History, Earle Sloan, Oliver P. Hay, W. Gardner Lynn, R. Lee Collins, Charles T. Berry, and Ermine C. Case.

PISCES:

Anomoedus latidens marylandicus Berry.

Berry, C. T., Amer. Midl. Nat., vol. 22, p. 746, fig. 1, 1939.

Carcharias incidens Eastman.

Eastman, C. R., Maryland Geol. Surv., Miocene, p. 87, pl. 32, fig. 8, 1904=*Carcharhinus*.

Felichthys stauroforus Lynn and Melland.

Lynn, W. G., and Melland, A. M., Journ. Washington Acad. Sci., vol. 29, pp. 14-20, figs. 1-3, 1939.

Istiophorus calvertensis Berry.

Berry, E. W., Amer. Journ. Sci., ser. 4, vol. 43, p. 461, figs. 1, 2, 1917.

Myliobatis copeanus Clark.

Clark, W. B., Johns Hopkins Univ. Circ., vol. 15, p. 4, 1895.

Squatina occidentalis Eastman.

Eastman, C. R., Maryland Geol. Surv., Miocene, p. 71, pl. 28, figs. 1a, 1b, 1904.

Synechodus clarkii Eastman.

Eastman, C. R., Maryland Geol. Surv., Eocene, p. 103, pl. 14, figs. 5a-c, 1901.

Xiphias (?) *radiata* Clark.

Clark, W. B., Johns Hopkins Univ. Circ., vol. 15, p. 4, 1895=*Ischyryza*?

AMPHIBIA:

Crossotelos annulatus Case.

Case, E. C., 2d Ann. Rep. Geol. and Nat. Hist. Terr. Oklahoma, p. 65, 1901.

REPTILIA:

Amyda virginiana Clark.

Clark, W. B., Johns Hopkins Univ. Circ., vol. 15, p. 4, 1895.

Bystra nanus Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 53-55, pl. 1, 1916.

Chamops denticulatus Gilmore.

Gilmore, C. W., Mem. Nat. Acad. Sci., vol. 22, pp. 26, 27, fig. 14, 1928.

Chamops segnis Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 43, p. 450, figs. 2, 3, 1892.

- Chelonia marylandica* Collins and Lynn.
Collins, R. L., and Lynn, W. G., Proc. Amer. Philos. Soc., vol. 72, pp. 162-166, fig. 1, 1936.
- Chelydra laticarinata* Hay.
Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 72-73, pl. 6, fig. 6, 1916.
- Chelydra sculpta* Hay.
Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 73-75, pl. 6, fig. 8, 1916.
- Cteniogenys antiquus* Gilmore.
Gilmore, C. W., Mem. Nat. Acad. Sci., vol. 22, pp. 162-163, pl. 20, fig. 14, 1928.
- Dryosaurus grandis* Lull.
Lull, R. S., Maryland Geol. Surv., Lower Cretaceous, pp. 204-206, pl. 19, figs. 6, 7, 1911=*Ornithomimus affinis* Gilmore.
- Goniopholis affinis* Lull.
Lull, R. S., Maryland Geol. Surv., Lower Cretaceous, p. 210, pl. 20, fig. 7, 1911.
- Glyptosaurus anceps* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 1, p. 458, 1871=*Ototriton anceps* (Marsh).
- Glyptosaurus brevidens* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 305, 1872.
- Glyptosaurus nodosus* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 1, p. 458, 1871.
- Glyptosaurus ocellatus* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 1, p. 458, 1871=*G. sylvestris* Marsh.
- Glyptosaurus princeps* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 301, 1872.
- Glyptosaurus rugosus* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 305, 1872.
- Glyptosaurus sphenodon* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 306, 1872.
- Glyptosaurus sylvestris* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 1, p. 458, 1871.
- Gopherus praecedens* Hay.
Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 55-56, pl. 4, figs. 1, 2, 1916.
- Hadrosaurus tripos* Cope.
Cope, E. D., Proc. Acad. Nat. Sci. Philadelphia, vol. 21, p. 192, 1869.
- Hypsibema crassicauda* Cope.
Cope, E. D., Proc. Acad. Nat. Sci. Philadelphia, vol. 21, p. 192, 1869.
- Iguanavus exilis* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 309, 1872.
- Iguanavus teres* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 43, p. 451, 1892.
- Oreosaurus gracilis* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 307, 1872=*Xestops gracilis* (Marsh).
- Oreosaurus lentus* Marsh.
Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 307, 1872=*Xestops lentus* (Marsh).

Oreosaurus microdus Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 308, 1872=*Xestops microdus* (Marsh).

Oreosaurus minutus Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 308, 1872=*Xestops minutus* (Marsh).

Oreosaurus vagans Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 303, 1872=*Xestops vagans* (Marsh).

Palaeophis virginianus Lynn.

Lynn, W. G., Johns Hopkins Univ. Stud. in Geol., No. 11, pp. 245-249, pl. 17, fig. 6, 1934.

Peritresius virginianus Berry and Lynn.

Berry, C. T., and Lynn, W. G., Proc. Amer. Philos. Soc., vol. 76, pp. 176-183, pls. 1-4, 1936.

Polydectes biturgidus Cope.

Cope, E. D., Proc. Acad. Nat. Sci., Philadelphia, vol. 21, p. 192, 1869.

Pseudemys floridana persimilis Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 71-72, pl. 5, fig. 6, 1916.

Taphrosphys miocenica Collins and Lynn.

Collins, R. L., and Lynn, W. G., Proc. Amer. Philos. Soc., vol. 76, pp. 155-162, pl. 1, 1936.

Terrapene antipex Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 58-61, pl. 4, fig. 1; pl. 5, fig. 1, 1916.

Terrapene formosa Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 57-58, pl. 4, fig. 3, 1916.

Terrapene innoxia Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 61-64, pl. 6, figs. 1, 2, 1916.

Testudo culbertsoni Leidy.

Leidy, J., Proc. Acad. Nat. Sci., Philadelphia, vol. 6, p. 59, 1852=*Stylemys nebrascensis* Leidy.

Testudo distans Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 48-49, pl. 3, fig. 9, 1916.

Testudo ducатели Collins and Lynn.

Collins, R. L., and Lynn, W. G., Proc. Amer. Philos. Soc., vol. 76, pp. 166-171, pls. 3, 4, 1936.

Testudo equicornes Hay.

Hay, O. P., Kansas Univ. Sci. Bull., vol. 10, pp. 40-41, pl. 1, figs. 1-3; pl. 3, fig. 1, 1917.

Testudo hayi Sellards.

Sellards, E. H., Amer. Journ. Sci., ser. 4, vol. 42, p. 235, fig. 1, 1916.

Testudo incisa Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 46-48, pl. 3, fig. 5, 1916.

Testudo luciae Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 52-53, pl. 9, fig. 5, 1916.

Testudo ocalana Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 44-46, pl. 8, fig. 1;
pl. 9, figs. 1-3, 1916.

Testudo sellardsi Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 49-52, pl. 8, figs. 6-8,
1916.

Thecachampsia marylandica Clark.

Clark, W. B., Johns Hopkins Univ. Circ., vol. 15, p. 4, 1895.

Thinosaurus agilis Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 302, 1872=*Saniwa
agilis* (Marsh).

Thinosaurus crassus Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 301, 1872=*Saniwa
crassa* (Marsh).

Thinosaurus grandis Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 301, 1872=*Saniwa
grandis* (Marsh).

Thinosaurus leptodus Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 300, 1872=*Saniwa
ensidens* Leidy.

Thinosaurus paucidens Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 299, 1872=*Saniwa
paucidens* (Marsh).

Tinosaurus lepidus Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 308, 1872=*Tinosaurus
stenodon* Marsh.

Tinosaurus stenodon Marsh.

Marsh, O. C., Amer. Journ. Sci., ser. 3, vol. 4, p. 304, 1872.

Tomistoma americana Sellards.

Sellards, E. H., Amer. Journ. Sci., ser. 4, vol. 40, pp. 135-138, fig. 1,
1915.

Trachemys nuhocarinata Hay.

Hay, O. P., 8th Ann. Rep. Florida Geol. Surv., pp. 70-71, pl. 6, fig. 1,
1916.

Trinacromerum bentonianum Cragin.

Cragin, F. W., Amer. Geol., vol. 2, pp. 404-407, 1888.

AVES:**Ardea sellardsi** Shufeldt.

Shufeldt, R. W., Journ. Geol., vol. 25, p. 19, 1916.

Bathornis veredus Wetmore.

Wetmore, A., Proc. Colorado Mus. Nat. Hist., vol. 7, pp. 11-13, figs.
19-24, 1927.

Jabiru weillsi Sellards.

Sellards, E. H., 8th Ann. Rep. Florida Geol. Surv., p. 146, pl. 26,
fig. 1, 1916.

Larus vero Shufeldt.

Shufeldt, R. W., 9th Ann. Rep. Florida Geol. Surv., p. 40, pl. 2, fig. 21,
1917.

Palaeocrex fax Wetmore.

Wetmore, A., Proc. Colorado Mus. Nat. Hist., vol. 7, pp. 9-11, figs.
15-18, 1927.

Palaeogyps prodromus Wetmore.

Wetmore, A., Proc. Colorado Mus. Nat. Hist., vol. 7, pp. 5-9, figs. 7-14,
1927.

Phasmagyps patritus Wetmore.

Wetmore, A., Proc. Colorado Mus. Nat. Hist., vol. 7, pp. 3-5, figs. 1-6, 1927.

Querquedula floridana Shufeldt.

Shufeldt, R. W., 9th Ann. Rep. Florida Geol. Surv., p. 36, pl. 1, fig. 4; pl. 2, fig. 25, 1917.

Sula avita Wetmore.

Wetmore, A., Proc. U. S. Nat. Mus., vol. 85, pp. 21-23, fig. 2, 1938.

MAMMALIA:**Agriotherium schneideri** Sellards.

Sellards, E. H., 8th Ann. Rep. Florida Geol. Surv., pp. 98-100, pl. 12, figs. 1, 2, 1916.

Balaenoptera sursiplana Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 151, 1895.

Canis riviveronis Hay.

Hay, O. P., 9th Ann. Rep. Florida Geol. Surv., pp. 59-62, 1917.

Cephalotropis coronatus Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 35, p. 143, pl. 11, fig. 2, 1896.

Cetotherium crassangulum Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 168, 1895.

Cetotherium megalophysum Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 146, 1895.

Hoplophoneus robustus Adams.

Adams, G. I., Amer. Nat., vol. 30, p. 49, pl. 1, fig. 4, 1896.

Mesocyon iamanonsis Sellards.

Sellards, E. H., 8th Ann. Rep. Florida Geol. Surv., pp. 88-89, pl. 11, fig. 11, 1916.

Mesoteras kerrianus Cope.

Cope, E. D., Amer. Nat., vol. 4, p. 128, 1870.

Metopocetus durinasus Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 35, p. 141, pl. 9, fig. 3, 1896.

Odocoileus sellardsiae Hay.

Hay, O. P., 9th Ann. Rep. Florida Geol. Surv., pp. 50-57, pl. 3, fig. 4, 1917.

Pelycorhamphus pertortus Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 137, 1895.

Prepotherium venezuelanum Collins.

Collins, R. L., Johns Hopkins Univ. Stud. in Geol., No. 11, p. 238-242, pls. 15, 16, 1934.

Priscodelphinus crassangulum Case.

Case, E. C., Maryland Geol. Surv., Miocene, pp. 12-13, pl. 11, 1904.

Prorosmarus alleni Berry and Gregory.

Berry, E. W., and Gregory, W. K., Amer. Journ. Sci., ser. 4, vol. 21, pp. 444-450, figs. 1-4, 1906.

Siphonocetus clarkianus Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 140, pl. 6, fig. 4, 1895.

Tretulias buccatus Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 143, pl. 6, fig. 2, 1895.

Ulias moratus Cope.

Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 141, pl. 6, fig. 1, 1895.

Vulpes palmaria Hay.

Hay, O. P., 9th Ann. Rep. Florida Geol. Surv., p. 57, 1917.

Xenorophus sloanii Kellogg.

Kellogg, R., Smithsonian Misc. Coll., vol. 76, No. 7, pp. 1-7, pls. 1, 2, 1923.

PRIVATE COLLECTIONS

In addition to the Marsh collection of vertebrate fossils brought together under governmental auspices, the collections of the Division have been augmented by a number of private collections acquired either through gift or purchase. A brief history of the more important of these, arranged in chronological order, follows:

Lacoe collection.—The very large and valuable Lacoe collection, received as a gift in 1896 from the heirs of R. D. Lacoe, banker of Pittston, Pa., and collector of fossils through many years, consisted primarily of fossil plants and invertebrate (mainly insects of late Paleozoic and Cenozoic forms) fossils, but it also contained several hundred fish, amphibian, and reptilian remains. Some of them are in a rare state of preservation; others from the Linton, Ohio, coalfields, owing to the exhaustion of the coal mines, are unique. The Tertiary was represented by specimens from the Eocene (Green River shales) of Wyoming and from Switzerland; Triassic by specimens from Great Britain, France, and the coalfields of Ohio, Pennsylvania, and Mazon Creek, Grundy County, Ill. The collection contained many types and figured specimens, including the unique *Isodectus punctulatus*, thought to be the oldest known reptile.

Hambach collection.—The Hambach collection was acquired through purchase in 1908 by Frank Springer from Gustav Hambach, of St. Louis, Mo., and presented to the United States National Museum. The collection consisted principally of fossil Echinodermata (largely crinoids), but it contained also a considerable number of Paleozoic fish remains from this country and abroad, as well as a few from the Shumard collection, which Professor Hambach had previously acquired.

Orestes St. John collection.—The St. John collection of Paleozoic fishes was presented to the National Museum in 1922 by Frank Springer, to whom it was bequeathed upon the death of Mr. St. John. The collection consists of two parts: (1) A general collection of Devonian invertebrate fossils made during Mr. St. John's younger days in Iowa; and (2) his large and extremely valuable collection of selachian fish remains accumulated in connection with his special studies, chiefly from the Carboniferous of the Mississippi Valley. It contains numerous types and figured specimens of species described by him in Illinois Reports and also much original material forming the subject of further extensive researches never published. In addition to the product of his personal collecting during 40 years of diversified field work, there is included a large quantity of very choice cestraciant fish material obtained by Dr. Springer, largely from a fortunate discovery in the Burlington limestone in Iowa; and also two exceptionally fine collections from the Keokuk lime-

stone made, respectively, by Dr. G. A. Williams, of Booneville, Mo., and Lisbon A. Cox, of Keokuk, Iowa. These were purchased by Mr. Springer and turned over to Mr. St. John together with his own, for use in his researches.

Among other notable items in this important collection is a very exceptional specimen from the Coal Measures of Kansas, the complete dentition of a large Paleozoic shark in a more perfect state of preservation than has ever been found elsewhere. This type of *Campodus* (*Agassizodus*) *variabilis*, described in volume 4 of the Illinois Reports, is regarded by ichthyologists as without a parallel among its kind.

Teller collection.—The Teller collection of invertebrates and fossil fishes was assembled by the late Edgar E. Teller, of Milwaukee, Wis. The entire assemblage, with his library, was received as a gift in 1924 from Mrs. Edgar E. Teller. The fish remains, consisting of about 100 specimens, are all from the Devonian and all were collected in and around Milwaukee. Included in the collection are a number of figured specimens.

Palmer collection.—The Palmer collection consisted entirely of Miocene vertebrate fossils gathered by William Palmer, taxidermist and naturalist in the United States National Museum, from the Calvert formation along Chesapeake Bay, Md. It was purchased by the Smithsonian Institution from his widow shortly after his death in 1921. Throughout most of his life Mr. Palmer was an indefatigable collector of natural-history specimens, but from 1908 to the time of his death his interests were largely devoted to the collection of Miocene vertebrate fossils. Many of the specimens secured were at once turned over to the Division of Vertebrate Paleontology as gifts and were described by Dr. F. W. True, but a considerable accumulation of specimens, including several extinct porpoise skulls, most of them prepared, formed the basis of the purchase.

Certain assemblages are outstanding, not only because of the quantity of materials represented but more especially because of the high quality of the preservation. Among these is the fossil cetacean collection, which ranks first among aggregations of the kind in American museums. The bulk of this assemblage is from the prolific nearby Miocene deposits of the Chesapeake Bay area, but the Gulf and Pacific coasts are also represented by many well-preserved specimens. This collection has resulted from the enthusiastic volunteer work of a considerable number of collaborators of which the more active were: Head Curator Frederick W. True, who pioneered in this work, about 1905-14; William Palmer, 1907-19; Norman H. Boss, 1914-35; Remington Kellogg, 1923-40; and R. L. Collins, 1935-38.

In recent years, Dr. Remington Kellogg, through his extensive researches on the Cetacea, has been the outstanding contributor to the building up and development of the collections in this important group of mammals.

INFLUENCE OF EXPOSITIONS

Although the Smithsonian Institution has participated in practically all the expositions of this country and many abroad, beginning with the Centennial in Philadelphia in 1876,²¹ the Division of Vertebrate Paleontology was not called upon to contribute to these exhibitions until 1895. Since then, however, it has participated in the following: The Cotton States and International Exposition, Atlanta, Ga., 1895; the Trans-Mississippi and International Exposition, Omaha, Nebr., 1898; the Pan-American Exposition, Buffalo, N. Y., 1901; the Louisiana Purchase Exposition, St. Louis, Mo., 1904; the Lewis and Clark Exposition, Portland, Oreg., 1905; the Sesquicentennial Exposition, Philadelphia, Pa., 1926; and the Texas Centennial Exposition, Dallas, Tex., 1936-37.

Participation in these expositions of national and international scope has yielded noteworthy advantages in the fact that the work of the division was made known to the people at large and in the opportunities offered by direct appropriations that could be expended for the purchase of specimens, the making of models, restorations, and paintings illustrative of extinct life. This illustrative material and a considerable number of choice specimens (listed below) have thus been added to the permanent collections:

- 1895, ATLANTA: A complete model restoration of the skeleton of *Basilosaurus cetoides*, life size.
- 1898, OMAHA: Lisbon A. Cox collection of Paleozoic fish remains purchased.
- 1901, BUFFALO: A restoration in oil (8 by 15 feet) of *Triceratops*, painted by Charles R. Knight, W. K. Stone, and Joseph Gleeson. Model restoration life size of *Triceratops* skeleton. Skeleton of *Hesperornis regalis* and *Dinornis crassus* purchased.
- 1904, ST. LOUIS: Life-size restoration of *Stegosaurus stenops*. Skeleton of *Mastodon americanus*. Skeletons of *Ichthyosaurus quadricissus*, *Rhamphorhynchus phyllurus*, *Stenosaurus bollensis*, and many fishes of large size (*Aspidorhynchus*, *Caturus*, *Hypocormus*, *Gyrodus*, *Pholidophorus*, *Squatina*) purchased.
- 1905, PORTLAND: *Epyornis maximus* egg purchased.
- 1926, PHILADELPHIA: 12-foot skeleton of *Portheus molossus* Cope. Three skeletons of *Protostega gigas* Cope and two partial skeletons of *Platycarpus* purchased. Restoration of *Protostega gigas* painted by R. Bruce Horsfall.

²¹ Dr. J. Leidy (Journ. Acad. Nat. Sci., Philadelphia, vol. 8, p. 213) stated that a last molar of *Elephas columbi* from Beaufort, S. C., was included in the exhibit made by the Smithsonian Institution at the Centennial in Philadelphia in 1876.

1936-37, DALLAS: Skeletons of *Diatryma gigas* Cope and *Glyptosaurus giganteus* Gilmore. Distal half of a hadrosaurian *Corythosaurus* skeleton with skin impressions and a complete tail of *Camarasaurus* all purchased. Life restoration (canvas 8 by 15 feet) and a model restoration of *Camarasaurus lentus* Marsh, painted by R. Bruce Horsfall. Restoration of Permian life, canvas 8 by 15 feet, with *Dimetrodon* as the dominant figure, painted by Garnet W. Jex, and a diorama illustrative of the dinosaurian life of the Morrison formation.

EXHIBITS

The earliest exhibition of extinct vertebrate animals made by the Smithsonian Institution consisted of plaster casts of the giant sloth *Megatherium cuvieri*, the large land tortoise *Colossochelys atlas*, and the South American glyptodon *Schistopleurum typus*, which were "set up" in the large room of the Smithsonian Institution in 1871. In 1872, a skeleton of the Pleistocene Irish elk (*Megaceros hibernicus*), which had been purchased from Thomas & Sons, of Philadelphia, in 1868, was mounted and placed on view, and this specimen thus has the distinction of being the first articulated skeleton of an extinct animal to be placed on public exhibition in the Smithsonian Institution.²² At this same time a model restoration of the Irish elk was placed on deposit by Waterhouse Hawkins.

With the completion of the new building in 1881 (now known as the Arts and Industries Building), the Irish elk, the *Megatherium*, and other large casts were transferred to it from the Smithsonian. These, together with a few fragmentary specimens from the Western States, resulting from the early Government surveys, constituted for a time the principal part of the exhibition series. A skeletal restoration of the famous *Hadrosaurus foulkii*, from the original in the Academy of Natural Sciences of Philadelphia, also formed a part of this early exhibition of extinct animals. An old photograph taken some time after the occupancy of the new building shows the *Hadrosaurus* associated with the skeletal cast of the *Megatherium* and skeletons of recent animals. No record has been found of this specimen, but Dr. Schuchert, under date of May 18, 1939, writes: "This restoration of *Hadrosaurus* was made for the United States National Museum for the Centennial Exposition. When I joined the National Museum, Dr. Goode told me the *Hadrosaurus* had long stood in front of the Museum and had weathered so badly that it was destroyed a few years before my arrival in 1893." Following the organization

²² A curious coincidence is the fact that the first skeleton to be exhibited (1844) in the British Museum was also a skeleton of *Megaceros hibernicus*. Skeletons of the "Irish elk" were the first to be exhibited in both the American Museum of Natural History, New York City, and the Carnegie Museum in Pittsburgh.

of the Department of Vertebrate Fossils in 1886, and the appointment of Prof. O. C. Marsh as honorary curator in 1887, the southeast court space was assigned to the exhibition of fossil vertebrates, invertebrates, and plants.

There was a small intermittent growth of the exhibition collections, the preparation and installation that was necessary being done by the osteologists under the direction of F. A. Lucas.

In December 1890 John B. Hatcher was given temporary appointment as assistant to Professor Marsh for the purpose of arranging and classifying the collections that had been assembled. The exhibition was given a fresh impetus in July 1891 with the arrival from New Haven of the second consignment of the Marsh collection. It consisted of 380 prepared specimens made up as follows: 3 ceratopsian skulls, including the type of *Triceratops elatus*; 10 titanotheres skulls, representing several genera; skulls and other remains of *Teleoceras fossiger*; other Tertiary fossils and some rare plaster casts. Owing to the gradual growth of the exhibition series, especially augmented by the acquisitions from the Marsh collection, in 1898 the entire southeast court was given over to vertebrate fossils.

In 1899 a papier-mâché cast of the skeleton of *Dinoceras* presented by Professor Marsh was mounted and placed on exhibition. In 1902 a mounted skeleton of *Hesperornis regalis*, first shown at the Pan American Exposition in Buffalo, was returned to the Museum and placed in the permanent exhibition series. With the acquisition of the Marsh collection and the employment of trained preparators from 1900 onward, there was a slow but steady growth and improvement of the exhibition collections. In 1903 the type skeleton of *Thespesius* (*Trachodon*) *annectens* was mounted under the direction of Lucas, the first articulated skeleton of a dinosaur to be exhibited in the National Museum. This specimen has the further distinction of being the second dinosaur skeleton to be thus exhibited in North America, first honors going to a companion skeleton in the Peabody Museum of Natural History at Yale that was placed on exhibition in 1901.

When the writer came to the National Museum in November 1903, the ground floor of the southeast court in the Old National Museum Building was entirely occupied by an exhibition of vertebrate fossils. This exhibition was all arranged by Mr. Lucas as acting curator, although his main duties were elsewhere in the Museum. The outstanding specimens comprised skeletons of *Megaceros hibernicus*, *Thespesius* (*Trachodon*) *annectens*, *Hesperornis regalis*, and a skeleton of *Basilosaurus cetoides*, the bones of the last being laid out in order on a shelf in a wall case on the north side that extended entirely across the court. A modeled restoration of the skeleton (later sent to the

British Museum in exchange) was suspended from the underside of the balcony above the original. There were also plaster casts of *Dinoceras*, *Megatherium*, *Dinotherium*, and *Schistopleurum*, the original hind limbs and pelvis of *Triceratops*, and a hind leg and foot of *Apatosaurus* (*Brontosaurus*). The other wall cases and slope-top diaphragm cases that occupied the remaining floor space were filled with a various assortment of fossil skulls and other skeletal parts of mammals, reptiles, and fishes.

In 1904 the type skulls of *Triceratops calicornis* and *Triceratops* (*Diceratops*) *hatcheri*, a skeleton of *Mastodon americanus* (returned from the St. Louis Exposition), a life-size restoration of *Stegosaurus stenops*, and a skeleton of *Dinornis* were added to the exhibition series. In 1905 a composite skeleton of *Triceratops clatus*, the first of this genus to be thus displayed, was installed. The addition of these specimens brought about the retirement of several cases of inferior materials. These constituted the exhibition collections until the New Natural History Building was occupied in 1910. Here, for the first time in the history of the Division, adequate and commodious exhibition, storage, and laboratory space was provided. Show specimens were assigned to halls 2 and 3, which aggregated 13,950 square feet of exhibition room, besides much wall space.

When the Division moved into the new building many of the older specimens were renovated, most of the skeletal casts were retired, several new specimens were added, and, as a new style of case was provided, the exhibition took on a very much improved appearance (see pls. 49 and 50), although the specimens were far too few to fill the allotted space.

From 1910 up to the present time there has been a slow but steady growth of the exhibition collections, until at the close of the year 1940 there were more than 50 mounted skeletons, ranging in size from the small 14-inch horned rodent *Epigaulus hatcheri* to the 72-foot *Diplodocus longus*.

A complete list of the mounted skeletons is given later, but some of the more outstanding of these are worthy of special mention. The articulated skeleton of *Basilosaurus cetoides*, prepared under the direction of Charles Schuchert and mounted under the direction of the late James W. Gidley, is the only specimen of its kind thus far exhibited. The type skeleton of *Ceratosaurus nasicornis*, although discovered more than 50 years ago, is also unique in being the only known specimen of its kind. The assemblage of *Stegosaurus* specimens, consisting of an articulated skeleton in the rock as found, is the only one known that furnishes positive information as to the arrangement of the dermal plates; an articulated skeleton of this

same genus, together with a life-size restoration made for the St. Louis Exposition in 1904, constitutes a unique representation of this curious armored dinosaur.

Three skeletons of the mastodon race of proboscidiens, a male and a female of *Mastodon americanus* from the Pleistocene, and a skeleton of *Stegomastodon arizonae* from the Pliocene of Arizona are adequate examples of this important group of animals.

The outstanding addition to the collection, especially as it relates to time and money expended, is the skeleton of *Diplodocus longus* from the Dinosaur National Monument in Utah. The work of collecting this specimen occupied the energies of 5 men for 4 months to quarry out, transport, box, and ship the 26 tons of rock-enclosed bones. From first to last, 2,545 working days were spent on this specimen, which, translated into Government time, means 1 man working steadily for nearly 9 years. It constitutes the most ambitious single piece of exhibition work ever attempted by this Division.

All classes of vertebrates are now represented in the exhibition series, which contains many well-preserved skeletons. Little attempt has been made to bring about a systematic arrangement of these materials, more stress being given to displaying the larger specimens, so as to make them as well as the exhibition halls appear to the best advantage.

With the acquisition of better-preserved specimens, the practice has been followed of retiring inferior materials from time to time. This has added greatly to the attractiveness of the exhibition as a whole, as well as increasing its educational value to the public.

To some extent the exhibition has been embellished by the addition of large canvases depicting the life appearance of various animals in their natural habitat. The more important of these are: A restoration (8 by 15 feet) of *Triceratops* by Charles R. Knight, W. K. Stone, and Joseph Gleeson; a restoration of *Camarasaurus* by R. Bruce Horsfall; and a restoration of *Dimetrodon* and other Permian reptiles by Garnet W. Jex. A diorama returned from the Dallas Exposition depicts some of the animals of the Jurassic period in their natural environment. Other illustrative materials consisting of model restorations of various animals, done by Knight, Lull, Gidley, and Gilmore, serve as an aid to visitors in visualizing the probable appearance in life of these long extinct animals.

TABLE 2.—Chronological list of mounted fossil skeletons in the U. S. National Museum

MOUNTED IN THE NATIONAL MUSEUM

Skeleton	Year	Mounted by—
1. <i>Megaceros hibernicus</i> Owen-----	1872	
2. <i>Hesperornis regalis</i> Marsh-----	1901	J. W. Scollick, remounted by N. H. Boss, 1911.
3. <i>Thespesius (Trachodon) anncc-</i> <i>tens</i> Marsh (type).	1903	Alban Stewart.
4. <i>Mastodon americanus</i> (Kerr)----	1903	Do.
5. <i>Triceratops elatus</i> Marsh-----	1905	C. W. Gilmore and N. H. Boss.
6. <i>Ursus spelaeus</i> -----	1905	N. H. Boss, remounted by T. J. Horne, 1913.
7. <i>Merycoidodon gracilis</i> Leidy-----	1906	C. W. Gilmore.
8. <i>Dinornis maximus</i> Geoffroy-----	1907	N. H. Boss.
9. <i>Ceratosauros nasicornis</i> Marsh (type).	1910	C. W. Gilmore and N. H. Boss.
10. <i>Camptosaurus browni</i> Gilmore (type).	1911	C. W. Gilmore.
11. <i>Camptosaurus nanus</i> Marsh (type).	1911	N. H. Boss.
12. <i>Basilosaurus cetoides</i> (Owen)----	1912	J. W. Gidley and W. H. Wade.
13. <i>Diceratherium cooki</i> (Peterson) --	1912	T. J. Horne.
14. <i>Teleoceras fossiger</i> Cope-----	1912	Do.
15. <i>Stegosaurus stenops</i> Marsh (type)	1913	N. H. Boss and C. V. Bressler.
16. <i>Kentriodon pernix</i> Kellogg (type).	1914	N. H. Boss.
17. <i>Thescelosauros neglectus</i> Gilmore (type).	1914	N. H. Boss and C. V. Bressler.
18. <i>Epigaulus hatcheri</i> Gidley (type) -	1915	T. J. Horne.
19. <i>Gulo luscus</i> (Linnaeus)-----	1915	Do.
20. <i>Aenocyon dirus</i> (Leidy)-----	1915	Do.
21. <i>Platygonus cumberlandensis</i> Gid- ley.	1915	Do.
22. <i>Mastodon americanus</i> (Kerr)----	1916	Do.
23. <i>Sinopa grangeri</i> Matthew (type) -	1917	Do.
24. <i>Stegosaurus stenops</i> Marsh-----	1917	Do.
25. <i>Dimetrodon gigas</i> Cope-----	1918	Do.
26. <i>Tylosaurus proriger</i> Cope-----	1919	N. H. Boss.
27. <i>Brachyccratops montanensis</i> Gil- more (type).	1920	Do.
28. <i>Brontotherium hatcheri</i> Osborn --	1920	T. J. Horne.
29. <i>Euarcos vitabilis</i> Gidley-----	1921	Do.
30. <i>Saniwa ensidens</i> Leidy (type)----	1922	N. H. Boss.
31. <i>Glyptotherium arizonae</i> Gidley (type).	1922	T. J. Horne.
32. <i>Bison occidentalis</i> Lucas-----	1923	N. H. Boss.
33. <i>Diceratherium</i> (slab)-----	1923	Do.
34. <i>Stegomastodon arizonae</i> Gidley (type).	1924	T. J. Horne.
35. <i>Protostega gigas</i> Cope-----	1926	N. H. Boss.
36. <i>Portheus molossus</i> Cope-----	1926	T. J. Horne.
37. <i>Diplodocus longus</i> Marsh-----	1931	N. H. Boss, T. J. Horne, and J. M. Barrett.
38. <i>Hyrachyus eximius</i> Leidy-----	1934	N. H. Boss.
39. <i>Helaletes nanus</i> Marsh-----	1934	Do.
40. <i>Trigonia osborni</i> Lucas-----	1934	T. J. Horne.
41. <i>Moropus elatus</i> Marsh-----	1936	Do.
42. <i>Platygonus pearcei</i> Gazin (type) -	1936	N. H. Boss.
43. <i>Scarritia canquelensis</i> Simpson --	1937	Do.
44. <i>Plesippus shoshonensis</i> Gidley (stallion).	1938	T. J. Horne.
45. <i>Polyglyphanodon sternbergi</i> Gil- more.	1938	N. H. Boss.

TABLE 2.—*Chronological list of mounted fossil skeletons in the U. S. National Museum—Continued*

Skeleton	Year	Mounted by—
46. <i>Plesippus shoshonensis</i> Gidley (mare).	1939	T. J. Horne.
47. <i>Plesippus shoshonensis</i> (half grown).	1939	Do.

MOUNTED ELSEWHERE

48. <i>Hoplophoneus robustus</i> Adams (type)-----		Adam Hermann, A. M. N. H.
49. <i>Stenomylus hitchcocki</i> Loomis---	1919	A. Augustina, C. M.
50. <i>Gorgosaurus libratus</i> Lambe-----		Peter Kaisen, A. M. N. H.
51. <i>Merycodus necatus</i> Leidy-----		P. C. Orr, F. M. N. H.
52. <i>Ichthyodectes hamatus</i> Cope-----		G. F. Sternberg.
53. <i>Emeus crassus</i> Owen-----		
54. <i>Emeus crassus</i> Owen-----		
55. <i>Stenomylus hitchcocki</i> Loomis---		Hugh Gibb, P. M. N. H.

CATALOGS

The catalog system first used by the Museum was that devised in April 1839 by Professor Baird at Carlisle, Pa., while engaged in work upon his private collection of birds. When he became Assistant Secretary of the Smithsonian Institution in 1850, his system was adopted for the Government collections.

When cataloging was first begun it was found more convenient to keep the records of the several collections in one book, although as pointed out by Mr. Geare²³ the catalog for the skeletons, including both recent and fossil, was started in 1840.

This double arrangement was continued through the first four volumes of this series as follows:

Vol. I, Nos. 1 to 3,500 original and copy in the Division of Mammals. Covers the period between 1840 and 1859.

Vol II, Nos. 3,501 to 8,850, original and copy in the Division of Mammals. Covers the period between March 12, 1859, to May 1869.

Vol. III, Nos. 8,851 to 15,800, original in the Division of Mammals. Covers the period between May 1869 to December 1877.

Vol. IV, Nos. 14,501 to 18,330, original in the Division of Mammals. Covers the period between December 1879 to October 26, 1888.

It will be noted that the entries in the fourth volume duplicate 1,299 numbers of the preceding volume. Examination of the original volumes shows that the entries also were repeated, so that there is no actual duplication of catalog numbers.

²³ Geare, R. I., Museum catalogues, Ann. Rep. U. S. Nat. Mus. for 1889, p. 8, 1891.

With the closing of this volume a new system was put into effect, the fossil specimens being entered in a separate book, designated as Volume VII. This was the current catalog for the "Department of Vertebrate Fossils." The entries begin at 30,701, and on March 26, 1891, when the book was discontinued, they had been carried as far as No. 31,025. This volume is now in the custody of the Division of Vertebrate Paleontology. Many of these numbers still remain on the specimens, in addition to the current catalog numbers.

In 1889 a card catalog was started by F. A. Lucas of all the vertebrate fossils belonging to the Museum collections that had been entered in the earlier volumes of this series.

On November 21, 1891, a new system of cataloging vertebrate fossils was inaugurated. The entries commenced with No. 1 and continued consecutively, with 5,000 entries to the volume. This method has been continued up to the present time, the numbers now reaching 16,591. All those specimens deemed worthy of retention in the collections that were entered in the earlier volumes were included here, but each was assigned a new catalog number.

Some time after 1903 (the exact date is not known), the entries in the catalog books were supplemented by duplicate cards for each entry; these cards were filed in an alphabetical and a zoological series under each class of vertebrates, as Pisces, Amphibia, Reptilia, Aves, and Mammalia. This arrangement makes it possible to get information regarding a specimen in different ways. If the catalog number only is available, the volume carrying the corresponding number should be consulted; if the name only is available then the alphabetical list is the most direct means. If information is desired as to available material in a group, the zoological series gives it.

The first entry to be made in the current system is "No. 1, *Mosasaur* tooth, collected by W. S. Yates, February 11, 1881, in Greene County North Carolina." The first entry of a vertebrate fossil in any of the catalogs was in Volume I, "No. 929, Fossil Seal, Cast of bone of hand, from Dr. Jeffries Wyman, entered in 1852."

Cards of type specimens have the original citation, and a red star is placed in the upper right corner; in the case of plesiotypes or figured specimens a blue star is similarly placed on the card with the citation.

THE PRINCIPAL ACCESSIONS TO THE DIVISION OF VERTEBRATE PALEONTOLOGY TO THE CLOSE OF THE YEAR 1940

The following list of accessions, arranged in chronological order, includes only those collections or specimens that have been of importance in building up the Division of Vertebrate Paleontology or

are associated with its history. The records of the early years are unfortunately incomplete, but most of the specimens of this period were inferior in quality of preservation. This list has been to a great extent compiled from the annual reports, and since the fiscal year (introduced in 1885) runs from July 1 to June 30 of the following year, many of the specimens and collections may have been collected or acquired in the calendar year preceding the annual report dates used here.

1850

A small lot of Oligocene Mammalia from the "Mauvaises Terres," or Badlands, of Dakota Territory was collected for the Smithsonian Institution by Thaddeus A. Culbertson. This collection, with other materials, formed the basis of Dr. Joseph Leidy's report "The Ancient Fauna of Nebraska" (Smithsonian Contr. Knowl., vol. 6, No. 58, 126 pp., 1853).

1851

A collection of fossil vertebrates from the Badlands of Dakota Territory was presented by Capt. Stewart Van Vliet, U. S. Army. Plaster cast of a fossil seal bone from Maryland was presented by Dr. Jeffries Wyman.

1853

Vertebrate remains from the exploring expeditions under the direction of Dr. David Dale Owen were deposited by the Commissioner of the United States Land Office. It is quite certain that these specimens were the ones collected by Dr. John Evans in 1849 and 1853 from the Oligocene of the Badlands of Dakota Territory.

1855

Shark teeth and mastodon bones from the Pleistocene of Florida were presented by Capt. John C. Casey, United States Army. Mrs. Mary Hereford presented bones of "Zeuglodon" from a marl bed in Calvert County, Md.

1858

The bulk of the collections of the National Institute was transferred to the Smithsonian Institution. See page 311 for list of fossil specimens.

1859

The type specimen of *Dystrophaeus viaematae*, collected by Dr. J. S. Newberry of the Macomb Expedition from the Jurassic of southern Utah, was deposited by the War Department (Cope, E. D., Proc. Amer. Philos. Soc., vol. 16, p. 581, 1877).

1860

Pleistocene fossils from Canada were presented by Prof. J. W. Dawson. A horse tooth from Big Bone Lick was presented by the Hon. Robert Mallory.

1861

An important collection of fossil fishes from Mount Blanc was received from A. Repetti.

1864

Tooth of mastodon from Kansas was presented by Lt. Edwin T. Berthoud, United States Army. A box of Lias fossil ganoid fishes from Barrow, Leicestershire, England, was presented by E. D. Cope. An elephant tooth from Las Vegas, N. Mex., was presented by Andres Dold.

1866

A lower molar tooth of *Elephas columbi* from the Pleistocene, Petite Anse, Iberia Parish, La., was presented by J. F. Clew (Hay, O. P., Carnegie Inst. Washington Publ. 322a, p. 57, 1924).

1867

Col. C. S. Bulkley, Overland (Western Union) Telegraph Expedition, presented a tusk of the mammoth *Elephas primigenius* from Bering Strait, Alaska. Miocene fossils from Maryland were presented by O. N. Byron; a vertebra of a fossil saurian from Aquia Creek, Va., was presented by E. A. Dayton; and bones of a mastodon from Buenos Aires, Argentina, were presented by H. R. Helper.

1868

A complete skeleton of *Megaceros hibernicus*, "Irish elk," from the peat bogs of Ireland, was purchased, and a fine head with antlers of the same animal was received as a gift from O. C. Marsh.

1869

Among the donations were: One box of fossil bones and teeth from Wyoming Territory presented by Dr. Charles H. Alden, U. S. Army; one box of fossils and minerals from Fort Bridger, Wyoming Territory, from J. V. Carter; teeth of fossil horse from Illinois presented by Mr. Dille; one box of prehistoric remains from France sent by Prof. E. Lartet; saurian remains from New Mexico, presented by Dr. W. B. Lyons; teeth and bones of mastodon from the Pleistocene of Florida presented by Peter Nelson; tooth of *Equus complicatus* and bones of a young mastodon from Washington County, Va., presented by Wyndham Robinson (Hay, O. P., Carnegie Inst. Washington Publ. 322, pp. 113, 189, 1923). A collection of fossil bones from Mount Pikermi, Greece, was received from the Museum of Natural History, Athens, Greece.

1870

Prof. Charles F. Himes presented a collection of bones from Carlisle bone cave, Pennsylvania. Dr. Carl Hermann Berendt donated a fossil fish from Mexico. Dr. J. A. Fitzgerald presented teeth from Indian Territory (Oklahoma). Horatio N. Pease presented a tooth of fossil cetacean from Gay Head, Mass., and Andrew Sherwood presented Devonian fish remains from Pennsylvania.

1871

A cast of the giant sloth *Megatherium cuvieri* from South America was presented by Prof. Henry A. Ward. Casts of the gigantic turtle *Colossochelys atlas* and of a South American glyptodont (*Schistopleurum typus*) were purchased. The last mentioned is still on exhibition; the others have been discarded. George H. Lewis presented an incomplete turtle from Atlantic City, Montana Territory.

1872

One box of fossil bones from Sonora, Mexico, was presented by Gen. James H. Carleton. A model of the Irish elk was placed on deposit by Waterhouse Hawkins. A tooth of *Ptychodus* was presented by G. H. Kalteyer.

1873

The Canterbury Museum at Christ Church, New Zealand, through its director, Julius Haast, presented a collection of moa bones, among which were skeletons of *Dinornis giganteus* and *Palapteryx elephantopus* and leg bones of *Dinornis gracilis*, *D. casuarius*, and *D. didiformis*.

1874

A cast of the skull of *Odontopteryx toliapica* was presented by Bryce M. Wright. From the Wasatch and Miocene of New Mexico, an important collection of fossils was transferred by the War Department. These specimens were collected by H. C. Yarrow and E. D. Cope of the United States Geographical Survey West of the One-hundredth Meridian in charge of Lt. George M. Wheeler. The collections were described by Cope in the report of that expedition, vol. 4, 1877. The Heidelberg University Museum, through Professor Pagenstecher, presented a skeleton of *Halitherium schinzi*.

Fossil bones from Florida were presented by N. B. Moore. L. G. Yates presented a cast of the teeth of a mastodon from Solano County, Calif. (Hay, O. P., Carnegie Inst. Washington Publ. 322b, p. 11, 1927).

1875

Donations included specimens of fossil teeth and bones from Badito, Colo., by F. W. Fouch; cast of shark's tooth, by Clark Mills; cast of fossil tooth from Iowa, by Dr. C. A. White; and a fossil fish from Wyoming Territory, by J. W. A. Wright.

1876

A collection of fossil bones from the Miocene of Oregon was presented by S. S. Davis and William Day; a plaster cast of the Cahoes mastodon (lower jaw), New York, by Dr. James Hall; fossil bones and teeth from Nebraska by Sgt. J. A. Leigh, U. S. Army; and a fossil bone from Texas by Brownson & Co.

1877

The following donations were received: A collection of bones from a cave in Ohio from W. Anderson; portions of mammoth tusk from Seth Beach; jaw of fossil *Macropus* from Queensland from Dr. Bennett; a collection of bones from a cave near Hagerstown, Md., through Prof. Charles F. Himes; fossil bones from Wyoming from F. Hirst; a fossil fish from California from Otis T. Mason; tooth of *Equus occidentalis* from West Virginia from R. F. Taggart.

1878

Donations were as follows: Box of fossil fishes from Connecticut from J. H. Clarke; two fossil horse teeth from C. H. Horod; plaster cast of elephant tusk found near Copenhagen, N. Y., from Dr. F. B. Hough; teeth of fossil elephant, horse, and shark from Bull River, S. C., from J. W. Quinlion.

1879

Plaster cast of the femur of *Atlantosaurus immanis* was presented by O. C. Marsh.

1880

A large series of mammal and some reptilian materials collected in the Badlands of South Dakota were received from Capt. Emmet Crawford, U. S. Army. These were forwarded to O. C. Marsh for investigation. A skull of *Castoroides ohioensis* from the Pleistocene of Michigan was received in exchange with Prof. J. Kost, of Adrian College (Hay, O. P., Carnegie Inst. Washington Publ. 322, p. 275, 1923).

1881

An important collection of Pliocene Peace Creek fossils from near Arcadia, De Soto County, Fla., was presented by J. F. La Baron. The collection was described by Dr. J. Leidy (Trans. Wagner Free Inst., vol. 2, 1889). The type of *Procyon simus* from the Pleistocene of California was collected and presented by L. Stone (Gidley, J. W., Proc. U. S. Nat. Mus., vol. 29, pp. 553-554, 1906).

1882

Donations included: Vertebra of a whale, Miocene, Stafford Cliffs, Va., presented by H. C. Harmon; fossil bones and teeth from Beaufort, S. C., from Mrs. J. E. Jouett; plaster cast of *Rhamphorhynchus phyllurus* showing wing membrane was presented by O. C. Marsh; a box of fossil mammals, *Myodes* and *Lagomys*, from Germany from Prof. A. L. Nehring; and a vertebra of a whale from Patuxent River, Md., from T. J. Stone.

1883

A valuable collection of bones and relics from Kent's Cavern, near Lamorna Torquay, England, as a gift from Lord Holdon, received through William Pengelly, who was asked to prepare a treatise on this subject to be published by the Smithsonian Institution. Other donations were a tooth of *Equus caballus* from South Carolina, from J. P. Caldwell; two boxes of mastodon, *Equus*, and *Mylodon* bones from New Iberia, La., from William Crooks (Leidy, Joseph, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 22; Trans. Wagner Free Inst., vol. 2, pp. 35, 1889); fossil fishes from Ohio from R. N. Fearson; a fossil bone, tooth, and rib from Tampa Bay, Fla., from Elias Hempstead.

1885

A collection of 20 species of Pleistocene animals from near Whitesburg, Hamblen County, Tenn., collected by Ira Sayles (Hay, O. P., Proc. U. S. Nat. Mus., vol. 58, p. 85, 1921).

1886

A collection of 72 large boxes of fossil vertebrates, a portion of the Marsh collection, was transferred to the Museum by the United States Geological Survey. Bones and teeth of a *Mastodon* from the Pleistocene of Kansas were presented by Dr. A. G. Chase.

1887

A small collection of Pleistocene fossils from near Rogersville, Tenn., was presented by James W. Rogan (Hay, O. P., Proc. U. S. Nat. Mus., vol. 58, p. 83, 1921).

1888

A small collection of Oligocene vertebrates, including *Testudo oweni*, type of *Testudo culbertsoni*, *Archaeotherium mortoni*, *Rhinoceros* sp., and *Oreodon culbertsoni* (Owen's Report of the Geological Survey of Wisconsin, Iowa, and Minnesota, 1852) was deposited by Indiana State University.

A small collection of tortoise and bird bones from Mascarene Islands was received in exchange with the Museum of Cambridge University, Cambridge, England. A skull of *Thoracosaurus neocesariensis* from the Cretaceous, Aquia Creek, Va., was presented by Nelson C. Page.

1889

A plaster cast of the skeleton of *Phenacodus primaevus* was purchased from E. D. Cope; a collection of the fossil fish *Leuciscus turneri* from the Miocene of Esmeralda County, Nev., was transferred by the United States Geological Survey (Lucas, F. A., Proc. U. S. Nat. Mus., vol. 23, pp. 333-334, 1900).

1891

A partial skull of *Bison latifrons* from the Pleistocene of the Willacoochee River, Fla., was presented by Gen. L. W. Colby (Hay, O. P., Proc. U. S. Nat. Mus., vol. 21, p. 767, 1898).

1892

A most important accession was a collection of 380 prepared specimens, a second consignment from the Marsh collection, transferred by the United States Geological Survey. It contained three ceratopsian skulls, including the type of *Triceratops elatus* (Marsh, O. C., Amer. Journ. Sci., vol. 42, p. 265, 1891), from the Lance, Upper Cretaceous, of Wyoming; a series of 10 titanotheres skulls representing several genera from the Oligocene of Nebraska and South Dakota; skulls and other remains of *Teleroceas fossiger* from the Pliocene of Long Island, Kans.; and a few other Tertiary fossils and some rare casts.

A collection of mammalian fossils from the estate of Joseph Leidy was transmitted as a gift by the United States Geological Survey.

1893

A small collection of mammalian specimens collected by Frank Burns from the Miocene of Maryland and Virginia was transmitted by the United States Geological Survey.

1894

The most important accession was a collection of *Basilosaurus cetoides* specimens made for the Smithsonian Institution by Charles Schuchert from the Jackson, Upper Eocene, of Choctaw County, Ala.:

Skull and lower jaws; a series of 24 dorsal vertebrae, 15 dorsal ribs, sternal bones of a second individual, and numerous other bones (Kelllogg, R., Carnegie Inst. Washington Publ. 482, pp. 7-20, 1938). A skull of *Castoroides ohioensis* from the Pleistocene near Logansport, Ind., was presented by L. S. McFadin (Lyon, Marcus W., Amer. Midl. Nat., vol. 17, No. 1, figs. 81, 82, 1936). The type skull and lower jaw of *Mesoteras kerrianus* (Cope, E. D., Amer. Nat., vol. 4, p. 128, 1870) were presented by the State Museum of North Carolina.

1895

A skull of *Portheus molossus* from the Niobrara, Upper Cretaceous, of Kansas was received in exchange from Edward E. Howell; a skull of *Bison* from the Pleistocene of Kansas was presented by Dr. A. G. Chase; a skeleton of *Ichthyosaurus quadricissus* from the Jurassic of Lyme Regis, England, was received in exchange with the Wagner Free Institute.

Other accessions for this year were: Cast of the skeleton of *Pelagosaurus typus*, in exchange with the University of Caen, France; plaster casts of the skull of *Ichthyosaurus platyodon*; a skull of *Elephas ganesa*; a skeleton of *Plesiosaurus dolichoderius*; a skeleton of *Plesiosaurus macrocephalus*, purchased from Ward's Natural Science Establishment; casts of vertebrate specimens received in exchange with the La Plata Museum, Argentina; skull of *Toxodon*, skull of *Trigodon*, skull and jaw of *Nesodon*, jaw of *Nesodon*, skull and jaw of *Propalaeohoplophorus*, skull of *Dasyptotherium*, femur, tibia, and fibula of *Brontornis*; skull of *Onohippidium* and deformed skull of *Astrapotherium*; 22 casts of mammalian specimens from the Paris Basin, received in exchange with the Museum of Natural History, Paris; the sixth installment of the Lacoe collection contained three boxes of fossil fishes.

An important collection of 28 Triassic fishes from Massachusetts, collected by S. Ward Loper, was received as a gift from the United States Geological Survey.

1896

The most important accession acquired this year was the Lacoe collection of fossil plants and invertebrates, which included 408 fish, amphibian, and reptilian specimens received as a gift from the heirs of R. D. Lacoe. Among the vertebrates the Tertiary was represented by specimens from the Green River of Wyoming and from Switzerland; Triassic by specimens from the Appalachian region; Paleozoic by specimens from Great Britain, France, and the coal fields of Ohio, Pennsylvania, and Mazon Creek, Ill. Many of the Ohio specimens are now unique, since further specimens cannot be obtained because of the exhaustion of the coal mines.

An important lot of *Basilosaurus cetoides* remains, including the types of *Pterosphenus schucherti* (Lucas, F. A., Proc. U. S. Nat. Mus., vol. 21, p. 637, 1898) and *Hadrianus schucherti* (Hay, O. P., Proc. U. S. Nat. Mus., vol. 22, p. 22, 1899), was collected for the Museum from the Jackson (Eocene) of Alabama by Charles Schuchert. This material supplemented the collection made in 1894, and from the two collections a skeleton was mounted for exhibition (Gidley, J. W., Proc. U. S. Nat. Mus., vol. 44, p. 649, 1913; also described by R. Kellogg, Carnegie Inst. Washington Publ. 482, 1936). In exchange with Dr. H. Credner, a collection of amphibians came from near Dresden, Germany.

1897

A fine example of a fossil ray, *Xiphotrygon acutidens*, from the Green River shales of Wyoming was purchased from R. L. Craig.

The types of *Heterodontosuchus ganei* from the Triassic of southern Utah, and of *Dinictis major* from the Oligocene of western Nebraska, described by F. A. Lucas (Amer. Journ. Sci., ser. 4, vol. 6, pp. 399-400, 1898), were transferred from the United States Geological Survey.

1898

An important collection of fossil fishes made by the Hayden surveys of 1870, 1872, and 1873 and by A. C. Peale in 1877, and retained by E. D. Cope for study and description, was returned by the executors of his estate. This collection of 175 specimens, principally from the Eocene, Green River, shales of Wyoming, contained a large number of type and figured specimens. These were described by Cope (principally in Rep. U. S. Geol. Surv. Terr., vol. 3, 1884).

A skull and lower jaws, with associated fore limbs and feet and skin impressions, of *Thespesius annectens*, from the Lance, Upper Cretaceous near Forsyth, Mont., were purchased from Robert Butler. The skin impressions were described by J. B. Hatcher (Ann. Carnegie Mus., vol. 1, p. 130, fig. 1, 1901) as *Claosaurus*.

The type specimen of *Hoplitosaurus marshi* collected by N. H. Darton from the Lakota sandstone, Upper Cretaceous, near Buffalo Gap, South Dakota, was transferred by the United States Geological Survey (Lucas, F. A., Proc. U. S. Nat. Mus., vol. 23, pp. 591, 592, pls. 23, 24, 1901).

Two carloads of vertebrate fossils (part of the Marsh collection) were received from the Marsh laboratories in New Haven, Conn., as a transfer from the United States Geological Survey.

An important collection of 138 Paleozoic shark spines and teeth from near Keokuk, Iowa, was purchased from Lisbon Cox.

1899

A well-preserved skull of *Hyracodon nebrascensis* from the Oligocene was presented by A. W. Barber. A small collection of mammalian specimens from the Oligocene, near Oelrick, S. Dak., made by N. H. Darton was transmitted by the United States Geological Survey. It contained a nearly complete skeleton of *Merycoidodon gracilis* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 31, pp. 513-514, 1907). A collection of fish remains from the Niobrara, Upper Cretaceous of Kansas, was presented by Dr. A. B. Baker. The type skull of *Ursus procerus* (Miller, G. S., Jr., Proc. Biol. Soc. Washington, vol. 13, pp. 53-56, 1899) from the Pleistocene of Ohio was presented by W. G. Roberts.

1900

Final consignment (5 carloads) of the Marsh collection of fossil vertebrates, consisting of 590 boxes and crates, having a total weight of 80 tons and a roughly estimated valuation of \$150,000, was transferred by the United States Geological Survey. This consignment was received in 1899 but not accessioned until 1900. A skeleton of *Lepidosteus atrox* from the Eocene of Wyoming was presented by Charles Schuchert. A collection of phytosaurian materials made by Barnum Brown, including the types of *Placerias hesternus* and *Metoposaurus fraasi* (Lucas, F. A., Proc. U. S. Nat. Mus., vol. 27, pp. 193-195, 1904), from the Triassic of Arizona, was transmitted by the United States Geological Survey.

A skull of *Archaeotherium mortoni* from the Oligocene of South Dakota was purchased from L. W. Stilwell.

1901

A well-preserved skeleton of *Hesperornis regalis* from the Niobrara formation, Upper Cretaceous, of Kansas, was purchased from Handel T. Martin. This specimen was mounted for exhibition (Lucas, F. A., Smithsonian Misc. Coll., vol. 45, p. 95, 1903); a small collection of bird bones, including the types of *Puffinus eyermani* and *Tantalus milne-edwardsi* (Shufeldt, R. W., Proc. Acad. Nat. Sci. Philadelphia, 1896, p. 511), from the Middle Miocene of France, was presented by Robert W. Shufeldt.

A skeleton of *Mastodon americanus*, a female, from the Pleistocene found near Church, Hillsdale County, Mich., was purchased (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 30, p. 610, 1906).

A skull and one tusk, the type of *Elephas roosevelti*, from the Pleistocene, found near Ashland, Cass County, Ill., were purchased (Hay, O. P., Proc. Biol. Soc. Washington, vol. 35, p. 101, 1922).

1902

Accessions included a collection of teeth of *Camelops*, *Symbos*, *Mammot americanum*, *Elephas columbi*, and *E. imperator* from the Pleistocene in a spring near Afton, Okla., made by W. H. Holmes (Hay, O. P., Proc. U. S. Nat. Mus., vol. 58, p. 117, 1921; Indiana Geol. Surv., vol. 26; Iowa Geol. Surv., vol. 23).

Plaster casts of five restorations of the heads of as many genera of Brontotheres were received in exchange with the American Museum of Natural History.

1903

Teeth of *Mastodon humboldti* and *M. cordillerum* and plaster casts of mandibular rami were received in exchange with the British Museum of Natural History.

A slab of sandstone showing Pennsylvanian footprints from Mount Carbon, Pa., was presented by Dr. H. J. Herbein. A tooth of *Cladodus formosus* from Needle Mountain quadrangle, collected by Dr. Whitman Cross, was transferred by the United States Geological Survey.

1904

A complete skeleton of *Rhamphorhynchus gemmingi* showing impressions of the wing and tail membranes (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 30, 1906) and fossil fishes of the genera *Aspidorhynchus*, *Caturus*, *Squatina*, *Hypsocormus*, *Pholidophorus*, and *Gyrodon*, from the Upper Jurassic near Eichstatt, Germany, were purchased from Fritz Ehrensberger. Complete skeletons of *Stenosaurus bollenensis* and *Ichthyosaurus quadricissus* from the Lias of Württemberg, Germany, were purchased from F. Krantz.

A skull of *Bison alleni* with horn and external sheaths, from the Pleistocene near Rampart, Alaska, was presented by D. McLean (Hay, O. P., Proc. U. S. Nat. Mus., vol. 46, p. 182, 1914).

1905

A small collection of mammalian specimens from the Wasatch, Eocene, of the Big Horn Basin, Wyo., made by Dr. C. A. Fisher was transferred by the United States Geological Survey. A collection of Pleistocene mammals from Alaska, made by A. G. Maddren, was transferred by the Smithsonian Institution (Maddren, A. G., Smithsonian Misc. Coll., vol. 49, pp. 1-117, 1908).

1906

The most important acquisition of this year was a beautifully preserved skeleton of *Sinopa grangeri* (Matthew, W. D., Proc. U. S. Nat.

Mus., vol. 30, pp. 203-233, 1906) and specimens of *Amyda aequa* (Hay, O. P., Carnegie Inst. Washington Publ. 75, pp. 517-519, 1908) from the Eocene, Bridger formation of Wyoming. These were transferred by the United States Geological Survey.

A musk-ox skull from the Pleistocene of Yukon Territory was presented by J. B. Terrell through Dr. W. H. Osgood, who subsequently described it as the type of *Symbos terrelli* (Smithsonian Misc. Coll., vol. 48, pp. 173-183, 1905).

A second musk-ox skull (*Gidleya zuniensis*) from the Pleistocene of New Mexico was presented by the Department of the Interior. It was originally described by Dr. J. W. Gidley as *Liops* (Proc. U. S. Nat. Mus., vol. 30, pp. 165-167, 1906).

1907

Plaster casts of the skeleton of *Pareiasaurus baini* and other reptilian skulls, all from the Karoo Beds of South Africa, were received in exchange from the British Museum of Natural History. A specimen of *Lepisosteus simplex* from near Cody, Wyo., was presented by Jeremiah Ahern. The type of *Echmatemys rivalis* (Hay, O. P., Proc. U. S. Nat. Mus., vol. 35, pp. 164-166, 1908) from Wasatch, Eocene of Wyoming was transferred by the United States Geological Survey.

1908

An important collection of 99 United States and South American vertebrate specimens was received in exchange with the American Museum of Natural History in settlement of a claim for certain Government-owned specimens that were retained in the Cope collection when it went to that institution. This collection contained many rare species, including the type mounted skeleton of *Hoplophoneus robustus* (Adams, G. I., Amer. Nat., vol. 30, p. 49, 1896) from the Oligocene of South Dakota, and a skull and jaws of *Uintatherium mirabile* from the Washakie (Eocene) of Wyoming.

The Hambach collection, assembled by the late Prof. Gustav Hambach, was presented by Frank Springer. Although consisting primarily of invertebrate fossils it also contained a considerable number of Paleozoic fish remains, some reptiles and mammals from this country and abroad, as well as a few from the Shumard collection, which Professor Hambach had previously acquired.

A collection of Pleistocene mammals made by Charles W. Gilmore for the Smithsonian Institution in Alaska in 1907 (Gilmore, C. W., Smithsonian Misc. Coll., vol. 51, pp. 1-38, 1908); skulls of *Bison crassicornis* (Hay, O. P., Proc. U. S. Nat. Mus., vol. 46, pp. 179-183, 1914); and a musk-ox skull the type of a new species *Ovibos yukon-*

ensis (Gidley, J. W., Proc. U. S. Nat. Mus., vol. 34, pp. 681-683, 1908) were the outstanding specimens.

A fossil turtle from the Niobrara (Upper Cretaceous) of Kansas was purchased from Charles H. Sternberg. It was subsequently described by O. P. Hay as the type of *Toxochelys stenopora* (Proc. U. S. Nat. Mus., vol. 36, p. 191, 1909).

A lower jaw of *Equus occidentalis* from the Pleistocene of Nevada was presented by C. A. Gaby. A natural cast of a chimaeroid egg case collected by N. H. Darton from the Montana, Upper Cretaceous of Wyoming, was transferred by the United States Geological Survey. Five fossil fishes from Ceara, Brazil, were presented by David Starr Jordan. A cast of the skull of *Zeuglodon hydrarchus* [= *Zygorhiza kochii*] was received in exchange with Teyler's Museum, Haarlem, Netherlands.

The types of *Delphinodon dividum* (True, F. W., Journ. Acad. Nat. Sci. Philadelphia, vol. 15, pp. 165-194, 1912) and *Psephophorus calvertensis* (Palmer, William, Proc. U. S. Nat. Mus., vol. 36, pp. 369-373, 1909) and other Miocene vertebrates from the Calvert formation of the Chesapeake Bay region were collected and presented by William Palmer.

1909

A collection of 300 specimens from the Fort Union (Paleocene) of Sweet Grass County, Mont., containing many new and little-known mammalian forms and the type of *Hoplochelys caelata* (Hay, O. P., Proc. U. S. Nat. Mus., vol. 35, pp. 163-164, 1908), was made for the Museum by A. C. Silberling. A woolly rhinoceros skull from the Pleistocene of Russia was purchased from E. Pfizenmayer. Two accessions comprising a very considerable and interesting series of Cretaceous remains from the Miocene of Calvert Cliffs, Calvert County, Md., were presented by Frederick W. True.

The type specimen of *Lissoprion ferrieri* (Hay, O. P., Science, new ser., vol. 26, pp. 22-24, 1907) from the Upper Carboniferous of Idaho was presented by W. F. Ferrier. A partial skeleton of *Glyptodon petaliferus* from the Pliocene of Texas was presented by O. S. Shelton (Hay, O. P., Proc. U. S. Nat. Mus., vol. 51, p. 107, 1916).

1910

The Fort Union collections from Montana were augmented by 70 additional specimens, collected by James W. Gidley and A. C. Silberling, working under the auspices of the United States Geological Survey. A further contribution was made by the Geological Survey in a small collection of turtles made by James W. Gidley and James H.

Gardner from the Upper Cretaceous of the San Juan Basin of New Mexico (Hay, O. P., Proc. U. S. Nat. Mus., vol. 38, pp. 307-326, 1910).

A complete crocodile skull and lower jaws described by Charles W. Gilmore as the type of *Leidyosuchus sternbergi* (Proc. U. S. Nat. Mus., vol. 38, pp. 485-502, pls. 23-29, 1910) from the Lance, Upper Cretaceous, and a complete skull and neck of *Clidastes velox* from the Niobrara formation, Upper Cretaceous of Kansas were purchased from Charles H. Sternberg. A plaster cast of the rhynchocephalian reptile *Homocosaurus maximiliani* was purchased.

1911

A third addition to the collection of Fort Union mammals was made by purchase of 55 specimens from A. C. Silberling. A second consignment of 20 mammal and reptile specimens from the American Museum of Natural History completed the exchange for the Cope materials; of the specimens transmitted a partial skeleton of *Dimetrodon incivius* and a skull of *Eryops* from the Permian of Texas are worthy of special mention. Plaster casts of the skull of *Camptosaurus nanus* and of the epidermis of a hadrosaurian "mummy" constituted a second exchange with this same institution. A molar tooth of *Elephas columbi* from Placita, N. Mex., was presented by E. D. Cope (Proc. Acad. Nat. Sci. Philadelphia, 1874, p. 221).

1912

Type and figured specimens described by E. D. Cope (Proc. Acad. Nat. Sci. Philadelphia, vol. 21, p. 192, 1869) constituted the outstanding accession of this year. The types were of *Polydectes biturgidus*, *Hadrosaurus tripos*, and *Hypsibema crassicauda*, all from the Upper Cretaceous of North Carolina. They were deposited by the North Carolina Department of Agriculture, through H. H. Brimley, curator of the State Museum. A unique type specimen consisting of the jaws and teeth of the extinct shark *Edestus mirus* (Hay, O. P., Proc. U. S. Nat. Mus., vol. 42, pp. 31-38, 1912) from the Carboniferous of Iowa was presented by the Smithsonian Institution.

A composite rhinoceros skeleton (*Diceratherium cooki*), now mounted and on exhibition, from the Lower Miocene of Nebraska was received in exchange with the Carnegie Museum of Pittsburgh. A plaster cast of the hind leg and foot of *Diplodocus carnegii* was received in exchange with this same institution. A turtle, *Styemys nebrascensis*, from the Oligocene of Wyoming was purchased from Charles H. Sternberg. A lower right molar of *Elephas columbi* from Tama, Iowa, was presented by Fred Herschel (Hay, O. P., Iowa Geol. Surv., vol. 23, p. 447, 1912).

The type specimen of *Neurankylus wyomingensis* from the Upper Cretaceous of Wyoming was transferred by the United States Geological Survey (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 56, p. 113, 1920).

1913

The Fort Union collection from Montana was further increased by the purchase of 400 specimens from the collector A. C. Silberling (Simpson, G. G., U. S. Nat. Mus. Bull. 169, pp. 1-279, 1937). A most important collection of Pleistocene mammals, representing 22 genera, several of which were new, was made by James W. Gidley from the "Cumberland Cave" near Cumberland, Md. A collection of Pleistocene fossils made by Copley Amory, Jr., for the Museum along the Old Crow River, Yukon Territory, was transferred as a gift from the Smithsonian Institution. It contained a unique specimen, the foot bone of a camel, the first evidence of the former occurrence of this animal north of the Arctic Circle (Gidley, J. W., Smithsonian Misc. Coll., vol. 60, pp. 1-2, 1913). C. P. Snyder presented a skull of *Equus niobrarensis alaska* (Hay, O. P., Smithsonian Misc. Coll., vol. 61, No. 2, pp. 1-18, 1913) and a mastodon tooth, both from the Pleistocene of Alaska. Cetacean specimens, including the type of *Parietobalaena palmeri* (Kellogg, R., Proc. U. S. Nat. Mus., vol. 63, pp. 1-14, 1924) from the Calvert, Miocene, of the Chesapeake Bay region, were presented by William Palmer and A. C. Weed of the Museum staff.

An upper molar of a mastodon and a skull of *Symbos cavifrons*, both from the Pleistocene of Mason County, Ill., were presented by John Wiedmer (Hay, O. P., Carnegie Inst. Washington Publ. 322, pp. 103-104, 1923).

1914

The important accession of this year was a collection of dinosaur remains collected by Charles W. Gilmore, working under the auspices of the United States Geological Survey, from the Two Medicine formation, Upper Cretaceous, of Montana. Aside from filling an important gap in the collections, this assemblage furnished the type of a new genus and species (*Brachyceratops montanensis*) of the Ceratopsia (Gilmore, C. W., U. S. Geol. Surv. Prof. Pap. 103, pp. 1-38, 1917).

Another installment of Pleistocene fossils from the Cumberland Cave deposit was collected by James W. Gidley. The specimens included a mountable skeleton of *Platygonus cumberlandensis* (Gidley, J. W., Proc. U. S. Nat. Mus., vol. 57, pp. 651-678, 1920), and many good skulls and articulated limbs and feet, in part belonging to genera and species not previously recognized from this locality (Gidley, J. W., and Gazin, C. L., U. S. Nat. Mus. Bull. 171, pp. 1-99, 1938).

A small collection of Pleistocene animal remains from Saltville, Smyth County, Va., was presented by H. D. Mount (Hay, O. P., Carnegie Inst. Washington Publ. 322, pp. 145-352, 1923).

Collecting in the local Miocene field in the cliffs along Chesapeake Bay by William Palmer and Norman H. Boss yielded a complete skull and lower jaws with much of the articulated skeleton of the long-beaked porpoise *Eurhinodelphis bossi*, a beautifully preserved short-beaked porpoise skull (*Kentriodon pernix*), and many parts of these same animals.

Other noteworthy accessions for this year were a well-preserved skull of *Bison alleni* with the horn sheaths and five articulated cervical vertebrae from the Pleistocene of Alaska, purchased (Hay, O. P., Proc. U. S. Nat. Mus., vol. 46, pp. 183-189, 1913); the type of *Crosso-telos annulatus*, a Permian amphibian from Oklahoma, received in exchange with Dr. E. C. Case (2d Ann. Rep. Geol. and Nat. Hist. Terr. Oklahoma, p. 15, 1902); and teeth and jaw fragments of the type of *Titanoides primaevus* from the Fort Union of North Dakota, received by transfer from the United States Department of Agriculture through Vernon Bailey (Gidley, J. W., Proc. U. S. Nat. Mus., vol. 52, pp. 431-435, 1917).

1915

A composite skeleton of *Aenocyon dirus* and three skulls and jaws of the same from the famous Rancho La Brea, Pleistocene asphalt deposits, California, were received in exchange with the University of California. A large mosasaur skeleton, consisting of the skull, jaws, 50 vertebrae, and portions of the paddles from the Bearpaw formation, Upper Cretaceous of Montana, was purchased from Guy L. Wait. A remarkably well-preserved skull of the rare *Desmostylus hesperus* from the Miocene of Oregon was purchased (Hay, O. P., Proc. U. S. Nat. Mus., vol. 49, pp. 381-397, 1915). A final consignment of Pleistocene mammals from the "Cumberland Cave," consisting of 15 skulls, was received. A partial skeleton of a very large *Mastodon americanus* from the Pleistocene of Indiana was presented by W. D. Pattison, with permission to unearth the remaining parts. The type skull of *Nothrotherium texanum* from the Pleistocene of Texas was received in exchange with Baylor University (Hay, O. P., Proc. U. S. Nat. Mus., vol. 51, p. 116, 1917).

A collection of 30 dermal plates of armored dinosaurs from the Lance, Upper Cretaceous, of Wyoming was presented by Dr. G. R. Wieland (Wieland, G. R., Amer. Journ. Sci., ser. 4, vol. 31, pp. 112-124, 1911). A small collection of Pleistocene mammals from the vicinity of Denver, Colo., was presented by Prof. George L. Cannon (Hay, O. P., Proc. U. S. Nat. Mus., vol. 59, pp. 599-603, 1922).

1916

The most valuable accession of the year was the remainder of the skeleton of a large *Mastodon americanus* from the Pleistocene of Indiana, presented by Maj. H. H. and W. D. Pattison. The skeleton is now mounted and on exhibition (Lyon, Marcus W., Amer. Midl. Nat., vol. 17, p. 336, fig. 116, 1936).

The Fort Union mammal collection from Montana was increased by the purchase of a small assemblage of specimens from A. C. Silberling. A collection of Pleistocene specimens made by Benno Alexander, who accompanied the 1914-15 Korean Expedition to the Kolyma River region in northern Siberia, was presented by the Smithsonian Institution. It included about 200 individual specimens, the most important being a fine skull of *Elephas primigenius*.

A skull of *Canis orcutti* from the Pleistocene of California was received in exchange with the California State Normal School of Los Angeles. The type specimen of the fossil fish *Evesthes jordani* from the Miocene of California was presented by Dr. J. Z. Gilbert (Bull. Dept. Geol. Univ. California, vol. 5, pp. 405-411, pls. 41-43, 1910). Plaster casts of the type of *Allosaurus fragilis* were received in exchange with the Peabody Museum of Natural History. The United States Geological Survey transferred some 30 vertebrate specimens, representing 9 species of fossil fishes and reptiles from the Upper Cretaceous of the San Juan Basin, N. Mex., including the types of *Baena nodosa* and *Neurankylus bauri* (Gilmore, C. W., U. S. Geol. Surv. Prof. Pap. 98-Q, pp. 290-295, 1916).

1917

A collection of Permian vertebrates made by Charles H. Sternberg in Baylor County, Tex., was purchased. It contained a good skeleton of *Dimetrodon gigas*, now mounted (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 56, pp. 525-539, 1919), besides partial skeletons of three other individuals. Also worthy of special mention are skulls and partial skeletons of the following genera: *Cardiocephalus*, *Lysorophus*, *Diplocaulus*, *Seymouria*, *Labidosaurus*, and *Pariotichus*, as well as a great quantity of unidentified materials of lesser value.

A collection of fossil reptile and cetacean remains, including the types of *Goniopholis affinis*, *Cetotherium crassangulum*, and *Metopocetus durinasus*, from the Arundel formation, Cretaceous and Calvert, Miocene of Maryland, was deposited by Goucher College.

A collection of 400 small mammal specimens was made from the Pleistocene cave deposits of western Cuba by William Palmer.

A small collection of turtles from the Upper Cretaceous (Belly River), containing the types of *Aspideretes latus* and *Boremys albert-*

ensis, purchased from Charles H. Sternberg (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 56, pp. 113-132, pls. 29-37, 1919).

The type skull and lower jaws of *Equus lambei* from the Pleistocene of Gold Run Creek, Yukon Territory (Hay, O. P., Proc. U. S. Nat. Mus., vol. 53, pp. 435-443, 1917), and a partial skull of *Symbos cavifrons* from the Pleistocene of Indiana were purchased.

1918

A collection made by Dr. John B. Reeside, Jr. (1916), from the Paleocene and Upper Cretaceous of the San Juan Basin of New Mexico was transferred by the United States Geological Survey. This is the most important contribution from this source of recent years, there being 50 identifiable turtle specimens, many of them complete, 16 of which were described as new species (Gilmore, C. W., U. S. Geol. Surv. Prof. Pap. 119, pp. 1-68, 1920).

The type specimen of *Terrepene whitneyi* from the Pleistocene of Texas was presented by Prof. F. H. Whitney (Hay, O. P., Univ. Texas Bull. 71, pp. 1-24, 1917). The type of *Agomphus alabamensis* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 56, pp. 123-125, 1919) from the Cretaceous of Georgia was presented by the Florida Geological Survey.

Additional remains of Pleistocene mammals from Siberia were presented by John Koren. These supplement the collection received from the Koren Expedition of 1914-15.

A collection of 76 fish scales from the Cretaceous of North America was transferred by the United States Geological Survey (Cockerell, T. D. A., U. S. Geol. Surv. Prof. Pap. 120, pp. 165-188, 1919).

A small collection of cetacean remains, including the type of *Eurhinodelphis bossi* (Kellogg, R., Proc. U. S. Nat. Mus., vol. 66, pp. 1-40, 1925), was made for the Museum by Norman H. Boss.

1919

The most important accession of this year was that received as a deposit from the Florida Geological Survey, consisting of 24 type specimens from the Miocene and Pleistocene of Florida.

A skull and lower jaws of *Monoclonius nasicornis* from the Belly River, Upper Cretaceous, of Alberta; a skull and partial skeleton of *Diplocaulus copei* from the Permian of Texas; and a partly articulated skeleton of *Tylosaurus proriger* and other mosasaurian specimens from the Niobrara formation, Upper Cretaceous of Kansas, were purchased from Charles H. Sternberg.

A partial skeleton including a well-preserved skull of a long-beaked porpoise from the Calvert, Miocene, of Chesapeake Bay, Md., was collected for the Museum by William Palmer and N. H. Boss. A consider-

able portion of the skeleton of a mastodon from the Pleistocene of Winona Lake, Ind., was presented by Frank L. Clark.

A cast of the type skeleton of *Diatryma steinii* was presented by the American Museum of Natural History.

1920

A valuable acquisition was a collection of 78 specimens placed on deposit by the Maryland Geological Survey of which 74 are either type or figured specimens, 13 being original types. These specimens come from the Pleistocene, Miocene, Eocene, and Cretaceous of Maryland.

A collection of 35 specimens from a cave near Bulverde, Bexar County, Tex., was presented by O. P. Hay (Hay, O. P., Proc. U. S. Nat. Mus., vol. 58, p. 129, 1921). A collection of 60 specimens from the Pleistocene, Cavetown, Md., was presented by Phillips Academy (Hay, O. P., Proc. U. S. Nat. Mus., vol. 58, p. 97, 1921). A small collection consisting chiefly of horse and camel remains from Washtucna Lake, Wash., collected by Dr. George M. Sternberg in 1877, was presented by Mrs. George M. Sternberg (Hay, O. P., Proc. U. S. Nat. Mus., vol. 59, pp. 607-608, 1922).

A beautiful articulated skeleton of *Stenomylus hitchcocki* from the Miocene of Nebraska was received in exchange with the Carnegie Museum. A humerus, the type of *Jabiru weillsi* (Sellards, E. H., 8th Ann. Rep. Florida Geol. Surv., p. 146, 1916), from the Pleistocene of Florida, was deposited by the Florida Geological Survey. Two sets of moa leg bones and one lot of crop stones from New Zealand were received in exchange with the Public School of Lake Bathurst, Australia. A skull and two vertebrae, the type of *Megaptera miocaena* (Kellogg, R., Proc. U. S. Nat. Mus., vol. 61, pp. 1-16, 1922), from the Miocene, Lompoc formation of California, were transferred by the United States Geological Survey. A plaster model restoration of *Mastodon americanus* by Charles R. Knight was purchased.

The type skull of *Elephas boreus* from Mount Healthy, Hamilton County, Ohio, was purchased (Hay, O. P., Observations on some extinct elephants, p. 5, June 12, 1922; privately published).

A small collection of Pleistocene vertebrate fossils was made by James W. Gidley near Renick, Greenbrier County, W. Va. (Gidley, J. W., Proc. U. S. Nat. Mus., vol. 57, p. 669, 1920).

1921

An important collection of more than 100 specimens representing a new Pliocene fauna of 30 or more species was made by James W. Gidley and Kirk Bryan in the San Pedro Valley, Ariz. Among the more striking new forms were two described by Gidley (U. S. Geol. Surv. Prof. Pap. 140-B, 1926), *Stegomastodon arizonae* and *Glypto-*

therium arizonae, and one by Gilmore, *Kinosternum arizonense* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 62, art. 5, pp. 1-8, 1922). In another paper (Gidley, J. W., U. S. Geol. Surv. Prof. Pap. 131-E, 1922) 15 new species of rodents were described. The collection also contained the types of two new species of birds (Wetmore, Alexander, Proc. U. S. Nat. Mus., vol. 64, pp. 1-18, 1924).

A block of *Diceratherium* bones *in situ* from the Miocene of the famous Agate Springs Quarry, Nebr., was collected for the Museum by James W. Gidley. A collection of about 200 specimens of Pleistocene mammals from a cave in Coconino County, Ariz., was received in exchange with the University of Arizona (Hay, O. P., Proc. U. S. Nat. Mus., vol. 59, pp. 617-638, 1921). The type of *Bystra nanus* (Hay, O. P., 8th Ann. Rep. Florida Geol. Survey, p. 53, 1916), from the Dunnellon formation of Florida, was received in exchange with the Buffalo Natural History Society. A skull of *Lambeosaurus* from the Belly River of Alberta; a half skull and lower jaws of a Pleistocene elephant from an unknown locality; and an elephant tooth from Otranto, Italy, were received in exchange with Ward's Natural Science Establishment. A male and a female skull of *Diceratherium cooki* and plaster casts of the two skulls of the Permian reptiles *Edaphosaurus* and *Diadectes* were received in exchange with the Walker Museum of the University of Chicago. A jaw of *Edestus heinrichii* from the Mississippian of Illinois was presented by the Southern Coal, Coke & Mining Co.; a Pleistocene elephant skull from Ohio was purchased. Lower jaw of a mastodon from the Pleistocene of Mississippi was purchased.

1922

Further collections from the Calvert (Miocene) along Chesapeake Bay were made for the Museum by Norman H. Boss. Two outstanding specimens are the type skull and parts of skeleton of *Squalodon calvertensis* (Kellogg, Remington, Proc. U. S. Nat. Mus., 62, pp. 1-69, 1923) and skull and lower jaws and much of the skeleton of *Zarhachis flagellator* (Kellogg, Remington, Proc. U. S. Nat. Mus., 63, pp. 1-39, 1924). A second collection of Miocene materials from the Chesapeake Bay region, consisting of five porpoise skulls besides many individual bones, was purchased from Mrs. William Palmer.

A nearly complete hind limb of *Gorgosaurus*, a tail club of an armored dinosaur, and the fore limbs, feet, and pectoral girdle of a small trachodont dinosaur, all from the Belly River, Upper Cretaceous, of Alberta, Canada, were received in an exchange with the Victoria Memorial Museum. A series of articulated cervical and dorsal vertebrae of *Edaphosaurus* was received in exchange with the Walker Museum. A nearly complete shell of *Boremys* from the

Belly River, Upper Cretaceous, was received in exchange with the University of Alberta.

A collection of skulls and several hundred bones of *Bison occidentalis* from the Pleistocene of Minnesota was presented by John A. Savage & Co. A composite skeleton was assembled for exhibition from this lot (Hay, O. P., Proc. U. S. Nat. Mus., vol. 63, art. 5, pp. 1-8, 1923).

Parts of the famous Beresovka mammoth from the Pleistocene of Siberia, such as skin, hair, muscular tissue, and stomach contents, were purchased from E. W. Pfizenmayer.

A tarsometatarsus of *Parapavo californicus* from the Pleistocene of California was presented by the University of California. The type of *Alamosaurus sanjuanensis* from the Ojo Alamo formation, Upper Cretaceous, of New Mexico was transferred by the United States Geological Survey (Gilmore, C. W., Smithsonian Misc. Coll., vol. 72, pp. 1-9, 1922).

1923

The most important accession of many years was the collection of several thousand specimens of Orestes St. John presented to the Museum by Frank Springer, to whom it was left upon the death of St. John. The collection consists of a general collection of Devonian invertebrates, but more important is his large and extremely valuable collection of selachian fish remains, chiefly from the Carboniferous. It contains numerous types and illustrated specimens described by St. John in the Illinois reports, as well as a large amount of original unstudied material. There is also included a large quantity of very choice cestraciont fish material, much of it collected by Mr. Springer from the Burlington limestone of Iowa, as well as two exceptionally fine collections from the Keokuk limestone made by Dr. G. A. Williams and Lisbon A. Cox, which were purchased by Mr. Springer and turned over to St. John, together with his own, for use in his researches. Among other notable specimens in this collection mention should be made of the type of *Campodus (Agassizodus) variabilis* (Newberry, J. S., Ohio Geol. Surv. Rep., pt. 2, vol. 2, p. 50, 1870); this represents a complete dentition from the Coal Measures of Kansas in a state of preservation such as has not been found elsewhere.

Another most notable accession was the residuary portion of the collection of R. D. Lacoë, of Pittston, Pa., presented by his heirs. Besides the fossil plants and invertebrates, which formed the bulk of the accession of 10,000 specimens, it also contained several hundred fish, reptilian, and amphibian remains. The Tertiary is represented by specimens from the Green River and from Switzerland; Triassic

by specimens from the Appalachian region; Paleozoic by specimens from Great Britain, France, and the coal fields of Ohio, Pennsylvania, and Mazon Creek, Ill. It contains many types and figured specimens.

The type specimen of the physeteroid whale (*Ontocetus oxymycterus*) from Santa Barbara, Calif., was presented by Mrs. Charles O. Roe (Kellogg, R., Proc. U. S. Nat. Mus., vol. 66, art. 27, pp. 1-8, 1926).

1924

A notable accession was a skeleton of *Diplodocus longus* collected for the Museum from the Jurassic, Dinosaur National Monument, Utah. This specimen is now mounted and on exhibition (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 81, art. 18, pp. 1-21, pls. 1-6, 1932).

Composite skeletons of *Smilodon californicus* and *Aenocyon dirus*, suitable for mounting from the Pleistocene of Rancho La Brea of California, were received in exchange with the University of California; a slab of dinosaur tracks from the Triassic shales of Virginia was presented by Frank C. Littleton. The types of *Trinacromerum bentonianum* from the Upper Cretaceous of Kansas (Cragin, F. W., Amer. Geol., vol. 2, pp. 404-407, 1888) and *Testudo equicomis* from the Pleistocene of Kansas (Hay, O. P., Kans. Univ. Sci. Bull., vol. 10, pp. 39-51, pls. 1-3, 1917) were received in exchange with Colorado College. Further cetacean specimens, a partial skull of *Zarhachis* (Kellogg, R., Proc. U. S. Nat. Mus., vol. 67, art. 28, pp. 1-18, 1926) and one of *Eurhinodelphis* collected by Norman H. Boss from the Miocene, Calvert formation, Chesapeake Bay, Md. The type of a fossil sculpin from Nevada presented by David Starr Jordan. A small collection of South American mammals was presented by Brother Ariste Joseph; a skeleton of *Elephas* lacking the skull from the Pleistocene of Franklin County, Wash., was transferred by the United States Geological Survey. Cast of the skull of *Baluchitherium* and cast of the type of *Griphodon peruvianus* were received in exchange with American Museum of Natural History, New York.

1925

The most important collection of the year was a series of fossil footprints from the Coconino sandstone, Permian of the Grand Canyon of Arizona, collected by Charles W. Gilmore in cooperation with the National Park Service (Gilmore, C. W., Smithsonian Misc. Coll., vol. 77, No. 9, pp. 1-41, 1926). This collection was supplemented by a smaller one made by Dr. J. C. Merriam and presented by the Carnegie Institution of Washington. Two very large dinosaurian

tracks from the Mesa Verde, Upper Cretaceous, Clear Creek, Utah, were transferred by the United States Geological Survey.

A collection of Pleistocene mammals from Melbourne, Fla., was presented by Charles P. Singleton. It included the skull and much of the skeleton of a mastodon. A small collection of mammalian fossils from Chihuahua, Mexico, was presented by Mrs. Bruce D. Brown. Three well-preserved turtles from the Upper Cretaceous, Kirtland of New Mexico were received in exchange with Ward's Natural Science Establishment.

The collection of fossil cetaceans was materially enriched by two sperm-whale skulls, the type of *Aulophyseter morricei* (Kellogg, R., Carnegie Inst. Washington Publ. 346, pp. 1-43, pls. 1-9, 1927) from the Temblor, Miocene of California, presented by Charles Morrice, and the type skull of *Xenorophus sloanii* (Kellogg, R., Smithsonian Misc. Coll., vol. 76, No. 7, pp. 1-7, pls. 1, 2, 1923) from the Oligocene of South Carolina was presented by Earle Sloan.

A collection of fishes from the Lompoc, Upper Miocene, of California was presented by David Starr Jordan. Skull and lower jaws of *Equus lambei* from the Pleistocene of Alaska were purchased.

Plaster casts of the type skulls of *Batrachosuchus browni*, *Dicynodon kolbei*, and *Struthiocephalus whaitsi* were received in exchange with the South African Museum. Casts of the types of *Andrewsarchus* and *Proamphicyon* were received in exchange with the American Museum of Natural History.

1926

A large collection of fossil tracks from the Coconino, Hermit, and Supai formations of the Grand Canyon was made for the Museum by Charles W. Gilmore (Gilmore, C. W., Smithsonian Misc. Coll., vol. 80, No. 3, pp. 1-78, pls. 1-21, 1927). Additional footprint material from the Triassic of New Jersey was received in exchange with Princeton University.

A collection of 38 species of Pleistocene mammals made by James W. Gidley from Melbourne, Fla., including a crushed human skull found intermingled with the animal remains, gave important evidence of their contemporaneity (Loomis, F. B., Nat. Hist., vol. 26, pp. 260-262, 1926). He also made a small collection of Pleistocene mammal remains from Long Horn Spring, Okla.

A further collection of cetacean remains from the Calvert, Miocene of Chesapeake Bay region was made by Remington Kellogg and Norman H. Boss. Two specimens of a well-preserved skeleton of *Priscodelphinus atropius* and a fine skull and partial skeleton of a smaller porpoise are deserving of special mention.

A partial skeleton of a long-snouted crocodylian from the Green River shales of Colorado was presented by Prof. O. M. Ball. Addi-

tional cetacean materials from the Sooke formation of British Columbia were presented by Ira E. Cornwall. Type specimen of *Bison sylvestris* (Hay, O. P., Proc. U. S. Nat. Mus., vol. 48, p. 515, 1915) from Huron County, Ohio, and a small collection of Pleistocene fossils from Vero, Fla., were presented by Oliver P. Hay. A well-preserved skull of *Stenosaurus bollensis* from Holtzmaden, Germany, was received in exchange with Ward's Natural Science Establishment. A collection of five turtles from the Upper Cretaceous of New Mexico was purchased from Charles H. Sternberg. A plaster cast of the skull of *Protocera-tops* was received in exchange with the American Museum of Natural History.

1927

An articulated skeleton of *Portheus molossus*, three skeletons of *Protostega gigas*, and two partial skeletons of *Platecarpus coryphaeus*, all from the Niobrara, Upper Cretaceous, of Kansas, were purchased from George F. Sternberg. A collection of Pleistocene mammals from Sarasota, Zolfo Springs, and Venice, Fla., was assembled by James W. Gidley. It also includes a partial skeleton of *Elephas* presented by the Venice Co.

The type of *Hypsognathus fenneri* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 73, art. 7, pp. 1-8, pls. 1-3, 1928) from the Triassic of New Jersey, was presented by Dr. C. N. Fenner. Bones of *Hesperornis* and *Ichthyornis* from the Niobrara, Upper Cretaceous, of Kansas, were presented by George F. Sternberg. A lower jaw, the type of *Martes kinseyi* (Gidley, J. W., Journ. Mamm., vol. 8, pp. 239-242, 1927) from the Miocene of Montana, was presented by C. A. Kinsey. Skulls of *Equus alaskae* from the Pleistocene of Alaska were transferred by the United States Geological Survey. A plaster cast of the lower jaw of *Trilophodon angustidens*, the original of which is in the Lyon Museum, France, was received in exchange with the American Museum of Natural History.

1928

A further collection of Pleistocene vertebrates from Melbourne and New Smyrna, Fla., was made by James W. Gidley. A nearly complete shell of *Trachemys sculpta* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 77, art. 10, pp. 1-8, pls. 1-3, 1930) was one of the specimens secured.

A skeleton of *Clidastes* from the Niobrara, Upper Cretaceous, of Kansas and a partial skeleton of *Parahippus* from the Miocene of Wyoming were purchased from George F. Sternberg.

A small collection of fossil footprints from the Hermit and Supai formations of the Grand Canyon, Ariz., was made by Charles W.

Gilmore (Gilmore, C. W., Smithsonian Misc. Coll., vol. 80, No. 8, pp. 7-10, 1928). Types of four species of extinct birds from the Oligocene of Colorado were deposited by the Colorado Museum of Natural History (Wetmore, A., Proc. Colorado Mus. Nat. Hist., vol 7, pp. 3-14, 1927). Type of *Pteranodon oregonensis* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 73, art. 24, pp. 1-5, 1928) from the Cretaceous of Oregon was presented by the Carnegie Institution of Washington.

1929

A collection of dinosaur remains, made for the Museum under the direction of Charles W. Gilmore from the Two Medicine formation of Montana, was the most important accession of the year. A considerable portion of the skeleton of an armored dinosaur, the type of *Palaeoscincus rugosidens*, the type of *Styracosaurus ovatus* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 77, art. 16, pp. 1-39, pls. 1-10, 1930), and a skull of *Dyoplosaurus* are specimens worthy of special mention.

The Florida series of Pleistocene mammals was augmented by a collection made by James W. Gidley. It included the type of a new bear, *Arctodus floridanus* (Gidley, J. W., Journ. Washington Acad. Sci., vol. 18, pp. 430-433, 1928).

A small collection of mammals, made by Dr. Harold T. Stearns from the Pleistocene and Pliocene of Idaho, was transmitted by the United States Geological Survey; a skull of a fossil cetothere from the Miocene of California was presented by Dr. A. F. Ousdal. Four elephant teeth illustrated by Prof. Henry F. Osborn from North Carolina presented by the American Museum of Natural History. Nine slabs of fossil tracks from the Triassic of the Connecticut Valley, Mass., were received in exchange with Amherst College.

1930

A collection of horse remains made by James W. Gidley for the museum from the Upper Pliocene near Hagerman, Idaho, was an important contribution. It included the type of *Plesippus shoshonensis* (Gidley, J. W., Journ. Mamm., vol. 11, pp. 300-303, 1930), many skulls and other skeletal parts, and also Pleistocene specimens from the vicinity of Twin Falls, Idaho.

A collection of reptilian specimens from the Kirtland formation, Upper Cretaceous of the San Juan Basin, New Mexico, was made for the Museum by a party under the direction of C. W. Gilmore. This included the articulated tail of the hadrosaurian reptile *Parasaurolophus tubicen* and 20 well-preserved turtle specimens, several

of them representing new species (Gilmore, C. W., Proc. U. S. Nat. Mus., vol., 83, pp. 159-188 pls. 13-18, 1935).

A group of eight articulated skeletons of *Meshippus bairdi* from the Oligocene of western Nebraska and a skeleton of a small marsupial (*Peratherium*) from the Florissant of Colorado (Gazin, C. L., Journ. Pal., vol. 9, pp. 57-62, 1935) were purchased from George F. Sternberg.

A collection of zeuglodont remains from the Jackson, Eocene, of Alabama, was made by Remington Kellogg and Norman H. Boss under the auspices of the Carnegie Institution. It included a beautifully preserved skull and lower jaws with much of the skeleton of a small zeuglodont *Zygorhiza kochii* (Kellogg, R., Carnegie Inst. Washington Publ. 482, pp. 101-176, 1936). The cetacean collection was further enriched by a nearly complete skull and lower jaws with much of the skeleton of a large whalebone whale collected from the Calvert, Miocene, near Governors Run, Md.; this specimen was discovered and presented by the Maryland Geological Survey. A partial skull of *Schizodelphis*, also from the Calvert of Maryland, was presented by William Jones.

Two fossil amphibian skeletons on slabs, *Pelosaurus* and *Branchiosaurus* from the Permian of Germany, were purchased. A complete shell of *Amyda virginiana* (Lynn, W. Gardner, Proc. U. S. Nat. Mus., vol. 76, art. 26, pp. 1-4, 1929) from the Cretaceous of Virginia, was deposited by the Geological Survey of Maryland.

1931

The most important accession of the year was a collection of 350 specimens made by a party from the Museum under the direction of Charles W. Gilmore from the Bridger, Eocene, of Wyoming. Outstanding specimens in the collection were: A nearly complete articulated skeleton of *Hyrachyus eximius* and a skeleton of *Heleletes nanus* (both now mounted and on exhibition), two partial skeletons of *Palaeosyops*, a skeleton of *Crocodylus*, and 38 well-preserved turtle specimens representing no less than eight genera.

A second collection of the Pliocene horse *Plesippus shoshonensis*, from near Hagerman, Idaho, was made by a party working under the direction of J. W. Gidley. Many skulls and parts of skeletons, all in excellent preservation, were secured. Accessory material was later added to the collection by the work of Elmer Cook, who carried on independent collecting in these same deposits for the Museum.

The type skull of *Troödon wyomingensis* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 79, art 9, pp. 1-6, 1931) from the Lance, Upper Cretaceous, of Wyoming, and well-preserved skulls of *Ichthyodectes* and *Protosphyraena* from the Niobrara chalk of Kansas, where pur-

chased from George F. Sternberg. A slab of Triassic footprints from Loudoun County, Va., was presented by Frank C. Littleton. Fossil bird bones from the Wasatch Eocene of Wyoming were presented by Dr. E. L. Troxell; a skull of *Eurhinodelphis* from the Calvert formation of Chesapeake Bay, Md., was presented by Arlton Murray.

1932

A collection principally of mammal remains was made by a party under the direction of Charles W. Gilmore in the Wasatch, Eocene, of the Big Horn Basin, Wyo.; and in the Miocene and Oligocene of western Montana. In addition to a large number of skulls, jaws, and other parts of skeletons, specimens worthy of especial mention are a considerable part of the skeleton of the large creodont *Pachyaena gigantea*, three partial skeletons of *Coryphodon*, a skull and lower jaws of the rare *Ectoganus gliriformis* (Gazin, C. L., Proc. Amer. Philos. Soc., vol. 76, pp. 597-612, 1936), an articulated skeleton of one of the larger merycoidodonts, and a skull and parts of the skeleton of *Dromomeryx*, the two last mentioned from the Miocene of Montana.

A valuable addition to the collection of *Plesippus shoshonensis* remains from Hagerman, Idaho, was made by a field party working under the direction of Norman H. Boss. Four articulated skeletons, 32 skulls, 48 jaws, and a vast quantity of bones representing all parts of the skeleton were secured. This collection also contained the type of the fossil goose *Chen pressa* (Wetmore, Alexander, Smithsonian Misc. Coll., vol. 87, No. 20, p. 9, 1933).

A small collection of 60 specimens consisting principally of mammalian skulls from the Oligocene near Douglass, Wyo., was purchased from George F. Sternberg.

Through gifts from W. W. Holmes, of St. Petersburg, and J. E. Moore, of Sarasota, Fla., the avian collections were increased by many specimens from the Pleistocene of that State. A skull of *Hipparion minus* from the Miocene of Samos, Greece, was purchased.

1933

The most important accession was a collection from the Oligocene of Nebraska, South Dakota, and Wyoming, made by a field party under the direction of Charles W. Gilmore during the summer of 1932. Specimens worthy of special mention were the type of an extinct eagle, *Palaeoplancus sternbergi* (Wetmore, A., Smithsonian Misc. Coll., vol. 87, No. 19, pp. 1-9, 1933); two articulated skeletons of *Meshippus bairdii*; articulated skeletons of *Merycoidodon*; skeleton of *Leptomeryx* and a skull and partial skeleton of *Eusmilus sicarius* (Jepsen, Glenn L., Proc. Amer. Philos. Soc., vol. 72, pp.

360-362, 1933); 120 skulls, many partial skeletons, and articulated limbs and feet, all representing more than 20 genera of fossil vertebrates.

A mountable skeleton of *Moropus elatus* from the Miocene of Nebraska and a mounted skeleton of *Gorgosaurus libratus* (Matthew, W. D., Amer. Mus. Nov., No. 89, fig. 1, 1923) from the Belly River, Upper Cretaceous, of Canada, were received through exchange with the American Museum of Natural History. Neither of these genera was previously represented in the collections. A composite skeleton of *Equus occidentalis* from the Rancho La Brea Pleistocene asphalt deposits of California was received in exchange with the Los Angeles Museum of History, Science and Art; a composite skeleton of the Oligocene rhinoceros *Trigonias osborni* from Weld County, Colo., was received in exchange with the Colorado Museum of Natural History. Two duck-billed dinosaur skulls, *Edmontosaurus regalis* (Parks, W. A., Univ. Toronto Studies No. 37, p. 6, pl. 2, fig. 1, 1935) and *Prosaurolophus maximus*, from the Upper Cretaceous of Alberta, Canada, were received in exchange with the Royal Ontario Museum of Paleontology.

Four skulls, limb, and foot bones of *Lystrosaurus* and *Dicynodon* from the Triassic of South Africa were received in exchange with the National Museum of South Africa.

A beautifully preserved skull of *Equus alaskae* from the Pleistocene of Alaska was collected for the Museum by James A. Ford. An articulated frog skeleton from the Miocene of Nevada was presented by R. M. Catlin. The skull of a large Miocene whale from California was presented by Dr. A. P. Ousdal.

A mounted skeleton of *Ichthyodectes hamatus* and a skeleton of *Platecarpus*, both from the Niobrara, Upper Cretaceous, were purchased from George F. Sternberg.

1934

A skull and mandible of *Equus andium* from the Pleistocene of South America and a skull, lower jaw, and vertebrae of *Nesodon imbricatus* from the Tertiary of South America were received in exchange with the Field Museum of Natural History. A skull and other bones of *Oxydactylus gibbi* from the Miocene of Nebraska were received in exchange with Amherst College. A small collection of Oligocene mammals from Wyoming was presented by the University of Wyoming.

The collection of marine mammals was enriched by the addition of several cetacean skulls from the Calvert, Miocene, of Maryland, collected by R. Kellogg, C. L. Gazin, and Raymond Gilmore. Perez Simmons presented a series of teeth of *Desmostylus* from the Miocene of California.

To the collections of fossil birds were added a partial skeleton of *Hesperornis* from the Upper Cretaceous of Kansas purchased from George F. Sternberg; limb bones of *Eogrus aeola* from the Eocene of Mongolia received as a gift from the American Museum of Natural History; and representative parts of the skeleton of *Bathornis celeripes* from the Oligocene of Wyoming, a gift from the Museum of Comparative Zoology.

1935

The most important accession of this year was a collection of mammalian fossils from the Pliocene, near Hagerman, Idaho, made by a field party under the direction of the assistant curator, Dr. C. L. Gazin. Remains of *Plesippus shoshonensis* formed the bulk of the collection, there being 65 skulls, a number of partially articulated skeletons, besides a vast number of bones of all parts of the skeleton (Gazin, C. L., Proc. U. S. Nat. Mus., vol. 83, pp. 281-320, 1936). Other specimens worthy of mention were three articulated skeletons of the peccary; *Platygonus pearcei*, a new species (Gazin, C. L., Journ. Washington Acad. Sci., vol. 28, pp. 41-49, 1938); a skull of *Stegomastodon*; the type of *Ceratomeryx prenticei* (Gazin, C. L., Journ. Pal., vol. 9, pp. 390-393, 1935); skulls and skeletal parts of beavers, otters, several birds, and many specimens of the microfauna.

An excellent articulated skeleton of *Camarasaurus*, representing an animal 30 feet in length from the Jurassic of the Dinosaur National Monument, Utah, was received in exchange with the Carnegie Museum.

The type specimen of *Palaeophis virginianus* (Lynn, W. G., Johns Hopkins Univ. Stud. in Geol., No. 11, pp. 245-49, 1934) from the Eocene of Virginia was presented by Dr. W. G. Lynn. Two fossil cetacean skulls from the Miocene of California were presented by T. V. Little and C. A. Pratt. A fine skull and lower jaws of *Archaeotherium* from the Oligocene of Nebraska was presented by Edward S. Tyler.

Five model restorations illustrating the evolution and development of the horse in North America were presented by Mrs. J. W. Gidley. This gift has a special significance since these were modeled by the late Dr. James W. Gidley, for many years connected with this division.

1936

The most important acquisition this year was a collection made by a party operating in Montana and Wyoming, under the direction of the curator, Charles W. Gilmore. Additional materials greatly augmented the collection from the Two Medicine, Upper Cretaceous.

Two articulated caudal series and other bones of *Procheniosaurus*; two incomplete specimens of *Leptoceratops*; and an incomplete but adult skull of *Brachyceratops* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 87, pp. 1-18, 1939), including skeletal parts, are worthy of special mention. Besides collecting the usual run of mamalian specimens from the Wasatch of the Big Horn Basin, this party secured a complete articulated skeleton of *Coryphodon*.

A complete articulated skeleton of *Scarrittia canquelensis* from the Tertiary of Argentina was purchased from the American Museum of Natural History. A skull and lower jaws of a large phyto-saurian reptile from the Triassic of Arizona presented by Merl V. Walker. A skeleton of *Scelidodon capellina* from South America was received in exchange with the Field Museum of Natural History. A skull of *Glyptosaurus giganteus* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 86, pp. 16-21, fig. 5, 1938) from the Oligocene of Wyoming was purchased from George F. Sternberg. The type of *Sula avita* from the Miocene of Chesapeake Bay, Md. (Wetmore, A., Proc. U. S. Nat. Mus., vol. 85, pp. 22-24, 1938); the type of *Peritresius virginianus* from the Miocene of Virginia (Berry, C. T., and Lynn, W. G., Proc. Amer. Philos. Soc., vol. 76, No. 2, pp. 183-187, 1936); the type of *Pelycorhamphus pertortus* from the Miocene of Maryland? (Cope, E. D., Proc. Amer. Philos. Soc., vol. 34, p. 137, 1895); the type of *Prepotherium venezuelanum* (Collins, R. L., Johns Hopkins Univ. Stud. in Geol., No. 11, pp. 235-244, 1934) from Venezuela, South America, were all deposited by Johns Hopkins University.

A small collection of fossil fishes from the Devonian of Colorado was transferred by the United States Geological Survey. Another small collection of primitive Downtonian fishes from Spitsbergen was received as a gift from the Paleontologisk Museum, Oslo, Norway.

1937

The chief accession of this year was a collection of mammalian fossils made by the Smithsonian field party under the direction of Dr. C. Lewis Gazin in Arizona and New Mexico. About 600 identifiable specimens were collected from the Puerco, Torrejon, Wasatch, and Pliocene.

A composite skeleton of the giant ground sloth *Paramylodon harlani* from the Rancho La Brea Pleistocene, California, was received in exchange with the Los Angeles Museum of Natural History, Science and Art.

A mounted skeleton of *Merycodus necatus* from the Miocene of Montana was purchased from Phil C. Orr.

A musk-ox skull (*Symbos cavifrons*) from the Pleistocene of Indiana and a nearly perfect carapace and plastron of the turtle *Aspideretes superstei* from the Paskapoo of Alberta, Canada, were purchased. A plaster cast of the snake *Boavus idelmania* from the Eocene of Wyoming was received in exchange with the American Museum of Natural History. A plaster cast of a skeleton of *Eohippus* from the Big Horn Basin, Wyo., was presented by Dr. E. R. Troxell. Two perfectly preserved eggs of the extinct ostrich *Struthio andersoni* from the loess of China were purchased.

1938

Specimens resulting from a field expedition to central Utah and northern Arizona, under Charles W. Gilmore, benefited both the mammalian and reptilian collections. Those worthy of special mention were a partial skeleton of the large sauropod dinosaur *Alamosaurus sanjuanensis*; disarticulated skull and skeletal parts of a horned dinosaur; skeletal parts of six individuals of the extinct lizard *Polyglyphanodon sternbergi* (Gilmore, Charles W., Smithsonian Misc. Coll., vol. 99, No. 16, pp. 1-3, 1940) all from the North Horn formation, Upper Cretaceous; 15 mammalian specimens from the Dragon formation, Paleocene (Gazin, C. L., Journ. Washington Acad. Sci., vol. 28, pp. 271-277, 1938). From the Triassic of Arizona this same expedition collected three phytosaurian skulls and a skull of the amphibian *Buettneria*.

Through participation in the Dallas Exposition important specimens and illustrative materials were received as gifts from the United States Texas Centennial Commission. The more important of these were a skeleton of the Eocene flightless bird *Diatryma*; a unique specimen of *Glyptosaurus giganteus*, having the dermal armor of the skull and neck preserved *in situ* (Gilmore, C. W., Proc. U. S. Nat. Mus., vol. 86, pp. 16-21, pl. 1, 1938); a nearly complete articulated tail of *Camarasaurus*; and the articulated pelvis, hind limbs, feet, and tail with large patches of skin impressions of a crested hadrosaurian dinosaur (*Corythosaurus*) from the Upper Cretaceous of Alberta, Canada. From this source also was a diorama, illustrating the fauna and flora of the Jurassic, and two canvases (8 by 15 feet), one a restoration of the sauropod dinosaur *Camarasaurus* by R. Bruce Horsfall, the other a restoration of *Dimetrodon* and other Permian animals by Garnet W. Jex.

A skull of *Merycoidodon gracilis* (Leidy, J., Smithsonian Contr. Knowl., vol. 6, p. 54, pl. 5; figs. 3-4, and pl. 6, figs. 6-7, 1853), of much historical interest since it originally belonged to the Evans collection, was received in exchange with Columbia University.

The type of *Tomarctus marylandica* from the Miocene of Maryland was presented by C. T. Berry (Berry, C. T., Proc. U. S. Nat. Mus., vol. 85, pp. 159-161, 1938). A tarsometatarsus of *Nesotrochis debooyi*, an extinct bird from Puerto Rico, was received as a gift from the Peabody Museum of Natural History. Three slabs of dinosaurian footprints from the Triassic of Pennsylvania were presented by the Highway Engineering and Construction Co.

1939

Specimens resulting from the field expedition to the Paleocene (Dragon) and Upper Cretaceous (North Horn) of central Utah and collections from the Uinta of the Uinta Basin, under the direction of C. Lewis Gazin, constituted the outstanding accession of this year. The Paleocene fauna was increased by a considerable number of new forms (Gazin, C. L., Journ. Washington Acad. Sci., vol. 29, pp. 273-286, 1939). Specimens worthy of special mention are a nearly complete articulated skeleton of the extinct lizard *Polyglyphanodon*; two well-preserved crocodile skulls; a complete skull of *Baena inflata*. The Uinta collection formed the bulk of the collection consisting of the usual run of skulls, jaws, and parts of skeletons.

An unusually well-preserved skull and lower jaw of *Trigonias* was received in exchange with the Colorado Museum of Natural History; a collection of mammalian specimens from the Pliocene of Pikermi, Greece, was received in exchange with the British Museum of Natural History; a skull and other bones of *Buettneria* was received in exchange with the Museum of Comparative Zoology.

Two incomplete cetacean skulls from the Miocene of Maryland were presented by Arlton Murray; and a partial skeleton of *Tursiops* from the Pleistocene of Maryland presented by Dr. S. F. Blake. A nearly complete type skull of *Felichthys* (Lynn, W. G., and Melland, A. M., Journ. Washington Acad. Sci., vol. 29, pp. 14-20, figs. 1-3, 1939) from the Miocene of Calvert County, Md., and 25 dental plates of *Phyllodus* from the Eocene of Virginia were presented by Dr. W. Gardner Lynn. A slab of fossil bird tracks was presented by V. H. Housholder.

1940

The most important accession of the year was a collection of 25 lizard specimens, all original types as follows: *Chamops segnisi* Marsh, *C. denticulatus* Gilmore, *Glyptosaurus anceps* Marsh, *G. brevidens* Marsh, *G. nodosus* Marsh, *G. ocellatus* Marsh, *G. princeps* Marsh, *G. rugosus* Marsh, *G. sphenodon* Marsh, *G. sylvestris* Marsh, *Iguanavus exilis* Marsh, *I. teres* Marsh, *Thinosaurus agilis* Marsh, *T. crassus* Marsh, *T. grandis* Marsh, *T. leptodus* Marsh, *T. paucidens* Marsh,

Tinosaurus lepidus Marsh, *T. stenodon* Marsh, *Oreosaurus gracilis* Marsh, *O. lentus* Marsh, *O. microdus* Marsh, *O. minutus* Marsh, *O. vagans* Marsh, *Cteniogenys antiquus* Gilmore, received in exchange with the Peabody Museum of Natural History. This addition makes the United States National Museum preeminent in North American fossil Sauria. Of the 69 described species, 54 of the original types are now in the national collections.

The fossil materials resulting from the field expedition to central Utah contributed important specimens to both the mammalian and reptilian collections. They include additional specimens of Paleocene mammals with several forms new to the fauna; considerable portions of two skulls and other ceratopsian materials; and 22 lizard specimens (*Polyglyphanodon*), 8 of which are good portions of articulated skeletons.

A collection of 123 fossil fish specimens was received by transfer from the War Department. Noteworthy were many fine examples from the Solenhofen deposits of Bavaria.

Through exchange with the University of Kansas there came a composite skeleton of the Pliocene amphibian *Plioambystoma kansensis*; and with the Peabody Museum of Natural History a mounted skeleton of *Stenomylus hitchcocki*, skull and lower jaws of *Platygonus compressus*, and a skull of *Nimravus*.

The cetacean part of the collection was enriched by a cetothere and *Eurhinodelphis* skulls presented by Drs. R. Kellogg and W. F. Foshag; a vertebral series of *Priscodelphinus* presented by Dr. A. R. Barwick; and a cetacean skull presented by Arlton Murray, all from the Calvert formation of Maryland.

The type of *Delphinus calvertensis* (Harlan, Richard, Proc. Nat. Inst., vol. 2, pp. 195-196, 1842) originally belonging to the National Institute but lent to Prof. Louis Agassiz prior to 1852, was returned to the National Museum collections by the Museum of Comparative Zoology.

The types of *Paralbula marylandica* and *P. dorisiae* (Blake, S. F., Journ. Washington Acad. Sci., vol. 30, pp. 206-209, 1940) were presented by S. F. Blake; the type of *Anomoedus latidens marylandicus* (Berry, C. T., Amer. Midl. Nat., vol. 22, p. 746, 1939) from the Cretaceous of Maryland, was presented by Dr. Charles T. Berry.