

Mr. Townsend exhibited a living specimen of the common mouse, (*Mus musculus*) which possessed the remarkable peculiarity of uttering notes resembling those of a singing bird. The notes were uttered in very rapid succession, and although weak, could be readily distinguished at the distance of several yards. The animal was recently taken in an ordinary trap, by a lady residing in the Northern Liberties.

Dr. Warrington, of England, exhibited and explained the modus operandi of an instrument of his own invention, which he called *Spirometer*, the object of which he stated to be, to test the capacity of the lungs in health and disease. "The amount of cubic inches of air the lungs are capable of expelling, being always in proportion to the height of the individual, and a scale attached to the instrument indicating with accuracy any diminished capacity, a standard of health and disease could be thus readily fixed, and the disorganization or contraction of the organ early detected."

Meeting for Business, Sept. 28, 1847.

MR. PHILLIPS in the Chair.

The Committee to whom was referred the following paper, by Dr. Leidy, reported in favor of publication in the Proceedings.

On the Fossil Horse of America.

BY JOSEPH LEIDY, M. D.

The fact of the existence of fossil remains of the horse in America has been generally received with a good deal of incredulity, arising, perhaps, from the mere fact being stated of their having been found, often without even mentioning the associate fossils, and in all cases, previous to Mr. Owen,* without describing the specimen. At present their existence being fully confirmed, it is probably as much a wonder to naturalists as was the first sight of

* Zoology of the Voyage of the Beagle, part 1. By R. Owen, Esq. London, 1840.

the horses of the Spaniards to the aboriginal inhabitants of the country, for it is very remarkable that the genus *Equus* should have so entirely passed away from the vast pastures of the western world, in after ages to be replaced by a foreign species to which the country has proved so well adapted; and it is impossible, in the present state of our knowledge, to conceive what could have been the circumstances which have been so universally destructive to the genus upon one continent, and so partial in its influence upon the other.

The remains are by no means unfrequent, and according to William Cooper, the author of a paper entitled "Notices of Big-Bone Lick," in Featherstonhaugh's "Journal of Geology,"* the first printed notice of them occurs in Mitchell's "Catalogue of Organic Remains,"† upon referring to which, I find mentioned pp. 7, 8, that a cervical vertebra and teeth of the horse were found associated with the *Mastodon*, &c., in a tract extending from the base of the Neversink Hills to Bordentown, New Jersey. The author of "Notices, &c." also mentions the remains of the horse being found at Big-Bone Lick, but speaks doubtfully as to the authenticity of such remains having been found in a fossil state in this country, and says, p. 208, "I saw nothing in support of it myself, nor have I met with any person who could answer for such a fact from his own careful observation."

Dr. Harlan‡ mentions the sparing existence of fossil remains of the horse, which, from the heading of his chapter, he has referred to the same species as the existing *Equus caballus*.

The most satisfactory account, however, with which I am acquainted, is given by Mr. Owen in the *Zoology of the Voyage of the Beagle*, Part 1, Fossil Mammalia, p. 109, and is derived from two teeth obtained by Mr. Darwin in South America. One of them, a superior molar, was far decomposed, and Mr. Owen observes, "every point of comparison that could be established, proved it to differ from the tooth of the common *Equus caballus* only in a slight inferiority of size." The other a superior left molar, was found with the *Mastodon*, &c., in the province of Entre Rios, and is figured (Pl. xxxii. figs. 13 and 14,) in the work. One of the figures represents an antero-lateral view of the tooth, and is rather smaller in size, and is much more curved than in the corresponding tooth of the recent *E. caballus*. The other figure represents the crown of the tooth and indicates the diameters to be somewhat less. From what Mr. Owen remarks in the "British Fossil Mammalia,"§ this is a species which he proved to be distinct from all European fossil and existing species, and from the greater degree of curvature of the upper molars|| he has designated it under the name of *Equus curvidens*. In the cabinet of the Academy there are a number of specimens of American fossil horse teeth, which I refer to two distinct and well marked species.

The first of these I consider as identical with the *Equus curvidens*, of which

*Philada., 1831, vol. 1, p. 208.

†New York, 1826.

‡Med. and Phys. Researches, Philada., 1835, p. 267.

§London, 1846, p. 398.

||Odontography. By R. Owen, Esq., London, 1840-45, vol. 1, p. 575.

there are ten specimens of permanent molars, one a superior posterior molar of the left side, and five inferior molars of the right side, and four of the left side. These were all obtained from that celebrated fossil bone deposit, Big-Bone Lick, Kentucky, where they were associated with the *Megalonyx*, *Mastodon*, &c., and are a part of a donation to the Academy by Mr. J. P. Wetherill. The external cementum is almost entirely removed, and the color, which is brown in the inferior molars, a bluish black in the superior molars, corresponds with that of their fossil associates. They are very little inferior in size, both in length and diameter, to the corresponding teeth of the recent *E. caballus*. The lateral diameter of the inferior molars hardly varies at all, the difference existing in the transverse diameter, which gives to the teeth a rather more compressed appearance. The superior posterior molar tooth in all species of *Equus* is much curved, so that but little difference is observable in this respect in the fossil specimen. The bodies of the inferior molars are considerably more curved laterally than is usual in the corresponding teeth of the recent horse, which fact, however, was not to be expected from the greater degree of curvature in the superior molars.

The enamel folds generally are more delicate, but I do not find sufficient peculiarity in their course to render them characteristic. On comparing the crowns of these fossil molar teeth, with the recent species, I find a remarkable degree of resemblance to exist, and in fact, greater differences may be found in this respect, in different individuals of the existing species. The posterior part of the enamel folding of the posterior tooth is rather narrower, and has a deeper groove upon the outer side than I have seen in the recent tooth. The superior molars lead to more positive results than the inferior, yet it is necessary to be very careful, for if we do perceive more differences in these particular teeth in different species, than exists in the inferior teeth, so also do we find a greater variation among them in different individuals of the same species. This variation in the same species is very striking in the case of the posterior tooth of the recent horse, as may be seen by comparing any number of specimens. In this particular tooth in the recent horse, there is always a disposition to the formation of a third isolated enamel fold, always small and posterior to the others. Sometimes it appears as if the disposition existed, but for want of room in the process of development of the tooth, the ordinary posterior, isolated enamel fold becomes united by an isthmus to the peripheral fold. In the fossil tooth no disposition of the kind has existed, so that it has more the appearance of the other molars, and indicates a less amount of room for development, and consequently a smaller jaw.

From the foregoing description it will be perceived that I have fixed upon no absolute characters for determining this species with any degree of accuracy, and that this is not possible, I may state upon the authority of Cuvier, who acknowledged his incompetency to find characters, "assez fixes," to pronounce upon any species of horse, examined by him, from an isolated bone,* and it is therefore only from their being fossil American teeth coinciding with the *E.*

*Cuvier, *Ossemens Fossiles*, 4 Ed. T. 3, p. 216.

curvidens as described by Mr. Owen, more than with any other species, so far as I am capable of judging, which has made me refer them to that species.

The second species is founded upon twelve specimens of teeth which have been deposited in the cabinet of the Academy by our enterprising fellow-member, Dr. M. W. Dickeson, and is one only of the many important results of his palæontological researches in the southwestern part of the United States. Ten of these interesting relics, consisting of five superior and five inferior molars, Dr. Dickeson states,* were obtained, together with remains of the *Megalonyx*, *Ursus*, the *os hominis innominatum fossile*, &c., in the vicinity of Natchez, Mississippi, from a stratum of tenacious blue clay underlying a diluvial deposit. The remaining two, both right superior posterior molars, are rolled or water-worn, and were found, as Dr. D. informs me, upon one of the Natchez Islands, in the Mississippi River. All the specimens have the exterior cementum entirely removed, with the exception of one inferior molar of the right side, in which it still exists upon the external face, and much of the inferior cementum, and part even of the dentine, is also destroyed, so that the enamel folds everywhere stand out in strong relief.

These teeth are larger than those of any species heretofore known, recent or fossil, and must have belonged to a horse, which, in point of magnitude, was a fit cotemporary for the *Mastodon*, *Elephas*, &c., and worthy of the large continent which produced it, and I have therefore named it *Equus Americanus*.

Two of the inferior molar teeth measure 4.3 inches in length, with a lateral diameter of 1.25 of an inch, and a transverse diameter of .7 of an inch. Two also, of the superior molars, measure 3.9 inches in length externally with a lateral diameter of 1.2 of an inch, and a transverse diameter of 1.1 of an inch. The inferior molars are curved from without inwards, instead of laterally, as is usual. The superior molars are curved to a degree intermediate to that of the *Equus caballus* and *Equus curvidens*.

The enamel folds are one-fourth thicker than in the recent horse and the isolated enamel folds of the superior molars are much more plicated, resembling in this respect the *Equus plicidens*, Owen. In one of the two superior posterior molars, there is an additional or third isolated enamel fold, which is oval, and two or three times larger than in the recent horse, and in the other there is a fourth, small, round, isolated enamel fold. Both of these teeth indicate a greater amount of room for development, and consequently a larger jaw. Other and considerable differences will be noticed upon comparing the figures 2 and 3, representing the crowns of these teeth, especially at the posterior part, which might lead to the supposition that they belonged to distinct species, but from the general characters of the two specimens, added to reasons before stated, relative to the amount of variation existing in the corresponding tooth of the recent horse, I cannot but think they both belong to *Equus Americanus*.

*Proc. Acad. Nat. Sci., vol. 3, p. 106.

There is in the cabinet but one remaining tooth, to which I shall refer. This is an inferior middle molar of the left side, in an excellent state of preservation, and is a beautiful specimen; the whole of the exterior cementum being preserved without a fissure, apparently through the agency of oxide of iron and siliceous matter, which have rendered it as hard as the dentine itself. It was found with the bones of the *Mastodon*, *Megatherium*, *Harlanus*, &c.; in making the excavation for the Brunswick Canal, near Darien, Georgia, and was kindly presented to the Academy by Mr. J. H. Couper.

It is straight, and although not longer than the corresponding tooth of the recent horse, with a very little increase in the diameters, character enough cannot be found in it to consider it distinct from the *Equus Americanus*.

References to the Figures.

Figs. 1 and 6, and 4 and 5, were taken from the same specimens.

Fig. 1. Crown of a superior middle molar of the left side; antero-posterior measurement 1.2 in., transverse 1.1 in.

Fig. 2. Crown of the superior posterior molar of the right side; antero-posterior measurement 1.3 in., transverse 1.9 in.

Fig. 3. Do. from another specimen.

Fig. 4. Crown of an inferior middle molar of the right side; antero-posterior measurement 1.25 in., transverse .7 in.

Fig. 5. Internal view of an inferior middle molar of the left side; greatest length 4.15 in.; depth of its curve .15 in.

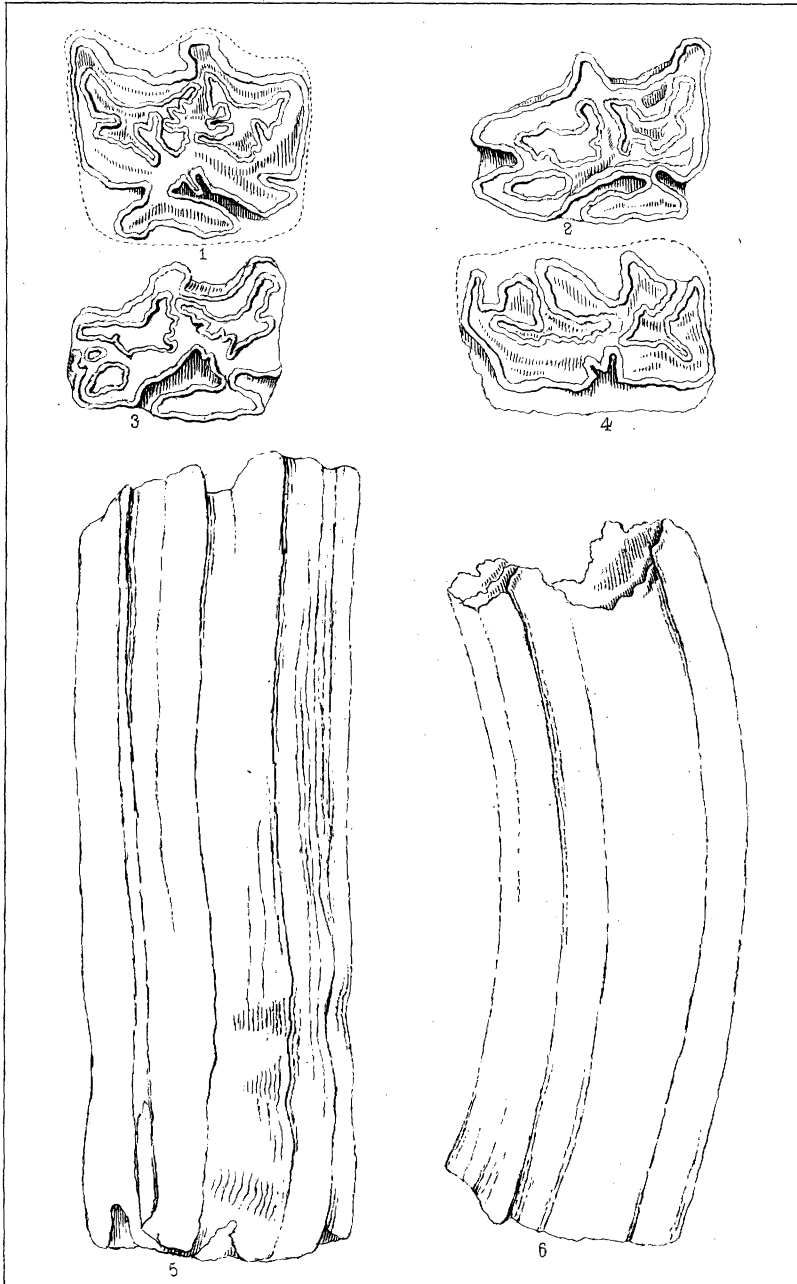
Fig. 6. Antero-lateral view of a superior middle molar of the left side; greatest length 3.9 in.; depth of curve .3 in.

The Committee on the following communication, by Dr. Gibbes, of South Carolina, reported in favour of publication in the Proceedings.

Description of new species of Squalides from the Tertiary Beds of South Carolina.

BY ROBERT W. GIBBES, M. D., Columbia, S. C.

1. *CARCHARODON Mortoni*.—I have only two specimens from the *Eocene*, both broken. That, of which a cast is in the collection of the Academy, was probably four inches deep, and three inches across the roots; the upper third is wanting. It is somewhat inequilateral—the anterior edge sloped inwards, and the posterior arched—both the outer and inner surfaces are convex and prominent, the latter trebly so. The enamel is thin but strong—cracked in striæ parallel to the edges, and as in most other species converging and disappearing towards the apex:—it is sloped on the inner face. The cutting edges are finely indented, the dentelures (if I may be allowed to adopt an expressive word from the French) are very small, and more minute near the base of the enamel. Next the edges on both faces is a longitudinal flattening, giving the appearance of undulations. The root is immensely thick, an inch and a half, and constitutes more than half of the bulk of the tooth. The root is concave, but the extremities being broken, the form cannot be



Bowen & Co. Lith. Philada.

Equus Americanus.

given; the structure of the dentine is not as compact as in *C. megalodon*. A partial description of this fine species was given in a previous paper published in the Proceedings of the Academy, when I named it after the distinguished pioneer of Tertiary Geology in the United States, Dr. Samuel Geo. Morton.

2. *CARCHARODON acutidens*.—This beautiful species resembles *C. angustidens*, Agassiz, but is very acutely pointed. Of four specimens which are in my cabinet, the largest cone measures three inches, and it is more than three times the depth of the root, which is concave, very thick and prominent on the inner face. The body of the tooth, or enamelled portion is conical, the lower third swollen, widest next the lateral denticles which are distinct from it. The inner face is arched, while the outer is nearly flat, though undulated by depression next the edges, and having a deep furrow longitudinally in the middle near the base of the enamel, which extends to the root. This does not extend as low on the inner face, and is sloped, leaving an interspace next the root. The cutting edges are sharp and finely indented, the serratures very close. Most of the specimens are straight, but I have two which are oblique. There are examples of this species in the Cabinet of the Academy.

3. *CARCHARODON lanciformis*.—Very flat, acutely pointed, triangular, nearly equilateral, the posterior edge slightly sloped, while the anterior is straight. The root is not much thicker than the base of the cone, very concave, the rami not symmetrical, one being much longer than the other; in the small lateral teeth this, however, is scarcely perceptible. The edges are sharp and finely indented; the inner face elevated; the outer plane, in some specimens concave. Viewed laterally, some are much bowed or arched forward. In the middle of the outer face near the base of the enamel, is a longitudinal depression, the sides of which are elevated and unite above the horizontal middle line, and form a ridge to the apex. It has lateral appendages, which are not distinct from the principal cone. The enamel extends lower on the outer face than on the inner.

I have a series of specimens from the Eocene beds of Ashley and Cooper rivers, S. C.

4. *OXYRHINA Desorii*.—Prof. Agassiz described under this name specimens which subsequent experience induces him to consider identical with *Lamna cuspidata*, with which he had noticed a resemblance.

I take pleasure in restoring the name of the distinguished M. Desor, the friend and co-laborer of M. Agassiz, in this department of science, to a fine species in my cabinet.

It is very massive—thicker than any other of this genus—in this respect resembling *Oxyr. crassa*, but not so broad. Viewed *en profil*, the form is similar to *Lamna Hopei*, much curved inwardly, except near the apex, which is flat. The edges are cutting in their whole extent, the base of the enamel arched, and nearly equal on both faces, the root very thick, compact and

heavy. I have six specimens from the *Miocene*, and three from the *Eocene* of South Carolina.

5. *OXYRHINA Sillimani*.—Among twelve specimens from the *Eocene*, there is much uniformity in this species. The cone is straight or very slightly bowed on the inner surface, equilateral, acutely pointed, both surfaces convex, the inner much more so. A peculiarity exists in the great breadth of the enamel at the base, which is similar on both aspects. The root is thick, and forms one-third of the height of the tooth.

I attach to it the name of Prof. B. Silliman, the veteran co-laborer in American Science.

6. *Otodus levis*.—This has very much the form of *Lamna cuspidata*, but the position, form and size of the lateral winglets mark it as a true *Otodus*. It is more slender than any other of this genus, lanciform, equilateral, straight, convex on the inner face, and undulated on the outer from a triangular depression near the base extending longitudinally nearly to the apex. The lateral cones are broad and thick, and detached from the base of the enamel which extends lower on the outer face than on the inner. I have a single specimen from the *Eocene*, S. C.

7. *GLYPHIS subulata*.—The cone is shorter and thicker proportionally than in *G. hastalis*, Agassiz, and is more straight, convex on both surfaces, more so on the inner; the upper third of the outer face is flat, and the point has a tendency outward. A sharp lateral edge extends from the apex equally on both sides two-thirds of the length of the cone, and is uniformly indented. The root is thick, the enamel extends lower on the outer face and to the root on both. In one specimen the root is very broad, and the enamelled base equally so.

I have only two specimens from the *Eocene*, S. C.

I have in preparation full descriptions of all the genera and species of Squalides from the Tertiary of South Carolina, which will be published with figures in a future number of the Journal of the Academy. I have in my collection eight genera and thirty-nine species. I have had the privilege and pleasure of submitting them to the inspection of our distinguished visitor, Prof. Agassiz, who has kindly and liberally given me much information as to their character and arrangement, the result of his extensive experience.

A communication was read from Mr. Moss, dated Sept. 28th, 1847, tendering his resignation as Recording Secretary, in consequence of his removal from the city; which was accepted, and the following resolution unanimously adopted:

Resolved, That the Academy receives with regret the resignation of Mr. Theodore F. Moss, as Recording Secretary, and

tenders him its thanks for the zeal and fidelity with which he has performed the duties of the office during his incumbency.

On motion, also *Resolved*, That at the next meeting for business, the Society proceed to the election of a Recording Secretary.

ELECTION.

M. Carey Lea, Moses H. Emery, Benjamin J. Kern, M. D., and F. W. Sargent, M. D., of Philadelphia, were elected *Members*; and Jacob Sturm, Esq., of Nüremberg, was elected a *Correspondent*.

Stated Meeting, October 5, 1847.

Vice President MORTON in the Chair.

DONATIONS TO MUSEUM.

Ocyroda Urvillii, from the Pacific Coast. From Dr. Joseph Wilson, U. S. Navy.

Transverse section of a fossil tree, 18 inches diameter, from Athens, Ohio, and numerous specimens, in spirits, of reptiles, from the south-western part of the United States. From Dr. S. P. Hildreth.

Fossil coniferous wood and bark. From Professor Johnson. A number of American Reptiles. From Dr. George Spackman.

Platycarcinus ———? from Tampa Bay, Florida. From Mr. T. A. Conrad.

Apus longicaudatus; from the Rocky Mountains. From Dr. J. L. Le Conte.

DONATIONS TO LIBRARY.

Transactions of the Botanical Society of Edinburgh. Vol. 2, parts 1, 2 and 3. Edinburgh, 1845—46. From Dr. Balfour, of Glasgow, through Dr. Watson.