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# JOURNAL

OF

## THE ACADEMY OF NATURAL SCIENCES

OF

### NOTICE.

The publication of this Journal having been unavoidably suspended for several years, it is now resumed in a **NEW SERIES**.

The work will be continued hereafter semi-annually, so that two parts will appear each year, or four in two years, which will form a volume.

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PHILADELPHIA:

PRINTED FOR THE ACADEMY,

BY MERRIHEW & THOMPSON, NO. 7 CARTER'S ALLEY.

1847—1850.









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**THE ACADEMY OF NATURAL SCIENCES**

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**VOL. I. SECOND SERIES.**

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*Extracts from Chap. IX. of the By-Laws of the Academy in regard to the publication of the Journal.*

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JOURNAL  
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OF PHILADELPHIA.

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ART. I. — *On the Fossil genus Basilosaurus, Harlan, (Zeuglodon, Owen,) with a notice of Specimens from the Eocene Green Sand of South Carolina.* By ROBERT W. GIBBES, M. D., of Columbia, South Carolina, Correspondent of the Academy of Natural Sciences of Philadelphia; of the New York Historical Society, &c.

Among the interesting discoveries of modern Geology, none have excited more notice than the relics of immense Sauria and Cetacea.

In 1832, Dr. Harlan described a gigantic vertebra, weighing forty-four pounds, sent to him by Judge Bry from the banks of the Wachita river, which he referred to a new genus of the class ENALIOSAURI, of Coneybeare, and proposed for it, from its analogies and gigantic size, the name of *Basilosaurus*.\* He subsequently procured from the plantation of Judge Creagh, in Clark county, Alabama, remains of similar vertebræ, and portions of other bones evidently belonging to the same fossil, which he afterwards described more at length, and figured, in his "Medical and Physical Researches."

In 1835, Professor Agassiz visited England, and observed in the collection of the University of Cambridge, a singular tooth, of which Scilla had given a figure. He regarded it as a Mammalian, and published his views of it soon after in Valentin's "Repertorium für Anatomie und Physiologie." Viewing it as nearly allied to the seal family, he proposed for it the name of *Phocodon*. (Pl. II., fig. 9.)

In 1840, M. Grateloup published at Bordeaux a "Description d'un fragment de machoire fossile d'un genre nouveau de reptile (Saurien) voisin de l'Iguanodon."

\*Transactions of the American Philosophical Society, Vol. IV., N. S.



This fossil was found at Léognan, a few leagues south of Bordeaux, in the *calcaire grossier*, or *Eocene*. The form of the fragment he describes thus :

“ Le museau est alongé, déprimé et va en s'amincissant comme dans le rostre des crocodiles et de certains lézards. Sa longueur est d'environ dix-huit pouces, et n'est pas même complète. \* \* \* Ce qui rend cet os fossile fort précieux, c'est la présence de quatre dents postérieures, implantées dans leurs alvéoles. Le sommet des trois est un peu endommagé, mais la plus grande est d'une intégrité admirable. Elles sont fortes, épaisses, subtriangulaires, pointues, comprimées, et aplaties latéralement, un peu arquées en dedans, fortement dentées en scie, ou plutôt crénelées en leurs bords; celui-ci est tranchant. Les dentelures sont profondes, inégales, plus multipliées du côté de la tête de l'animal. Il y en a cinq sur ce bord, a la dent intègre, et deux seulement au bord opposé. Les dentelures présentent, à leur tour, de fines denticulations. En résumé, la forme de ces dents rappellent celles des dents de squalé; et les détails des dentelures, rappellent faiblement aussi, ceux de la structure des dents de l'iguanodon. La hauteur de la dent bien conservée est de seize lignes, hors de l'alvéole, d'un pouce. Le diamètre, sur ce point, est de six lignes, tandis que vers la pointe il n'a que deux lignes et demie. La racine est de forme conique; sa longueur doit égaler celui de la profondeur de la cavité alvéolaire, qui est de neuf à dix lignes, comme je viens de l'indiquer.” (Pl. I., fig. 5.)

He doubted whether to refer it to *Cetacea* or *Sauria*; and finally came to the conclusion that it constituted a new order of amphibious reptile—a carnivorous marine animal of the tertiary period—perhaps a connecting link between the Lacertians and the Sharks, and proposed for it the name of *Squalodon*.

In 1839, Dr. Harlan submitted his specimens to Professor Owen, of London, who, upon a careful examination, expressed the conviction that they were not the bones of a reptile, but of a great *cetacean*. The microscopic character of the texture of the teeth, satisfactorily proved them to be mammiferous, and they were compared with those of the few mammalia whose teeth are devoid of enamel. Professor Owen, with his paper on the subject, has given figures of the teeth; but subsequent specimens show them to have been imperfect from the absence of the enamel and a portion of the crown.\*

He found the humerus approaching more to the mammalian than to the saurian types: the vertebræ were strictly mammalian and cetacean; the teeth being freely implanted in distinct sockets with double fangs, had much resemblance, in their intimate structure, to those of the Dugong; and he was thus induced to place it in the class and order where it now remains. He says—“It is to the teeth of the Cachalot and Dugong, that those of the *Basilosaurus* offer the nearest resemblance in the particulars already cited, and I conceive its position in the natural system to have been

\*Transactions of the Geological Society of London, Vol. VI.

in the cetaceous order, intermediate between the Cachalot and the herbivorous species." The peculiar form of a horizontal section of the tooth, suggested the generic name of *ZEUGLONDON*, (*yoke-tooth*) (Pl. I., fig. 8,) and the affinity with Cetacea, the specific term *cetoides*. The following extract from Prof. Owen's paper embodies his remarks:

"The teeth in their combination of an exaggerated condition of the conjugate form—which is but indicated in certain teeth of the Dugong, with two distinct fangs, in their oblique position in the jaw, and the irregular interspaces of their alveoli—present very striking peculiarities; and when to these dental characters we add the remarkable and abrupt contraction of the distal end of the humerus, which is nevertheless provided with an articulating surface for a ginglymoid joint, and its remarkably diminutive size,—a cetaceous character which is here carried to an extreme; and when we also consider the dense laminated structure of the ribs, and the third exaggeration of a cetaceous structure in the extreme elongation of the body of the caudal vertebræ, we cannot hesitate in pronouncing the colossal *Zeuglodon* to have been one of the most extraordinary of the Mammalia, which the revolutions of the globe have blotted out of the number of existing beings." The geological position of these remains was for a long time undetermined; but Mr. Conrad and Mr. Lyell have satisfactorily referred them to the Eocene period, as well those found in South Carolina and Alabama, as those originally described by Dr. Harlan from the Wachita river, in Louisiana.

In 1843, the greater portion of a skeleton of this huge denizen of a former world, was procured from Clark county, Alabama, and taken to New York by Mr. S. B. Buckley, who published an account of the bones in the *American Journal of Science and Arts*;\* and a subsequent number of the *Journal* contains another notice by Mr. Buckley of these specimens.† They were sent to Albany, and placed by Dr. Emmons in the saloon of the State geological collection, where I saw them in 1845. They are now in the possession of Dr. J. C. Warren, of Boston, and have been in part described by Professor Emmons, in the *Quarterly Journal of Agriculture and Science*.‡ The figures given are from perfect teeth, vertebræ and ribs; and Prof. Emmons, after noticing the drawings of Prof. Owen, expressed his conviction that, after taking all the circumstances into consideration, the two descriptions pertain to the same animal, and adds—"Of the bones, besides the vertebræ, we have a femur or humerus, and the ulna and radius, with a portion of a scapula, a portion of an enormous pelvis, several ribs, two or three bones corresponding to the wrist, both extremities of the lower jaw, and the extremity of the upper jaw, and many other fragments of some importance. The vertebræ extend in a line 65 feet."

This is the most extensive collection of bones of this animal hitherto found, except-

\* Vol. XLIV., for April, 1843.

† Vol. II., for July, 1846, new series.

‡ July, 1845, and April, 1846.



ing those crowded together by Mr. Koch, a German collector, and exhibited by him as the remains of a single individual, from a single locality, under the erroneous name of *Hydrarchos*. It is well known that most if not all of these gigantic bones belong to the *Zeuglodon*, the supposed exceptions being some of the caudal vertebræ, which may have pertained to another animal. The identity of the *Zeuglodon* and *Hydrarchos*, was demonstrated to Mr. Koch himself, before he published his description; and subsequently Dr. Wyman of Boston confirmed and illustrated this fact in a masterly manner. Prof. Müller of Berlin, who is now engaged in examining Mr. Koch's collection with a view to publication, has come to the same conclusion; on which point, however, no one could have a moment's doubt who has any knowledge of the subject.\*

I have in my collection a large vertebra which was presented to me by Mr. Cooper, of Claiborne, Alabama, and which is the specimen noticed by Mr. Buckley in the *American Journal of Science* for July, 1846. It measures eighteen inches in length, and twelve inches in diameter on the articulating surfaces; and although destitute of the processes and somewhat broken, it weighs sixty-five and a half pounds! With it I received several portions of ribs, corresponding in character with those described by Dr. Harlan and Prof. Emmons.

I have lately had an opportunity of examining the cranium of a small *Zeuglodon*, (Pl. V.) discovered by Prof. Lewis R. Gibbes, of Charleston, and described by Prof. Tuomey in the *Proceedings of the Academy*.† The characters of this skull afford additional evidence that Prof. Owen was correct in assigning to the animal a place among the Cetacea, for it shows a striking affinity to the genus *Delphinus*. Prof. Tuomey thinks it belonged to a young animal; but the solidity of the bones and the tooth, with the apparent full development of enamel, incline me to a contrary belief. Since I have seen Grateloup's description of *Squalodon*, and his figure, (Pl. I. fig. 5,) I suspect the two may even prove specifically identical. The teeth are thinner, the form of the crown more conical and the serratures more vertical, the crenatures smaller and shorter, and the neck, at the insertion into the alveolus, more contracted in the Charleston and Léognan specimens than in the other species now under consideration.

My supposed discovery of what I called *Dorudon*, described in the *Proceedings of the Academy* for June, 1845, adds another species to this genus. In the notice I then published, these remains appeared to me to differ generically from the *Z. cetoides*,

\* Mr. Lyell has published sufficient evidence to show that Mr. Koch's specimens were obtained in various parts of Alabama. This is further proved by a letter from Dr. Lister, of Alabama, published in the *Proceedings of the Boston Society of Natural History*; and Dr. Dickeson, who has recently made a geological exploration of that state, confirms the now proverbial fact, that the so-called *Hydrarchos* was obtained from several different and even distant localities.

† February, 1847.—Prof. Tuomey's description is republished in the present volume.

which I had examined in Albany. I founded the distinction on the hollowness of the teeth and the more elongated, gavial-like form of the beak. The following is the description, slightly amended, which I then gave of these teeth. (Pl. IV. figs. 1, 2, 4.) "Teeth spear-shaped, the crowns compressed laterally, and in distinct, deep sockets, with double fangs; the bifurcation commencing a half inch below the enamel, which extends from the point of the tooth one inch; enamel smooth, except near the base, where it is wrinkled vertically; the serræ longitudinal, diminishing in size from the apex of the tooth, which is seven-eighths of an inch from the first lateral point; length of the tooth  $3\frac{1}{4}$  inches; breadth  $2\frac{3}{8}$  inches; thickness of the body below the enamel, a half inch; the anterior root a cone, compressed laterally; the other prismatic, thicker on the posterior side, which is fluted so as to present the appearance of being partially divided into two fangs: where the fangs are united, the neck is contracted, so that a horizontal section presents the yoke-shape of the *Zeuglodon* of Owen. In one of the teeth the distance from the extremities of the fangs across is  $2\frac{1}{2}$  inches."

Besides the serrated molar teeth, which are figured in a portion of a lower maxilla, and which are all similar, I have two kinds of perfect canine tooth of a single fang each, one of which was then, and both of which are now, figured. One is curved, compressed and pointed, resembling very much a figure given by Faujas de St. Fond\* of a tooth of the Asiatic crocodile or gavial; though it has no appearance of a secondary tooth, and is contracted at the extremity of the fang, and inserted obliquely in the socket. It is much compressed laterally and longitudinally, and is hollow, the dentine thin, but the enamel developed. A depression on each lateral surface almost gives it the appearance of being lobed, showing the tendency to the yoke form in the section. It has also cutting edges on the anterior and posterior compressed sides of the enamelled crown, and in appearance resembles very much the teeth of *Megalosaurus*, though the edges are not serrated, (Pl. IV., fig. 3.) The other canine tooth, (Pl. II., fig. 1,) is more straight until within the distance of the enamel from the point, which is slightly curved. The body below the enamel bulges out, and is not compressed laterally like the former specimen. Casts of both these teeth, and of the molars, were forwarded to Prof. Owen by my friend Dr. S. G. Morton, who has kindly favoured me with a letter from that distinguished naturalist, containing his impressions on the subject.

"ROYAL COLLEGE OF SURGEONS, NOV. 11, 1845.

"I have been much gratified by finding, on my return from a tour in Italy, additional examples of your friendly remembrance in the interesting cast of the tooth on which Dr. Gibbes has founded his genus "*Dorudon*." It reminds me of the character of the serrated teeth described by M. Grateloup in the "*Jahrbuch für Mineralogie*," 1841, p. 830, as those of a fossil carnivorous cetacean for which he proposes the name

\* Fossiles de St. Pierre à Maestrecht, Pl. XLIX., A.



*Squalodon*. I have not, however, seen these teeth, and know them only by Grateloup's brief description.

"With regard to *Dorudon*, I have a stronger suspicion that the large two-fanged, compressed, serrated tooth which you have transmitted to me, may prove to be an anterior tooth of ZEUGLONDON (*Basilosaurus*, Harlan.) It would be desirable to determine accurately the modifications of form of the teeth in different parts of the jaws of that very remarkable cetacean, and to this end I trust Mr. Koch's late discovery in Alabama may contribute.

"In the same box was the cast of the tooth of the *Mosasaurus*, and also two uncoloured casts of simple teeth. One I take to be the canine of a bear. Were these found with the serrated teeth of *Dorudon*?"

Subsequently he says—

"I had written the foregoing before discovering in the pyramid of papers accumulated during my absence, the packet of memoirs which accompanied the casts. I observe therein that Dr. Gibbes has made the comparison of his *Dorudon* with *Zeuglodon*, and finds a distinction in the form of the jaw. With regard to the hollowness of the teeth of *Dorudon*, this might perhaps arise from the immaturity of the individual which yielded the fossils.

"The figure subjoined to Dr. Gibbes's most interesting paper reminded me of the very old figure in "SCILLA, *de corporibus marinis; tab. XII. fig. 1, 1747,*" of serrated teeth, which have been the subject of much speculation.\* My last views of them were that they were apparently premolars of the fossil Hippopotamus.† Dr. Gibbes's discovery may prove them to belong to the very curious family of extinct cetacea of which *BASILOSAURUS* is the type, and to which it is most probable that *Dorudon* belongs.

"The tooth like the canine of a bear" (Pl. II. fig. 1,‡) "is not that which Dr. Gibbes has figured," (Pl. IV., fig. 3;) "the figured tusk or canine belongs to a different genus from the tooth I have likened to a bear's canine, and may probably be from the lower jaw of *Dorudon*, as Dr. Gibbes supposes."

The figured tusk alluded to by Prof. Owen, was subsequently proved to be from the lower maxilla, for I found it inserted in a fragment of that bone. (Pl. III., fig. 2.) During an extensive exploration of the bed of green sand at the locality, with the hope of turning up other portions of the skeleton, fragments of a lower maxilla containing the then unfigured tusk were procured, with twelve caudal vertebræ. These I was disposed to consider as belonging to another species, if not a new genus as suggested by Prof. Owen, but a careful examination of Prof. Warren's specimens convinces me that I must refer them to *Z. cetoïdes*.

\* I learn from M. Agassiz that the tooth in the University of Cambridge is the original which furnished the figure given by Scilla. I have copied one of these teeth from Scilla. (Pl. II., fig. 9.)

† Odontography, p. 564.

‡ This tooth was not figured in my original memoir, but a cast was sent to Prof. Owen.

I have two fragments of this maxilla—one five inches long, containing a canine tooth with the alveoli of two others, (Pl. III., figs. 5 and 6,) and the other of the opposite side, about three inches. The characters of these specimens I thought were more Saurian than Cetacean; there being distinct pits on the outer surface of the jaw, showing the overlapping of the upper teeth as in Saurians; and the vertebræ having a strong tendency to become convex posteriorly. However, I am now satisfied that they belong to *Z. cetoides*.

Among the fossils of the Eocene period found with these relics, are tympanic bones and teeth of cetacea resembling *Physeter macrocephalus*, and *Balæna affinis*, Owen, as given in his "British Fossil Mammalia." Several vertebræ of a *Delphinus*, teeth of a true crocodile, and others with a compressed lateral cutting edge similar to figures given by Prof. Owen in his *Odontography*, as of extinct Saurians, which Prof. Agassiz informs me have been figured by H. Von Meyer, under the name of *Mudrimosaurus*; a fossil that appears to me to have an analogue in the *Crocodylus macrorhynchus* of Harlan.\*

Here also I found teeth of a large *Pristis*, (Pl. I., fig. 6 and 7,) differing from *P. acutidens*, Agassiz.† The prevalence of Cetacea and Sauria at this period, together with that of fossils common to the cretaceous and Eocene beds, are interesting facts. These Eocene beds are the lowest in the series, and contain *Gryphæa mutabilis*, (Morton,) and *Terebratula Harlani*, (Morton,) which are also found in the cretaceous formation; while *Cardita planicosta*, (Sowerby,) *Scutella Lyelli*, (Conrad,) *Pecten membranosus*, (Morton,) and other fossils, characterize them as Eocene.

When the *Maestricht monitaur* was discovered, it was a long time before naturalists were able to decide its position in the scale of organized beings. Camper and Van Marum considered it Cetacean; Hoffman, Drouin, and Faujas de St. Fond insisted that it was a Crocodile; but Adrien Camper decided it was neither cetacean, fish, nor crocodile, and referred it to a new genus of *Sauria* related to the *Monitor*, and to which Coneybeare gave the name of *Mosasaurus*. Subsequently Cuvier confirmed the opinion of Camper.‡ Since that period various new genera have been added to this remarkable class of fossil reptiles, yet doubts have existed whether some of them do not possess affinities to the *Mammalia*. Cuvier has laid down the following rule, which is now generally admitted:

"En Zoologie, quand la tête, et surtout les dents et les machoires, sont données,

\* Medical and Physical Researches, p. 380; and Journal of Academy of Natural Science, Vol. IV., p. 15, 1824.

† This *Pristis* bears some resemblance to *P. acutidens*, Agassiz, but differs in tapering more gradually from the root to the point which is more acute. The root is thicker and longer in proportion, and the groove or channel on the posterior edge is deeper, and extends to the point of the tooth. The body is rather more pyramidal than conical, as in *P. acutidens*. I propose for it the name of *Pristis agassizi* as a small tribute to the distinguished author of the great work "*Sur les Poissons Fossiles*."

‡ Cuvier, Ossemens Fossiles, Tome V., p. 314.



tout le reste est bien près de l'être, du moins pour ce qui regarde les caractères essentiels ; aussi n'ai je point eu de peine à reconnaître à classer les vertèbres quand une fois j'ai bien connu la tête."\*

There is, however, an exception in the case of *Megalosaurus* and *Geosaurus*. Von Meyer says of the former, "that notwithstanding the similiarity of the teeth with those of *Geosaurus*, the structure of the rest of the skeleton differs very considerably. Among the bones yet found some remind us of the *Crocodile*, others of the *Monitor*, while others have not been sufficiently determined. The beak appears to have been straight and elongated ; the width of the vertebræ at present discovered, exceeds their length by a third. They are contracted in the middle, as in *Streptospondylus* ; both surfaces are plane."† And he again observes of them, that "the teeth are very similar, while they have nothing else in common." Although, in the recent crocodiles, the vertebræ are convex on one surface and concave on the other, still there are some fossil species which are plane or concave on both surfaces, and thus resemble those of *Cetacea*.

"In the recent crocodile," says Dr. Mantell, "the vertebræ are convex posteriorly, and concave anteriorly ; but those from Tilgate, like the vertebræ of the crocodile of Caen, and of one of the species of Havre, are, with but few exceptions, slightly concave at both extremities"‡ In *Megalosaurus* both surfaces are slightly concave ; in *Iguanodon*, they are almost flat on one side and slightly depressed on the other ; in *Geosaurus* slightly concave ; in *Streptospondylus* "the vertebræ are distinguished by the very remarkable peculiarity, that their anterior surface is convex, and the hinder concave ; consequently the reverse of those of the Crocodiles, and formed like the cervical vertebræ of the whole order of terrestrial mammalia."§ On this peculiarity the genus *Streptospondylus* is founded. Cuvier also says :

"Mais il y a des vertèbres de grands reptiles, qui ressemblent si fort à celles de certains dauphins qu'il est facile de s'y tromper ; toujours faudrait-il examiner leur position avec beaucoup de soin, et voir s'il n'y aurait point, à cet egard, de difference entre ces os de cétacés et ceux de reptiles."||

For several varieties of vertebræ of fossil Saurians differing from the recent species, I refer to Dr. Mantell's work on the Fossils of Tilgate Forest. These remarks and references are necessary in relation to the description of my later specimen, which possesses characters belonging to the Cetacea and Sauria, though the former predominate.

In the lower maxilla (Pl. III., figs. 4 and 6) there are marked differences from the former, (Pl. III., figs. 1 and 3.) The external surface is convex, the inner hollowed,

\* Cuvier, Art. Sauriens, Vol. V., p. 326.

† On the structure of Fossil Saurians, in Charlesworth's Magazine of Natural History, Vol. I., p. 341.

‡ Geology of South East of England, p. 263.

§ H. Von Meyer, ut supra, p. 352.

|| Letter to G. Mantell, Geology of South East of England, p. 282.

the two meeting in a sharp angle within and above the longitudinal median line of the lower surface, which is well exhibited in the sections, (Pl. III., figs. 3 and 4,) posterior to the insertion of a canine tooth. The latter specimen, (fig. 4,) upon a careful comparison with that of Prof. Warren, I am satisfied is identical with it. From Prof. Emmons's description I was disposed to consider them different; but he was mistaken in describing the anterior portions of the lower maxilla as being united, and having a groove or sulcus; whereas they are only united at the terminal extremities of the rami anteriorly; the interspace being filled with the matrix, which requires to be closely scrutinized to show the fact. I pointed it out to Prof. Wyman when we lately examined the specimen together. A little above the longitudinal median line on the inner face, the inner alveolar process arises like a continuous parapet, of a half-inch in thickness, extending nearly as much above the insertion of the canine tooth (Pl. III., fig 5, a,) which is placed almost perpendicularly in the alveolus. In this respect it is directly the opposite of the *Megalosaurus*, where the external edge of the jaw rises almost an inch above the margin, forming a lateral buttress to support the teeth externally. Immediately anterior and posterior to this canine, are hollow pits or depressions on the outer surface of the jaw for the overlapping of the tusks of the upper jaw. In Prof. Warren's specimen, this inner thick plate or buttress is distinctly marked, but Dr. Emmons's figure does not represent it. In my first specimen there is no such additional plate, or projecting alveolar process, on the inner side of the maxilla. In the latter case, the pits, of which two exist in each lateral fragment, certainly show an approximation in the animal to the *Saurian* rather than to the *Cetacean* type. Both are hollow.

"In all the genera of Crocodilians," observes Prof. Owen, in his *Odontography*, "the teeth of the upper and lower jaws are so placed that their points, instead of meeting, interlock. In the Crocodiles, (genus *Crocodylus*,) the first tooth in the lower jaw is received into a notch excavated in the side of the alveolar border of the upper jaw, and is visible externally when the mouth is closed." "In the Gavials, (genus *Gavialis*,) the first as well as the fourth tooth in the lower jaw, passes into a groove in the margin of the upper jaw, when the mouth is closed." p. 286.

I have not yet seen a perfect upper maxilla, but supposing from the form of the groove that a similar tusk existed in the upper jaw, here would be another approach to the Gavials, (so far as the canines are concerned,) since their teeth are nearly equal in size and form in both jaws. In the figures given by Faujas de St. Fond of the Asiatic and African crocodiles, these pits or depressions in the lower jaw are obvious characters.

Of the caudal vertebræ I received twelve, six larger (Pl. II., figs. 6 and 7) destitute of spinous processes, and six smaller (Pl. II., figs. 4 and 5) without any processes—merely rudimentary notches. The largest of the former is three and a half inches long, and four inches in the width of the articular surfaces, which are circular



the anterior face is irregularly concave, with a depression in the centre, while the posterior is slightly convex; in the smaller vertebræ (fig. 4) which have no processes, the concavo-convex character is more marked. Several of the larger vertebræ resemble the description given by Dr. Mantell\* of *Cetiosaurus*; but instead of becoming bi-concave as they approach the caudal extremity, the posterior surface becomes more convex. In this respect they resemble the *Monitor*. All the caudal vertebræ of the *Monitor* have the anterior surface concave, and the posterior convex. Pl. II., fig. 8, represents the caudal vertebræ in position.

The centrum or body of the six larger vertebræ, which differ very little in size, is somewhat contracted in the middle; and on the sides of the processes is a little depressed: the transverse processes are pyramidal, the base extending the whole length of the body, next to which, in the centre, is a large oval perforation. This I find in some of the vertebræ in Prof. Warren's collection. He has no small caudal vertebræ. On the abdominal surface of the body is a longitudinal depression, which might almost be called a groove, in the centre of which is a large foramen, in all the vertebræ. It is remarked by Professor Owen,† that the bodies of the vertebræ in most species of *Plesiosaurus*, are traversed vertically by two vascular canals, which lead from the medullary or spinal canal to the inferior surface of the centrum, where they terminate each by an orifice, and sometimes by two orifices, on each side of the middle line. These orifices, however, are not a constant character of the genus *Plesiosaurus*, neither are they peculiar to this genus, being present in the vertebræ of the *Cetacea* as well as those of the *Sauria*. The medullary cavity is formed by two lateral processes extending upward and forward, connected by an arched, bony band. All the apophyses seem ankylosed, for I can find no trace of a suture. In the larger specimens are tubercles for the attachment of chevron bones.

In making a distinction between my two specimens, in addition to the more elongated and tapering form of the jaw, I urge the difference in form of the tusks, the oblique position of the fangs, and the freedom from the projecting inner plate of the alveolus; and I still think the character of hollowness is not entirely to be set aside. Prof. Wyman is of opinion that the thinness of the dentine and the hollowness are indicative of the immaturity of the animal; while Prof. Agassiz inclines to the belief that it is not a young animal, as the enamel is perfectly developed and smooth—not wrinkled as in young animals. Apart from this character he considers it a different species from *Z. cetoides*. With these impressions, I propose for it the specific name of *serratus*.

The question now arises whether Dr. Harlan's original name of *BASILOSaurus* should or should not be restored to the remarkable remains now under consideration. That it is objectionable in a critically zoological point of view, we grant; but it is not more so than many other names that are admitted in the systems, among which we

\* Medals of Creation, p. 727.

† Report on British Reptiles.

may, by way of example, refer to that of *Saurus*, which Cuvier has applied to a genus of Fishes. In the order of priority, Prof. Agassiz's *Phocodon* supercedes *Zeuglodon*, which latter designation only expresses a character of the teeth, which is equally present in some of the Dugongs and Seals. Of the several names—*Basilosaurus*, *Phocodon*, *Squalodon*, *Zeuglodon* and *Dorudon*, which have been successively applied to these fossil remains, I respectfully suggest the propriety of restoring the original appellation of the discoverer; and in so doing I further propose, in the present state of our knowledge, to recognize three species of this extraordinary genus, thus:

BASILOSARUS. *Harlan.*

1. *B. cetoides*. Owen.
2. *B. serratus*. Gibbes.
3. *B. squalodon*. Grateloup.

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REFERENCE TO THE PLATES.

PLATE I.

- Figs. 1 and 2. Anterior extremity of lower maxilla, (reduced.) Dr. Emmons's collection.  
 " 3. Molar tooth, (natural size.) Dr. Emmons's collection.  
 " 4. Large vertebra, (reduced.) Dr. Emmons's collection.  
 " 5. Fragment of upper maxilla, from Léognan in the Gironde. *Squalodon* of M. Grateloup.  
 " 6 and 7. *Pristis Agassii*, (nobis.)  
 " 8. Section of molar tooth of *Basilosaurus cetoides*, from Prof. Owen's Odontography.

PLATE II.

- Fig. 1. Two views of canine teeth of *B. cetoides*. The author's collection.  
 " 2. Section of canine tooth of *B. serratus*. The author's collection.  
 " 3. Section of canine tooth of *B. cetoides*. The author's collection.  
 " 4. Small caudal vertebra of *B. cetoides*, (natural size.) The author's collection.  
 " 5. Small caudal vertebra, posterior articular surface, (natural size.)  
 " 6 and 7. Large caudal vertebræ of *B. cetoides*, (one-fourth natural size.) The author's collection.  
 " 8. Twelve caudal vertebræ reduced, and in relative position.  
 " 9. Tooth of the *Basilosaurus* of Malta, copied from Scilla. *Phocodon* of Prof. Agassiz.

PLATE III.

- Fig. 1. Fragment of lower maxilla of *B. serratus*. The author's collection.  
 " 2. Fragment of lower maxilla of *B. cetoides*. The author's collection.  
 " 3. Section of fig. 1.  
 " 4. Section of fig. 2.  
 " 5. Upper surface of fig. 6.  
 " 6. Anterior fragment of lower maxilla of *B. cetoides*. The author's collection.

PLATE IV.

- Fig. 1. Fragment of lower maxilla and teeth of *B. serratus*.  
 " 2. Edge view of molar tooth of *B. serratus*, (natural size.)  
 " 4. Lateral view of the same tooth.  
 " 3. Two views of a canine tooth of *B. serratus*.

PLATE V.

Cranium of *Basilosaurus*, found in the Eocene near Charleston, South Carolina.



ART. II.—*Notice of the Discovery of a Cranium of the Zeuglodon, (Basilosaurus.)\**  
 By M. TUOMEY, State Geologist of South Carolina; Corresponding Member of  
 the Academy of Natural Sciences of Philadelphia.

Almost every day adds something to our knowledge of those remarkable forms which, in the revolutions, of time have passed out of existence. In 1832, Dr. Harlan described and figured in the American Philosophical Transactions some fossil bones from Alabama, consisting of portions of the upper and lower maxillæ of an animal to which he gave the name of *Basilosaurus*, from an impression that they belonged to a gigantic Saurian. An examination of the teeth, however, satisfied Prof. Owen that these remains pertained to a Cetacean, to which he has given the name *Zeuglodon*.

The first description of an entire tooth of this animal, was given by Mr. Buckley, in a concise account of the discovery of a considerable portion of the skeleton, published in the American Journal of Science in 1843. In 1845, Dr. R. W. Gibbes, of South Carolina, published in the Proceedings of the Academy of Natural Sciences of Philadelphia, accurate figures of similar teeth with fragments of the lower maxilla. The teeth being hollow, and in his opinion presenting other important differences, he constituted for them a new genus, *Dorudon*.

The *Hydrarchos*, I believe, has passed away without advancing our knowledge upon this interesting subject, excepting perhaps that Prof. Wyman discovered in the extremity of the ribs some cetacean characters.

The next important development consisted in the publication, by Prof. Emmons, in the American Quarterly Journal of Agriculture, of beautiful figures of the teeth, the anterior portion of the lower maxilla, part of the ramus having the coronoid process and condyle almost perfect, together with cervical and caudal vertebræ, and a rib. But up to the present time, no notice has appeared of the discovery of any considerable portion of the cranium proper—for the mutilated head of the so-called *Hydrarchos* can scarcely be considered an exception.

Early in January I was presented by F. S. Holmes, Esq., with a portion of the left upper maxilla, containing one tooth and the alveoli of several others, which he discovered in the Eocene beds of Ashley river, about ten miles from Charleston. Soon after, Prof. Lewis R. Gibbes, of the College of Charleston, visited the same locality, and had the good fortune to find the rest of the skull, much fractured, but so carefully were the fragments collected, that with a little patience we were enabled to restore them to their proper places. It is then altogether to these gentlemen that we owe a knowledge of this valuable relic.

\* Proceedings of the Academy of Natural Sciences, February, 1847.

*Description.* Occipital bone somewhat semicircular, transversely flat or slightly concave, central portion thin; a crest-like ridge surrounds the superior portion terminating in the suture with the temporal bone. Condyles two, articulating surfaces lunate, and almost enclosing the foramen magnum. Foramen magnum oval; transverse diameter  $1\frac{1}{2}$  inches, vertical diameter 1 inch; transverse processes thick, spreading, making the breadth of the base of the cranium equal to its diameter across the zygomatic processes; jugular foramen  $\frac{1}{2}$  inch in diameter; temporal bones small, mastoid portion thick and strong but not prominent; articulating cavities for condyles of lower maxillæ large, forming about  $30^\circ$  of a circle, inclining inwards and backwards; maxillæ thick and strong, vertical section triangular; a cavity for nerves and vessels runs within at the points of the roots of the teeth; alveolar process thick; palatal bone strong, anteriorly emarginate and horizontal, posteriorly descending below the alveolar process.

Frontal bone and anterior portion of maxillæ wanting; walls of the nasal canal smooth; sutures squamous; in the left maxilla one tooth remains, which is solid, spear-shaped, edges coarsely serrate, exterior side flattened, interior side convex, agreeing in this respect with the position of the teeth in the shark; roots double, nearly parallel, and inserted obliquely backwards; in the right maxilla are the alveolæ for eight teeth with double roots. In the solidity of the teeth and slight divergency of the roots, this specimen agrees with the figures of Dr. Harlan and Prof. Emmons.

This fossil is particularly interesting, as it removes every doubt, if any remain, of the true character of the animal to which it belonged. The double occipital condyle shows it to have been a mammal, while the squamous sutures and a symmetrical form refer it to the Cetaceæ.

*Dimensions.* Length  $14\frac{1}{2}$  in.; greatest breadth  $7\frac{1}{2}$  in.; height  $5\frac{1}{2}$  in.; length of enameled portion of tooth  $\frac{2}{3}$  in.; breadth  $\frac{2}{3}$  in. It was evidently a young individual. (Pl. V., fig. 1 and 2.)

*Geological position.* The teeth described by Dr. Gibbes were found in the oldest of the calcareous beds of the Eocene of South Carolina, which contain *Cardita planicosta*, (Sowerby,) and other well known Eocene fossils, together with *Gryphæa mutabilis*, (Morton,) and *Terebratula harlani*, (Morton,) which are also common to the cretaceous formation. The fossil just described was found in upper beds of the Eocene; so that the Zeuglodon must have existed through the whole of the Eocene period; a period which, in South Carolina, was at least sufficiently long for the deposition of three hundred feet of calcareous and sedimentary matter; a fact ascertained by boring at Charleston.



ART. III.—*Observations on certain Fossil Bones from the collection of the Academy of Natural Sciences of Philadelphia.*\* By RICHARD OWEN, Esq., F. R. S., Professor of Comparative Anatomy in the Royal College of Surgeons, London, &c., &c.†

Genus Bos.

No. 1. Distal half of right humerus: it is about one-sixth less than the same part in *Bos primigenius*, and more resembles that of the Aurochs: it belongs, probably, to a species of *Bison*.

No. 2. The left tibia of the same species.

Genus EQUUS.

No. 3. Fragments of a lower molar tooth of the size of the *Equus caballus*; but the specific character not determinable.

Genus MASTODON.

No. 4. A portion of tusk, labelled *Hippopotamus*, but satisfactorily known to have belonged to a Proboscidian Pachyderm by the decussating curved lines intercepting lozenge-shaped spaces, at the transverse fractures of the ivory at the two ends. This structure is shown in British Fossil Mammalia, p. 291, fig. 101, c. Transverse fractures of the tusks of *Hippopotamus* show fine concentric lines, as figured in British Fossil Mammalia, p. 402, fig. 160.

From the size, shape and slight degree of curvature of the Georgian fossil, it may probably have belonged to the left side, lower jaw, of the *Mastodon giganteus*.

Genus HARLANUS. Plate VI.,

No. 5. The middle part of the right ramus of the lower jaw of a large Pachyderm, with the last three (or true) molars, part of the premolar next in advance, and part of the socket of another premolar. The crowns of all these teeth appear to have been worn down by mastication to their base; they present the proportions, and the last molar, in a cast transmitted to me by my lamented friend Dr. Harlan, appears to retain the anterior of the two large transverse ridges, which characterize the teeth of the genus *Lophiodon*, Cuv.: it likewise possesses the large posterior lobe or talon, which dis-

\* Proceedings of the Academy of Natural Sciences, August, 1846.

† The organic remains which form the subject of this paper are a part of a series collected by James Hamilton Couper, Esq., during the excavation of the Brunswick Canal, near Darien, in Georgia. Prof. Owen, having expressed a wish to examine these fossils, they were transmitted to him through Mr. Charles Lyell, by authority of the Academy, and the following highly interesting memoir was promptly returned. Besides the reference by Professor Owen to Dr. Harlan's original paper in the American Journal of Science, some valuable remarks by Mr. Couper himself, will be found in Vol. I. of the Proceedings of this Academy, page 216.

tinguishes this tooth in the *Lophiodon* from that of the Tapir. The teeth of the fossil from Georgia a little exceed in size those of the *Lophiodon Isselanus* (*Grand Lophiodon d'Issel*, Cuvier, 'Ossemens Fossiles,' ed. 1822, tom. 2, pt. 1, p. 184, pl. 3, fig. 3,) the antero-posterior diameter of the last molar in that species being one inch and eight lines, and in the present fossil one inch ten lines. But the depth of the jaw below the middle of the last molar in the present fossil is three inches; whilst that in the *Lophiodon Isselanus* in the figure cited, is scarcely two inches; and Cuvier expressly states (p. 186) that it surpasses in depth the corresponding part of the jaw of the *Lophiodon medius* (pl. 3, fig. 1,) which has molar teeth of the same size as in the *Lophiodon Isselanus*.

The present fossil has been described and figured in "Silliman's American Journal of Science," vol. 43, 1842, pl. 3, fig. 1, under the name of *Sus Americana*; Dr. Harlan conceiving that from its general appearance and number of the teeth this fragment bore a close analogy with the same part in the *Sus babirussa*, Buff., acknowledging, however, that the Babyroussa "was a much smaller animal." Besides the difference of size, the last molar in the fossil has the anterior transverse ridge proportionally larger, and the posterior lobe proportionally smaller than in the Babyroussa, resembling the *Lophiodon* in the points in which it thus differs from the species of *Sus* cited. The form of the fossil jaw differs at the part supporting the last molar from that in the Babyroussa, where the socket of the last molar overhangs the inner surface of the ramus, whilst in the fossil the inner surface of the ramus beneath the last molar describes a gentle convexity from the tooth to the lower margin of the ramus. The outer part of the ramus of the jaw of the Babyroussa begins to expand below the fourth and fifth molars, counting forwards from the last, to form the socket of the large tusk; but the fossil jaw does not offer the least indication of an enlargement for that purpose; and the fractured anterior end, as displayed in the cast, is very different in shape from the corresponding part of the jaw in the Babyroussa, and shows merely the wide dental canal, and no socket for the tusk which would be here situated in the Babyroussa or Wild Boar.

The nearest approximation which I could make from a study of a cast of the fossil in question to any known existing or extinct animal, was to the great tapiroid Pachyderms; but I added in my description of this cast in the "Catalogue of Fossil Mammalia and Birds in the College of Surgeons," 4to., 1845, p. 198, "that ulterior discoveries, may, indeed, show that the Lophiodont dentition was combined with other characters in the American fossil, necessitating a generic distinction, and it is well to remember that the dentition of the *Macranthenia*, of South America, a three-toed Pachyderm with an astragalus almost identical with that of the *Lophiodon*, and of a size which agrees with the jaw of the fossil *Sus Americana* of Harlan, has yet to be discovered."

The original of the cast shows the course of the enamel on the outer side of the



penultimate molar ; it there defines an anterior lobe of the crown about the one-third the antero-posterior extent of the crown, by a close, straight fold of enamel penetrating inwards about  $2\frac{1}{2}$  lines.

The anterior lobe or transverse ridge of the corresponding tooth of a *Lophiodon* might, perhaps, present a similar appearance, if worn down to the base of the crown.

But in the present fossil, the enamel proceeds to define a middle lobe on the outer side of the crown, shorter than the foregoing, beyond which the enamel and dentine are worn obliquely away to the base of the posterior fang ; the indication of the middle external lobe or festoon of enamel is, however, decisive against its generic relationship with *Lophiodon*.

This indication of the arrangement of the enamel, slight as it is, reminds one of that in the lower molars of the *Toxodon*,\* and another feature of resemblance is the apparent interruption of the enamel at the anterior part of the molar in the fossil. If the presence of two distinct fangs in the Georgian Fossil were adduced as distinguishing it from the *Toxodon*, it might be replied that perhaps the long curved rootless molars in that animal at the last period of age might, as in the Horse, acquire root.

But the trilobed character is on the outside of the molar in question, and on the inside of those of the *Toxodon* ; in which also the middle lobe only has a coat of enamel, not the anterior or posterior of the inner lobes : there is no doubt, therefore, that the Georgian Pachyderm is as generically distinct from *Toxodon*, as it is from *Lophiodon* ; and it would seem to have diminished the interval which divides the strange Gliriform Pachyderm of South America, from the more normal Tapiroid forms of Pachyderms which are found fossil in the old world.

As naturalists have accepted the latinized Indian word *Tapirus* as the generic name of the existing American Pachyderm, which makes the nearest approach to the present remarkable fossil, they will probably sanction the application to the genus and species which it represents, of the name *Harlanus Americanus* ; † in honour of the indefatigable and accomplished naturalist by whom the fossil was first made known to science.

*Royal College of Surgeons, London, July 8th, 1846.*

\* Fossil Mammalia of the Beagle, pl. 5, fig. 2.

† The annexed drawing of this fossil was made in London under the supervision of Prof. Owen.

ART. IV.—*Description of a new rapacious Bird in the Museum of the Academy of Natural Sciences of Philadelphia.\** By JOHN CASSIN.

Genus CYMINDIS, *Cuvier*. Plate VII.

*C. Wilsonii*, nobis, ♂. Corpore toto supra nigro-fusco, in capite pallidiore, subtus albo, plumis totis amento usque ad caudæ tectrices inferiores nonnullis fasciis transversis nitide rufo-castaneis; his coloribus collum in vittam circumductis. Primariis quartis, quintis et sextis longissimis et fere paribus, pogoniis externis fere nigris, internis primariorum externorum a basi pene ad medium albis, parte reliqua rubida ad castaneum vergente, primario quovis (in pogonis interno) maculis duobus nigris et inequaliter formatis, apice nigro. Cauda dorso concolore, nisi pallidiore, ad basin alba, fasciis ad quatuor, latis, fere nigris, fascia ab apice secunda vitta angusta, rufa, obscure definita, comitata. Caudæ apice subtiliter albo marginato. Rostro permagno (quam in quavis alia hujusce generis, specie largiore,) flavido albo, ad basin cœruleum-corneum vergente.

♀. Corpore toto supra cœruleo-cinereo, in capite pallidiore, subtus fasciis concoloribus, ferrugineo tinctis. Long. tot. (exuviæ maris) a rostri apice usque ad finem caudæ, 17 poll. Hab. in Insula Cubæ.

Male. Body above entirely dark brown, paler on the head, beneath white, every feather from the chin to the under tail coverts crossed by several bars of bright rufous chestnut, and these colours extending upwards into a collar around the neck; 4th, 5th and 6th primaries longest and nearly equal, external webs nearly black, internal webs of outer primaries white at base, and for nearly half their length remaining part reddish inclining to chestnut, every primary (on its inner web) having two irregularly shaped black marks, and tipped with black. Tail of the same colour as the back, but paler, white at base and crossed by about four broad bars, which are nearly black, the second bar from the tip accompanied by a narrow, rather indistinct bar of rufous; tip of tail narrowly edged with white.

Bill very large, larger than that of any other species of this genus, yellowish white, inclining to bluish horn colour at base.

Female. Body above entirely light bluish ash colour, paler on the head, beneath barred with the same, the bars having a ferruginous tinge.

Total length, (skin of the male,) from the tip of the bill to the end of the tail seventeen inches.

Hab. Island of Cuba.

The two specimens here described were presented to the Academy by its esteemed member, Richard C. Taylor, Esq., the eminent geologist, who has kindly furnished

\* Proceedings of the Academy of Natural Sciences, April, 1847.



a memorandum from a journal kept by him at the time they were procured, with the following interesting note of the locality and of the habits of this remarkable species :

“ PHILADELPHIA, April 5th, 1847.

*Dear Sir*,—I make the best reply in my power respecting the pair of Hawks, the skins of which and of other birds were brought by me from the Island of Cuba ; but not being an ornithologist, the very concise description that I can give of them may not be very intelligible nor useful.

The locality was towards the north-eastern part of the island, in the vicinity of the port of Gibara, in the province of Holguin. The range of country more especially traversed by me, during six months' residence, extended from the seacoast to thirty miles inland, either into the Savanna or copper region of the mountains. I have particularly described this country in the Transactions of the American Philosophical Society, vol. ix., pp. 204 to 218, where I have also given a reconnoissance map.

My journal contains a short note made at the time these hawks were shot. My companion and myself saw this pair in company, hovering over the crest of the high limestone mountain called La Silla, about seven miles from the coast. My attention was called to them by my companion, a resident of the island, who assured me they were extremely rare, and he hoped we should be able to shoot them ; we were then on the peak of the mountain, and, after a little chase, were so fortunate as to obtain both male and female. My memorandum is literally as follows :

“*Gabilan azul*, blue hawk of the Spaniards, male and female, very rare and difficult to shoot. Pupil black, with a greenish yellow iris.”

The food of these birds was stated to be various birds, of which doves were the most abundant on the spot, with perhaps an occasional relish of lizards, which were also abundant. I understood that these hawks frequented the most lofty and solitary peaks, and were not often seen below. We considered ourselves extremely fortunate in the acquisition of this fine pair of birds.

Respectfully, yours,

RICHARD C. TAYLOR.

Mr. John Cassin.

The bill in this species is very large in proportion to the size of the bird, much better entitling it to the specific name *magnirostris* than any other rapacious bird with which I am acquainted ; it agrees, moreover, tolerably well with the descriptions of *Falco magnirostris*, Gm.; so does the young *Cymindis uncinatus*, Illig. All authors, however, except Dr. Latham, appear distinctly to understand the *F. mag-*

*nirostris*, Gm., to be the bird figured in pl. enl. 464, which is a very common South American species of Astur.

Dr. Latham, in his article on *F. magnirostris*, Gen. Hist., vol. i., p. 282, gives a description of a bird suspected by him of being the species intended by Gmelin, which applies very well to *Cymindis cayanensis*, Gm., in young plumage, but not to the species now described.

I have named this species in honour of Thomas B. Wilson, M. D., as a slight tribute to his high personal merit, and to his munificence as a patron of Zoological science.





ART. V.—*Remarks on the Birds observed in Upper California, with descriptions of New Species.* By WILLIAM GAMBEL.

CATHARTES, *Illig.*

1. C. CALIFORNIANUS, (Shaw.) Rantz. Californian Vulture.

This immense and interesting bird, rivalling the Condor in size, and confined exclusively to the Pacific coast, is particularly abundant in California during winter, when they probably come from Oregon, as they are said to disappear from the region of the Columbia at that time.

Although it does not display the familiarity of the Turkey Buzzard, yet they are often found in the vicinity of the towns.\*

It is very voracious, and nothing less than the carcass of a horse or cow can make a meal for many of them; but such food is abundant, at least in the fall of the year, where the dry pasturage has been destroyed by fire, accidentally or intentionally, by the Indians. These fires extend over large tracts of country, and in consequence many cattle perish, as well as from the summer drought.

It is not uncommon to see them assemble with the gulls, and greedily devour the carcasses of whales which have been cast ashore; they will also frequently pursue wounded game.

The male in perfect plumage has the skin of the head and neck orange-yellow, and the irides carmine.

2. C. AURA, (Linn.) Illig. Turkey Vulture.

The Turkey buzzard is quite as abundant and familiar in California as it is in the southern parts of the United States. It is seldom molested, on account of its useful-

\*I may mention here an instance of the great disposition in the Vultures to become domesticated, and to show how much they differ in character from the other Accipitres with which they are classified. A Condor, which I saw in Valparaiso, Chili, during the early part of the year 1845, was allowed to roam the city at large, and from its remarkable docility received kind treatment from every one. It would follow and walk alongside of a person like a dog, for a considerable distance, and offer no resistance to being handled or have its feathers or wings smoothed down. It would walk up a long hill leading to a part of the city where the foreigners resided, and when tired of the place, or after having obtained all it could procure to eat, would spread its huge wings and soar down to the city, alighting perhaps on a steeple or other lofty point. So good natured was it that it would receive the caresses of children, and permit them to beat it with switches, or even to attempt to get upon its back. It was fond of thrusting its bill into my pocket, and under the straps of my pantaloons, at the same time shutting its eyes and allowing me to rub and scratch its head. In fact, I think that I have never met with any bird which exhibited more tameness or greater confidence in man than this large and remarkable Condor. They appear to be frequently caught by the Peruvians and Chilians, and thus tamed; on the mole of Callao (Peru) I have several times seen nearly full grown birds exposed for sale, being confined only by a strong string passed through their open nostrils.



ness in ridding the neighborhood of the towns and farm houses of the refuse of the cattle, which are slaughtered in such great numbers.

The Carrion Crow (*C. atratus*, Wils.) is very common about the Gulf of California, and at Mazatlan, particularly, may be seen around the town in large gangs. In company with them I think I have also seen that distinct species intermediate between the two, detected in the collection of the Academy, and described by my friend Mr. Cassin.\* Probably both may be found in Upper California.

#### HALIAËTUS, *Sav.*

##### 3. H. LEUCOCEPHALUS, (Linn.) *Sav.* Bald Eagle.

Abundant; in winter feeding on the ducks and geese which cover the plains in immense flocks.

I have found the nest on high isolated rocks along the coast, containing eggs as early as the middle of February.

An interesting circumstance connected with this noble eagle, as the emblem of our country, is, that it was held sacred by the native tribes of Indians of the coast and interior of California.

Another large brown Eagle, the *Aquila réal*, is said by the Indians and others to be occasionally observed here.

#### PANDION, *Sav.*

##### 4. P. CAROLINENSIS, (Gmel.) *Bonap.* Fish Hawk.

Common along the coast, particularly the rocky islands, where they breed. At Santa Catalina I found them nesting on the precipitous cliffs, in February, along with the bald eagles.

#### ARCHIBUTEO, *Brehm.*

##### 5. A. SANCTI JOHANNIS, (Gmel.) *Gray.* Rough-legged Buzzard.

Common in the prairie-valleys during winter, keeping much on the ground. The adult in his dark livery, although frequently seen, is much less common than the young.

#### BUTEO, *Bechst.*

##### 6. B. BOREALIS, (Gmel.) *Swains.* Red-tailed Buzzard.

Very abundant; as also in the interior in the ranges of the Rocky mountains.

##### 7. B. LINEATUS, (Gmel.) *Jard.* Red-shouldered Buzzard.

The shrill *kee ou* of this handsome species may be heard at all times around the vineyards and farms of the lower portions of Upper California, where it is more abundant than about Monterey.

\* *Cathartes Burrovianus*, Cassin, *Proceed. Acad. Nat. Sciences*, Vol. II., p. 212.

8. *B. SWAINSONI*, Bonap. Rocky Mountain Buzzard.*Buteo montana*, Nutt. Man., p. 112, 2d ed.*B. vulgaris*, Aud., pl. 372, et auc.

This species was first brought from the fur countries by Richardson, who considered it identical with the European *Buteo vulgaris*.

Bonaparte, in his comparative list of the birds of Europe and America, distinguishes it by the specific name of *Swainsoni*, quoting Audubon's description and plate of the specimen brought from Oregon by Townsend.

My friend Nuttall retains the common buzzard as an inhabitant of the fur countries, on the authority of Richardson, and refers Bonaparte's synonym to that species, describing this, which he considers sufficiently distinct, under the name of White-throated Buzzard, *Buteo montanus*.

Richardson describes the nest as containing from three to five eggs, equal in size to those of the common fowl, and of a greenish white colour, with a few dark brown blotches at the thick end.

A. L. Heermann, M. D., during a recent trip to the prairies, found this species breeding near the Platte River, and also procured the egg, of which he kindly furnished me with a drawing and description. It is considerably smaller than that of the European buzzard, and differs from it in being pure white, with a few dark brown blotches on the smaller end, while the latter is of a bluish or greenish tinge, with faded marks of a neutral tint, apparently sunk into the shell, and scattering blotches of dark brown. The account given me of its nest by Dr. Heermann agrees so exactly with that of Richardson, that I have no doubt of its being the same bird.

ELANUS, *Sav.*9. *E. LEUCURUS*, Bonap. White-tailed Elanus.

This active, beautiful hawk, is not unfrequent in California. At the Mission of St. John, between Monterey and the Bay of St. Francisco, I procured three specimens in one day. It flies low and circling over the plains in the manner of a marsh hawk, feeding on the small birds which are so abundant on the ground. It is easy of approach when perched on trees, and utters a very loud shrill cry, particularly when wounded and caught, at the same time fighting viciously.

FALCO, *Linn.*10. *F. ANATUM*, Bonap. Peregrine Falcon.*F. peregrinus*, Wils., Aud.

Occasionally seen along the coast, nesting on cliffs near the sea.

11. *F. COLUMBARIUS*, Linn. Pidgeon Falcon.

Common throughout the Western coast.



CERCHNEIS, *Boie*.

- 12.
- C. SPARVERIUS*
- , (Linn.) Boie. Sparrow Hawk.

This familiar little species is abundant throughout the country.

ACCIPITRE, *Briss*.

- 13.
- A. FUSCUS*
- , (Gmel.) Gray. Sharp-shinned Hawk.

Our pugnacious and daring little marauder appears to be distributed over the whole of North America.

- 14.
- A. COOPERII*
- , (Bonap.) Gray. Cooper's Hawk.

The most remarkable similiarity exists between the plumage of this species and the former in every age ; and although the great difference in size renders it impossible to mistake them, I think that if we depended upon the plumage alone, few sufficiently distinguishing marks could be given. We find, in fact, in every department of natural science, that those characters, which in one genus or family can be relied upon as showing specific differences, are, in others, almost useless, or at best perplexing.

This bird is common throughout the Pacific coast.

CIRCUS, *Lacep*.

- 15.
- C. HUDSONIUS*
- , (Linn.) Vieill. Marsh Hawk.

In low valleys or marshes throughout California, the Rocky Mountains, and New Mexico, we are sure to find this widely disseminated species.

BUBO, *Cuv*.

- 16.
- B. VIRGINIANUS*
- , (Gmel.) Bonap. Great Horned, or Cat Owl.

Common in the wooded regions of Upper California.

STRIX, *Linn*.

- 17.
- S. PERLATA*
- , Licht. American Barn Owl. Verzéichniss d. doubl. des Berl.

Mus. p. 59. De Wied's Zoology of Brazil, vol. iii., part 1, p. 263.

*S. flammea*, Wils. Amer. Orn. vol. vi., pl. 50, fig. 2.

*S. furcata*, Temm. Planche's col. 432.

*S. pratincola*. Bonap.

*S. Americana*, Aud. Bds. of Amer., pl. 171.

The American Barn Owl was first distinguished from the European, by Lichtenstein, in his catalogue of the duplicates of the Berlin Museum, published in 1823, under the name of *Strix perlata* ; and afterwards by the Prince de Wied, who described it more at length, and drew the distinctions between it and the true *S. flammea*. It was again described and figured by Temminck, in the *Planches Coloriées*, under the very inappropriate name of *S. furcata*, the tail in some speci-

mens only being slightly emarginate. Bonaparte, in the Comp. List of the Birds of Europe and North America, bestows upon it the name of *S. pratincola*, and lastly, Audubon, that of *S. Americana*.

After comparing the specimens from North and South America and Mexico, contained in the Wilson collection, I am satisfied that all these names have been given to a single species, which is distributed over the whole of the tropical and temperate Americas.

The geographical distribution of this species upon the American continent is one of interest when compared with that of the *S. flammea* of the old world. The latter is also confined to the temperate and tropical regions, being found throughout Africa, and in Europe extending only as far north as Denmark, decreasing in numbers as we proceed northward.\*

The American *S. perlata* appears to be confined within the 40° of latitude on each side of the Equator, becoming rare in Chili, more abundant in Peru, Brazil, the West Indies and Mexico, but with us again becoming rare as we approach the middle states, beyond which it has not been seen.

On the Pacific coast I found it as far north as the 37° of latitude, but it is not included in the lists which have been given of the birds of Oregon.

Even were the distinctions between the two birds less marked, I should look upon the fact, that in neither continent do they approach the arctic regions, at the same time that they are spread over so vast an extent of country, as constituting one of the best grounds for their being considered distinct.

Although much has been said of the difference of colour in the two species, I can discover none; on the contrary, there is the most perfect resemblance in every respect, except in size and proportions. The length of the wing in the *S. flammea* is 11½ inches, in the *S. perlata* it is 13½ inches; the tail in the former is 5 inches, in the latter 5½. In the size of the bill there is considerable difference, but more in the tarsus, which in the European is about 2½ inches in length, while in ours it is 3 inches or more, and, as well as the feet, are very much larger and stouter.

Young birds of both species are of a light rust colour beneath, speckled with roundish dusky spots. In the adult they become pure white beneath, a few of these spots only remaining upon the sides; the colour above is also very much changed, growing quite pale.

This delicate feathered and familiar owl, is in California sufficiently abundant, and presents all the habits ascribed to its European relative. Its favourite resort is in the neighbourhood of the towns and Missions, although it may be found also about farm houses, and occasionally in prairie valleys, which furnish it with abundance of

\* Yarrell's British Birds, vol. 1, p. 129.



mice and other small animals for subsistence. Its nesting place is under the tiled roofs of the houses of the towns, numbers under one roof, and shows but little fear when approached. I have scarcely ever visited a Mission without disturbing some of these birds, which were roosting about the altar, chandelier, &c., of the chapel, and hearing the benediction of the Padre for drinking all the oil out of the lamps. Every where in California, when speaking of it, we are sure to be told of its propensity for drinking the sacred oil; a trait which has also been noticed in the European species.

The specimens which I have examined agree in every respect with those from this side of the continent, and present the constant characters of larger size, and greater length of wings and tarsi, which at once distinguish it from the European species.

#### ATHENE, *Boie*.

18. A. SOCIALIS, Gamb.. Burrowing Owl. Proceed. Acad. Nat. Sci., Vol. II., p. 74.  
*Strix cucularia*, Bonap., Aud., Nutt.

This bird, which hitherto has been considered the same throughout the wide range of North and South America, may, perhaps, be separated on as good grounds as many of the owls which are generally admitted to be distinct. It is unnecessary to repeat here the excellent descriptions which have been given by Bonaparte and Audubon of North American specimens of the burrowing owl. I shall merely state wherein I think ours differs from the South American.

It seems to differ in the general colour, being lighter in our species: with the markings and quills usually of a pale yellowish or cinnamon hue, while in the other it is much deeper and approaching dusky.

The most marked difference exists in the feet and legs, which are in ours slender and delicate, while in the other they are longer and much stouter.

The wings are shorter, and have the first and fifth quills equal; if any thing, the first longest; in the South American the fifth quill is considerably longer than the first.

I have not yet been able to institute a satisfactory comparison between these species, but in those I have compared, the great difference in the proportions of the wings and tarsi, seems to indicate specific distinctions; that of colour is but of little value, without extended comparison of all ages and sexes.

The Prince de Wied, in his *Beiträge zur Naturgeschichte von Brasilien*, says that he is satisfied that the North and South American Burrowing Owls are distinct species, but judges alone, I believe, from plates and descriptions. The Coquimbo burrowing owl of Brisson is evidently distinct from either, being much larger, and having the tail of a dirty white colour without spots.

I have seen this bird in various parts of Mexico, in the Rocky Mountains, and California; in each place presenting but little difference in its habits. It always

lives in burrows in the ground, either solitary, as I have frequently seen it, or in small companies. If it can avail itself of the labours of other animals, it will always do so, so that it is a constant interloper in the habitations of the prairie dogs, and in California in those of the large ground squirrel, which is there so very common. It however often digs for itself, and lives in scattered companies of four or five.

Nuttall is, I think, mistaken with regard to its migrating from California in August. I have seen it there at all periods of the year.

On the prairies its note is said to resemble that of the Marmots, with which it is associated. The account which Vieillot gives of its nocturnal habits and note, has been doubted by Bonaparte and my friend Nuttall, but during the breeding season, while sleeping near their burrows, I have been awakened by its low, measured and solemn cry, uttered much in the manner of its congeners, something like *hoo hoo hoo o*, but peculiarly solemn. An aspirated *whóh, whóh*, is also a common note.

NYCTALE, *Brehm*.

19. N. ACADICA, (Gmel.) Little Night Owl.

I procured but one specimen of this species at Monterey in October.

HIRUNDO, *Linn*.

20. H. THALLASSINA, Swains. Violet-green Swallow.

This beautiful species I found passing to the northward through California, in the spring.

21. H. FULVA, Vieill. Republican Swallow.

This is the most abundant swallow on our western coast, and arrives in California about the latter part of February or beginning of March. They immediately resort to the neighbourhood of the towns, missions and farm-houses, and soon commence repairing their old retort-shaped nests, with which sheltered walls, the eaves, and even window frames of the houses, are sometimes nearly covered. The nest is also frequently made on the trunks of large trees in the woods. They are very loath to quit their old nesting places, and will persist in building them up, however often they may be destroyed either by rain or the inhabitants.

CHELIDON, *Boie*.

22. C. BICOLOR, (Vieill.) Bonap. White-bellied Swallow.

This is also a common species, and a few appear to remain all winter, but the greater part arrive towards the close of February. At Santa Barbara, I found their nests, as usual, in the knot holes of the evergreen oaks in April.

COTYLE, *Boie*.

23. C. RIPARIA, (Linn.) Boie. Bank Swallow.

Common; burrowing their nests in the sandy banks of small streams and creeks, which have worn deep ravines.



I also observed another swallow, not far from Monterey, in August, with a deeply forked tail, like our barn swallow, but apparently differently marked.

CERYLE, *Boie*.

24. C. ALCYON, (Linn.) Boie. Kingfisher.

Common along the whole of the western coast. In California it is never observed to frequent the inland streams and creeks, being exclusively found along the rocky shores and islands.

CALLIPHLOX, *Boie*.

25. C. RUFA, (Gmel.) Boie. Rufous Humming-Bird.

This beautiful little flame bearer is not unfrequent throughout California.

26. C. ANNA, (Less.) Gamb. Anna Humming-Bird.

*Trochilus icterocephalus*, Nutt. Man. Orn., vol. 1, 2d ed., p. 712.

A very abundant and interesting species, numbers passing the winter in California; at such times inhabiting sheltered hill sides and plains; where, at all seasons, a few bushy plants are in flower, and afford it a scanty subsistence. They appear, however, in greater numbers about the latter part of February and during the month of March; the country is soon carpeted with flowers, and the Anna humming bird, revelling among their sweets, commences the duty of rearing its young. About the Pueblo, the vineyards and gardens are its favourite resort, forming its delicate downy nest in a small flowering bush, or some concealed spot about the fence. In April or May these may be found in almost every garden.

In other parts it attaches its nest almost exclusively to a low, horizontal branch of the evergreen oak, (*Quercus agrifolia*) so common throughout the country; the nest is small, being about an inch in depth and one and a quarter in diameter; it is not very thick, and is formed in the most delicate manner of pappus and down of various plants, held together and matted into a soft felt with spider's webs, which latter I have frequently observed them collecting for the purpose in the spring along hedges and fence rows, and at first supposed they were only searching them for the gnats and small insects which might be entangled; but in a nest which I now have, the base is formed of a few dried male aments of the oak, which, with the adjoining felt-like matting of pappus, is agglutinated and bound around the twig with a thick layer of spider's web. The eggs, as usual, are two, white and elliptical. The note resembles that of the Rufous humming bird, and is a slender *chep*, frequently repeated; but during the breeding season they are very pugnacious, and the little combatants dart through the trees, like meteors, uttering a loud and repeated twittering scold. It has the same habit also, that has been remarked in the Rufous humming bird, that of ascending in clear weather to a considerable height in the air, and then descending with great rapidity, uttering at the same time a peculiar note.

Nuttall, who brought this species from California, did not procure the male, but saw it frequently, and supposed it to have a yellow spot on the crown. I discovered that that which deceived him in this respect was the glutinous pollen of a tubular flower upon which it feeds, adhering to the rigid feathers of the crown, and making it look as if it really had a yellow head. I have also seen the bill for half its length covered in the same manner.

SITTA, *Linn.*

## 27. S. CAROLINENSIS, Briss. Carolina Nuthatch.

This species is common in the pines of the Rocky Mountains, and also in the wooded regions of the western coast.

## 28. S. CANADENSIS, Linn. Canada Nuthatch.

I found this little wanderer very abundant in the mountains of the interior of California in October, roving in company with busy flocks of the *Parus montanus*, nobis.

## 29. S. PYGMÆA, Vigors. Pigmy Nuthatch.

Extremely abundant in winter in Upper California, sometimes almost covering the trunks and branches of the pine trees, through which they exclusively forage. Around Monterey, particularly, the trees at times are alive with these noisy little creatures, incessantly uttering their monotonous querulous notes as they run around the branches. The note is generally a repeated whistling, *wit, wit*, which, when one commences, the rest join in; they also utter a whistling trill, at the same time industriously searching the tree throughout, and only leaving it when every crack has been examined for the concealed insect fare.

TROGLODYTES, *Vieill.*

## 30. T. BEWICKII, Aud. Bewick's Wren.

*T. spilurus*, Vig. Zool. Beechey's voyage.

Common, keeping in low bushes and piles of brush, as well as about old dead trees and logs, over and around which it flits with the greatest activity, uttering, when approached, the usual grating scold of the wrens.

## 31. T. ARUNDINACEUS, Vieill. Marsh Wren.

*Certhia palustris*, Wils.

I found this species in small reedy marshes in the Rocky mountains of the interior, in October.

## 32. T. AMERICANUS, Aud. Wood Wren.

A summer resident among the evergreen oaks of California, in which it sings and breeds.



Lesson, in his *Traité de Ornith.*, p. 400, gives a *Troglodytes Americanus*, from Cayenne, which had been so named by Cuvier, in the *Gal du Paris*; but as no description appears to have been published, Audubon's name must remain good.

Genus \*CHAMÆA.†

Bill short, tapering to the point, acute and compressed. Both mandibles entire, ridge of upper elevated, and curving nearly from the base; the depression for the nostrils large, oval, and exposed; the nostrils opening beneath a membrane in the depression. Wings very short and much rounded. Tail very long and graduated. Tarsus long. This genus belongs to the sub-family *Menurinae* of Gray.

PLATE VIII., fig. 3.

33. C. FASCIATA, Gamb. Ground Tit. *Proceed. Acad. Nat. Sc.*, vol. iii., p. 154.

*Parus fasciatus*, Gamb., *Proceed. Acad. Nat. Sc.*, vol. ii., p. 265.

Male.—Feathers of the head elongated, erectile into a crest; head greyish brown, inclining to bluish grey on the cheeks and sides of the neck. Back, rump, margins of wing and tail feathers olive brown. Beneath pale rufous, slightly mingled with bluish grey about the throat and breast, and with brownish about the flanks and vent. Wings and tail dusky brown, the latter distinctly barred throughout with a darker colour, having from twenty to twenty-five bars, the quill feathers also barred in the same manner on their inner webs. Bill and feet dark horn colour. Feathers between nostrils and eye whitish. Wings short and rounded. 1st quill an inch shorter than 5th, 6th and 7th, which are longest. 3d shorter than 9th to 12th, from flexure  $2\frac{1}{4}$  inches. Tail very long, cuneated,  $3\frac{1}{4}$  inches in length; two outer feathers  $1\frac{1}{4}$  inches shorter than middle ones. Tarsus long and slender, 1 inch. Total length about 5 inches, extent of wings the same.

The bars on the tail and wings in some specimens are more indistinct than in others.

This interesting bird, placed provisionally among the Titmice, I have made the type of a new genus, not being able, as yet, to find a suitable place for it, among those already described.

For several months before discovering the bird, I chased among the fields of dead mustard stalks, the weedy margins of streams, low thickets and bushy places, a continued, loud, crepitant, grating scold, which I took for that of some species of wren, but at last found to proceed from this Wren-Tit, if it might be so called. It is always difficult to be seen, and keeps in such places as I have described, close to the ground; eluding pursuit, by diving into the thickest bunches of weeds and tall grass, or tangled bushes, uttering its grating wren-like note whenever an approach is made towards it. But if quietly watched, it may be seen, when searching for insects, to mount the twigs and dried stalks of grass sideways, jerking its long tail, and keeping it erect like a wren, which, with its short wings, in such a position it so much resembles. At the same time uttering a very slow, monotonous, singing, chickadee note, like *pee pee pee pee*; at other times its notes are varied, and a slow, whistling,

† From *χαμαι*, on the ground.

continued *pwit, pwit, pwit, pwit, pwit*, may be heard. Again, in pleasant weather towards spring, I have heard them answering one another, sitting upon a low twig, and singing in a less solemn strain, not unlike a sparrow, a lively *pit, pit, pit, tr r r r r r r r*; but if disturbed, at once resuming their grating scold.

PARUS, *Linn.*

PLATE VIII., fig. 2.

34. P. \*INORNATUS, Gamb. Plain Titmouse. *Proceed. Acad. Nat. Sc.*, vol. ii., p. 265.

Male.—Crested: above olive brown; beneath greyish white, with a slight tinge of brownish on the flanks. Front close to bill, round eye and ears grizzled grey. Crest high and pointed like that of the *P. bicolor*. Bill and feet leaden-blue, the former very stout and blunt. Wings and tail dark-brown, the feathers edged with the same colour as the back; some of the primaries also with a faint edging of whitish. Irids wood-brown. 1st primary half the length of the 2d; 4th, 5th and 6th equal. Extent of wings a little over 8 inches. Wing from flexure  $2\frac{3}{8}$  inches. Tail nearly even,  $2\frac{1}{2}$  inches. Total length  $5\frac{3}{8}$  inches.

The Plain Titmouse I first discovered near Monterey, on the 20th of November. It was actively flitting about among the evergreen oaks of the vicinity, in company with large flocks of the Chestnut-backed and Least Titmouse, all in restless activity, searching every branch for insects.

Among the busy throng I could not well distinguish its notes, but they appeared to resemble very much those of the common Black-cap, and on my following it up, uttered a loud scold, erecting its high and pointed crest, and looking as angry as possible at the intrusion.

I afterwards found it common, frequenting in small flocks tall bushes and branches of low trees, uttering a weak and slender *tsee day day, tsee day day dait*.

PLATE VIII., fig. 1.

35. P. \*MONTANUS, Gamb. Rocky Mountain Titmouse. *Proceed. Acad. Nat. Sc.*, vol. i., p. 259.

Male.—Head, upper part of the back, throat, and upper part of the breast pure black; two white stripes commence on the front and extend over the head about the length of it, leaving a black band in the centre and a stripe running over each eye to the nape; cheeks and shoulders white. Wings and tail brownish grey; beneath whitish; tinged with brown on the sides and vent. Legs bluish. Length a little over five inches. Tail two and a half inches.

This new and distinct species I first observed about a day's journey from Santa Fe, in New Mexico, and from thence in all the ranges of the Rocky Mountains nearly to California. Its manners and notes are very much like those of the common Chickadee, but the latter are more weak and varied. It keeps also much in low bushes, where, from morning to night, with untiring patience and activity, it may be seen hopping from bush to bush, searching them minutely for small insects. It also frequently descends to the ground to pick up small seeds; when thus occupied it

occasionally stops, looks around and utters a slender *tě dē dē dē*, then altering to *dě dě dăit*, flies off to some other bush. On the Rio Colorado it kept much in the cotton wood trees which grew along its banks, and its notes, which became familiar, were almost the only ones heard in the winter, when we were there, to cheer our course. This species is sometimes seen in company with the *P. minimus* and *Regulus calendula*, which at this time are roving in large and busy flocks along the small streams.

Although so very abundant in the western ranges of the Rocky Mountains, particularly near the great Salt Lake, where in some of the high wooded mountains the trees were almost alive with them, yet I never saw them on the other side of the Californian ridge, much to my surprise, where the other species of Titmice so abound. It is at once distinguished from the *P. atricapillus*, by the two white lines running over the top of the head to the occiput, and by its much larger and stouter bill.

36. *P. RUFESCENS*, Towns. Chestnut-backed Titmouse.

In the latter part of summer and during the winter season, the young of this species are found around Monterey in large flocks.

37. *P. MINIMUS*, Towns. Least Titmouse.

This interesting and most diminutive bird, is exceedingly abundant in the Rocky Mountains and California. During winter, the otherwise cheerless woods are alive with busy, noisy troops of these industrious birds, gleaning their scanty fare in company with the Ruby-crowned Kinglet, in every possible manner and position from bush or tree.

It is curious to watch them in this anxious solicitous search for food, keeping up a continual twittering; so intent are they in their employment, that they appear to lose sight of danger, and often have I been so surrounded by a flock, that I could have almost caught them in my hands.

The above new species, together with the *P. septentrionalis*, recently described by my friend, Mr. Edward Harris, in the Proceedings of the Academy, have increased the number of North American Titmice, exclusive of the Ground Tit, to nine species.

REGULUS, *Cuv.*

38. *R. CALENDULA*, Licht. Ruby crowned Kinglet.

This species, like many of the most diminutive birds, is also found distributed over the whole extent of North America, thereby showing its connexion as a single zoological centre, or province of creation.

In the highest ranges of the Rocky mountains, we met with the Ruby-crowned Wren in large flocks; roaming in company with the *Parus minimus*, also in large flocks; enlivening those dreary solitudes with their restless activity and twittering while in search of food. Throughout California it is equally abundant.



ANTHUS, *Bechst.*

## 39. A. LUDOVICIANUS, Licht. American Titlark.

This species appears to be one of the most extensively distributed of North American birds being found throughout the length and breadth of our country. In the desert regions, between Santa Fé and California, it was one of the few birds we met with; then going in small flocks, either on the plains among arid *Artemisia* and sage bushes, or along the courses of rivers and small streams. In California it is abundant, particularly in winter, when it frequents the seashore to pick up insects, and perhaps small shells, from the seaweed which is cast ashore.

SIALIA, *Swains.*

## 40. S. ARCTICA, Swains. Arctic Blue bird.

This beautiful azure songster is common throughout the northern provinces of Mexico. In the neighbourhood of Santa Fé it is abundant, keeping about the houses and gardens, where they breed, sometimes forming its nest in boxes which are stuck up for the purpose by the inhabitants. In the ranges of the Rocky Mountains, as far as California, we frequently found it, and always associated with the *S. Mexicana*, both at this season occasionally uttering their cheerful song to remind us of home.

## 41. S. MEXICANA, Swains. Western Blue bird.

*S. occidentalis*, Towns., Aud.

This species is found throughout the Rocky Mountains in company with the former, and in California is by far the most abundant species. In April and May I found it breeding in the knot holes of the evergreen oaks. During winter they assemble in small flocks, and frequent the weedy plains and valleys of the mountains.

TRICHAS, *Swains.*

## 42. T. MARYLANDICA, (Linn.) Swains. Maryland Yellow Throat.

This species, distributed throughout the whole of North America is common, both in the Rocky Mountains and California.

VERMIVORA, *Swains.*

## 43. V. CELATA, (Say) Jard. Orange-crowned Warbler.

Flocks of this species are common during winter in Upper California, frequenting low bushes and margins of streams. On the Island of Santa Catalina, in early spring, I heard its simple though lively song, commencing in a loud sweet trill and ending *tshé up*, sometimes considerably varied, but generally *er r r r r r tshé up*.

SYLVICOLA, *Swains.*

## 44. S. AUDUBONI, (Towns.) Bonap. Audubon's Warbler.

This handsome warbler is abundant throughout the West. I first observed it in

New Mexico, thence through the ranges of the Rocky Mountains to California, where, particularly during winter, the young birds are found in large flocks, and generally in the tops of trees. In habits as well as appearance they much resemble the yellow Rump, *S. coronata*, and like them also, display a great deal of familiarity, entering the towns, and resorting to gardens and fence rows, and even the *corrals* of the houses; frequently, also, descending to the ground with the Blackbirds and Sparrows.

SYLVANIA, *Nutt.*

45. *S. PUSILLA*, (Wils.) Nutt. Green Black-capped Flycatcher.

*Wilsonia pusilla*, Bonap.

*Myiodyctes Wilsoni*, Aud.

This pretty little Sylvan Flycatcher is common both in the Rocky Mountains and California.

CULICIVORA, *Swains.*

46. *C. CÆRULIA*, (Lath.) Swains. Blue-grey Flycatcher.

Abundant in Upper California.

MYIOBIUS, *Gray.* (*Tyrannula*, *Swains*)

47. *M. PUSILLA*, (Swains.) Gray. Little Pewee Flycatcher.

*Tyrannula pusilla*, Swains.

I observed this species to be plentiful about the Pueblo de los Angeles in Upper California, where most probably they breed. During the month of April, it frequented the hedges of vineyards and neighbouring trees, uttering a sweet and considerably varied song. The following description of an adult killed there in the spring, may be useful, to show that it is the same bird as that described by Swainson in the Arctic Zoology, and found in Labrador by Audubon. Above greenish olive; wings and tail dusky brown, the coverts tipped with dull white, forming two bands on the wing; the tertiaries also broadly edged with the same. Below yellowish, brightest on the lower part of the throat and breast, and on the abdomen. Feet and legs bright lead-blue. A yellowish ring around the eye. Upper mandible black, the lower pale flesh colored; inside of both orange. Tail even,  $2\frac{1}{2}$  inches; wings  $2\frac{3}{8}$  inches. Tarsus  $\frac{3}{8}$ . Bill along ridge about  $\frac{3}{8}$ , from angle of mouth  $\frac{3}{8}$ . Total length 5 inches. First quill a little shorter than the 6th; 3d and 4th nearly equal. The bird has a conspicuous crest.

48. *M. SAYA*, (Bonap.) Gray. Black-tailed Pewee.

*Tyrannula pallida*, Swains. Syn. Bds. of Mexico.

This species, common throughout the western regions of our country, is particularly so in California and the northern provinces of Mexico. Its manners much resemble those of the common Pewee, frequenting the neighbourhood of towns, weedy

hill sides and plains, darting from twig to twig after passing insects, jerking its tail, and merely uttering a single weak and singing *chip*, or an occasional guttural twitter, but very different from the harsh angry *tship* of the *T. nigricans*, with which it is so often associated. It breeds in California, and no doubt, like its dark companion, about the houses and Missions, but I did not find its nest.

49. *M. NIGRICANS*, (Swains.) Gray. Black Pewee.

*Tyrannula nigricans*, Swains, Aud.

This bird is abundant in California, and like our common Pewee is particularly fond of being near the habitations of man: with the utmost confidence, it is seen familiarly flying about the corals and gardens, and even the very doors; over which, on a projecting beam, about the middle of April I found its nest. It was large for the size of the bird, and consisted of a solid round mason work of clay, intermixed with fibres of grass, &c., and lined with a thin layer of softer materials, blades of grass, fine strips of bark from the neighboring vineyard, and horsehair, and contained five whitish flesh coloured eggs, one or two of them with a few specks of reddish at the larger end. This was the second nest which had been built that year; the first near the same place having been destroyed by the occupant of the house, this was commenced still nearer the door. I was informed that it was difficult to get them to leave the place they had once selected for their nest, and that if it were torn down they would at once commence forming another. The previous year three successive nests had been destroyed.

These birds are constant residents in California; and, as well as near the towns, are also distributed over the whole country, either in the margins of woods, or bushy plains, and almost always in pairs. They are very pugnacious, and are often seen fighting together in the air, and darting after each other from branch to branch, at the same time uttering their peculiar loud and angry *tship*, which can always be recognized. From the arrangement of its colours, at a little distance, when sitting with their breasts towards you, they are easily mistaken for Snow birds.

50. *M. CRINITUS*, (Linn.) Gray. Great-crested Flycatcher.

*Tyrannus crinitus*, Swains.

This species is common around Santa Barbara, where they breed in the knot holes of the evergreen oaks; and near Monterey, during winter, I have frequently seen them, occasionally uttering their *payup* note as they flew after passing insects.

#### SAUROPHAGUS, *Swains.*

51. *S. SULPHURATUS*, (Linn.) Swains. Common Lizard-eater.

*Pitangus Sulphuratus*, Swains.

*Lanius sulphuratus*, Linn.

This beautiful bird is extremely abundant about the Gulf of California.



## 52 S. \*BAIRDII, Gamb. Baird's Lizard-eater.

Head, sides of neck, back and scapulars, greyish brown; rump, tail and exterior margins of wing-feathers and coverts, bright ferruginous; wings, with the exception of their broad outer and inner margins, shafts of the tail-feathers and streak on each side down their centres, hair brown; throat greyish; upper part of breast dirty yellowish; all the rest beneath dull sulphur yellow, tinged on the sides and beneath the wings with ferruginous, brightest on the belly and thighs, and becoming somewhat duller on the lower tail coverts; front and broad line to eye black; auriculars dusky; feathers of the top of the head, except at their tips, bright orange yellow; bill and feet dusky, base of lower mandible pale. Tail even.

Length 9 inches; wing from flexure  $4\frac{7}{8}$  inches; tail  $4\frac{1}{4}$  inches; tarsus 1 inch; bill along ridge  $\frac{7}{8}$  of an inch; from angle of the mouth  $1\frac{1}{4}$  inches.

This interesting species forms a connecting link between the genera *Saurophagus* and *Myiobius*, but from its colours and general appearance seems to belong more properly to the former. It is readily distinguished from the *S. sulphuratus* by the entirely different markings of the head; its bright ferruginous rump; the dulness of its colour beneath; and by its very different proportions. The bill is much smaller; the tail longer; and the tarsi, though of the same length, very much more slender and delicate.

For the opportunity of describing this fine species, I am indebted to my friend Prof. S. F. Baird, of Carlisle, Pennsylvania; who received it from California, and in honour of whom it is named.

## TYRANNUS, Vieill.

## 53. T. COOPERII, Nutt. Olive-sided Flycatcher.

*T. borealis*, Swains.

I found this species scatteringly in the Rocky Mountains: it is quite abundant in the pine woods of upper California, for which it appears to have a great partiality. In the latter part of July I killed the young, not yet fully fledged, in the pines near Monterey, where they must have bred.

## 54. T. VERTICALIS, Say. Arkansas Flycatcher.

This tyrant is an abundant resident in California. Around the Pueblo de los Angeles it takes possession of the hedges of the vineyards, orchards and gardens; noisy, pugnacious, and ever on the alert, it suffers no intrusion upon its dominions; Hawk, Raven, or Crow, not even its own species, are allowed to pass unmolested. For this reason it has acquired the name of *Correcuerbo* (Crow-chaser) by the inhabitants, who also gladly allow them full possession.

## PTILIOGONYS, Swains.

## 55. P. TOWNSENDII, Aud.

This rare and singular bird, of which but a single specimen has been obtained in Oregon, I first met with, in October, on the banks of a small rocky creek, in the

Mountains between the Rio Colorado and California. Here, in the depth of solitude, it was flying along the stream, alighting on the rocks, and jerking its tail in a lively manner; feeding solely on buffalo berries (*Shepherdia*) which grew plentifully along its banks, and with which its stomach was crammed. We afterwards found it on one of the highest and most desolate mountains, near a small pool of water, to which, towards evening, various kinds of birds came to drink, and among them two individuals of this species, which I killed: but these, like the specimen procured by Mr. Townsend, were females. It appeared to have somewhat the manners of a flycatcher, and I never heard it utter a note.

#### TURDUS, *Linn.*

56. T. MINOR, Gmel. Hermit Thrush.

*T. nanus*. Dwarf Thrush. Aud. Orn. Biog. 5, p. 204. pl. 419; Nutt. Man. p. 396.

*T. solitarius*. Auc.

The confusion hitherto existing in the description of the nearly allied group of Thrushes to which this belongs, has rendered the determination of the species exceedingly difficult, and at best but a matter of uncertainty.

The Dwarf Thrush of Audubon was founded upon specimens from the Atlantic states, and no doubt upon the true Hermit Thrush.

Mr. Pickering, and also Mr. Nuttall, must have had the *T. olivaceus*, since characterized by Drs. Brewer and Giraud before them, and mistaking it for the Hermit Thrush, when they distinguished the *T. nanus* as a species.

An examination of specimens of the *T. minor* from the Atlantic and Pacific coasts of North America shows no difference in any way, except that perhaps the western one is somewhat smaller, yet the difference is scarcely appreciable. From the measurement of many western specimens I found its length to be  $6\frac{1}{4}$  inches, and the extent of wings  $10\frac{1}{2}$  inches; the tail, wings, and relative length of quills the same as in our eastern one, and in fact, I think it can in no possible way be distinguished as specifically different. A European specimen also of the same species, from the Rivoli collection, now in the Academy, is the same in every respect as our own.

That which is most remarkable in the character of this delicate and gentle bird, is its solitary and retiring disposition; avoiding the ruthless gaze of man, it glides into the deepest shade of forest or underwood, and is but seldom seen except unconsciously, when earnestly engaged, scratching upon the ground in search of food: or else, it be discovered while perched upon a low leafy branch or twig, when it allows a very near approach, as if depending for concealment and security upon the thickness of the foliage and bushes around.

In the wooded regions of the Rocky Mountains, I found it not uncommon, always keeping on, or very near the ground. It is very frequent throughout California, and

in the spring may be found in the retired hedges of the vineyards, where very possibly it breeds.

57. *T. MIGRATORIUS*, Linn. American Robin.

We found the Robin scatteringly throughout the Rocky Mountains, and a few are found at all seasons in California.

58. *T. NEVIUS*, Gmel. Varied Thrush.

I have only observed this beautiful species to pass through California during the spring and autumn, in silent flocks.

MIMUS, *Boie*.

59. *M. MONTANUS*, (Townsend) Bonap. Mountain Mocking Bird.

We occasionally met with individuals of this mocking bird along the bushy banks of streams in the interior, during September and October, then silent.

60. *M. POLYGLOTTIS*, (Linn.) Boie. Common Mocking Bird.

I observed a few of these in sheltered ravines during the winter, and in May, around Santa Barbara, the woods were ringing with their inimitable song, at this time, mimicking Bullock's oriole and the western blue bird.

TOXOSTOMA, *Wagl.* (*Harpes, Gamb.*)

Bill much longer than the head, arched from base, depressed; upper mandible broad and flattened, with the margins very sharp and entire; lower narrower and somewhat shorter. Nostrils basal, open, rounded. A tuft of hairs at base of upper mandible. Wings short and much rounded. Tail long, rounded. Feet and legs long and stout. Tongue short and flat. Colours plain.

61. *T. REDIVIVA*, Gamb.

*Harpes rediviva*, Gamb. Proceed. Acad. Nat. Sc., vol. 2, p. 264.

*Promerops de la Californie Septentrionale*, La Perouse. Atlas to Voyages, pl. 47.

Glossy brown above; beneath from lower part of breast fulvous, approaching to rufous on the vent and lower tail coverts. Throat greyish white, lower part of neck, breast and sides brownish, somewhat lighter than that of the back. A dusky line runs along the side of the throat from base of lower mandible. Ears large and open, auriculars loose and somewhat rigid, the shafts white, with the sparse hairy webs dusky. A dirty white line over the eye. Tail  $5\frac{1}{2}$  inches in length, rounded; beneath tinged with the fulvous colour of belly, and with traces of narrow dusky bars throughout its whole extent; two outer feathers about an inch shorter than middle ones.

Wings short and rounded; extent of both  $12\frac{1}{2}$  inches, each from flexure 4 inches. 1st primary about half the length of the 3d, which is shorter than 7th, 8th and 9th; 4th, 5th and 6th equal and longest. Tarsus  $1\frac{1}{2}$  inches; hind toe and nail, which is curved, 1 inch, the nail being about as long as the toe. Total length 12 inches. Bill black, long ridge  $1\frac{5}{8}$  inches, inner surface of upper mandible almost flat, the edges sharp and projecting; each mandible triangular; the lower narrower than the upper. Irids hazel.



This remarkable bird was first noticed by La Perouse, who figured it in the atlas to his voyages, and subsequently by Vieillot and Latham when treating of the *Tenuirostres*, on his authority, as a *Promerops*.

La Perouse, at Monterey, merely remarks—"we killed and prepared a *Promerops*, which most ornithologists believe peculiar to the ancient continent," and gives no further description in addition to the plate, which, although inaccurate in several particulars, serves to distinguish it.

Several of these Thrush-like birds with elongated bills having been described, some confusion in regard to them as yet, must necessarily exist.

Wagler, in the *Isis*, 1831, forms the genus *Toxostoma* for a species very nearly resembling my bird, but differing in size, colour beneath, and proportions; having a shorter bill, a much shorter tail, tipped with white, and somewhat longer wings.

This *Toxostoma vetula* of Wagler, is no doubt the bird figured by Temminck in the *Planches coloriées* 441, under the name *Pomatorhinus turdinus*, and which Swainson supposed was intended for his *Orpheus curvirostris*, another good species with a long bill, apparently common in Mexico, and extending even into Texas.

I have seen a specimen of this latter, in the possession of Mr. Audubon, which was brought from the borders of Texas by Major G. A. McCall, U. S. A., who says that it is a most delightful songster, and frequently kept in cages by the inhabitants, and that the iris is of an intense fiery red colour.\*

Among the undetermined birds of the Rivoli collection, I found two specimens identical with mine from California, but which were labelled "New Zealand, Verreaux." The species figured by Temminck is also put down as coming from New Holland, but it is more than probable that both are mistakes.

Gray, in the *Genera of Birds*, throws them all together under the name of *Mimus curvirostris*, which he could not have done had he compared the specimens. The *M. curvirostris*, beside colour, marking and proportion, has an entirely different bill, (although quite as long,) from the *T. rediviva*.

I regret not being able to give any account of the habits of this interesting species; the few specimens I have seen, were shot, hopping about on the ground near bushes at Monterey. Their stomachs contained the remains of coleopterous insects chiefly.

#### CINCLUS, *Bechst.*

##### 62. *C. Americanus*, Swains. American Dipper.

A few of these are found along the solitary streams of the interior.

\*This account of the *Mimus curvirostris*, (Swains.) Gray, agrees with what Swainson says was stated to him by Mr. Bullock, (see *Faun. Boreal. Amer. Orn.*, p. 191.) The following is the description of the species as given by Swainson in the *Philosophical Magazine* for 1827, viz.:—Gray; beneath whitish; throat and breast spotted; vent pale fulvous; bill long, curved. Total length  $10\frac{1}{2}$  inches; bill  $1\frac{1}{2}$ ; wings  $4\frac{1}{2}$ ; tail 5; tarsi  $1\frac{1}{4}$ .

ICTERIA, *Vieill.*

63. I. VIRIDIS, (Gmel.) Bonap. Yellow-breasted Chat.

The Chat arrives in California about the middle of April, and resorts to the hedges of vineyards, gardens and bushy places, where no doubt it breeds

It is very extensively distributed on our continent, as I observed it also common along the coast of Peru.

VIREO, *Vieill.*

64. V. SOLITARIUS, Vieill. Solitary Vireo.

During the latter part of summer and winter, the young birds of this species are abundant, frequenting low bushes and thickets, in small flocks.

LANIUS, *Linn.*

65. L. LUDOVICIANUS, Linn. Loggerhead Shrike.

*L. excubitoroides*, Swains. Northern Zool., p. 115, pl. 34.

In the Shrikes we are presented with a group of birds closely allied to each other, and undergoing such changes in plumage as renders them difficult to discriminate. Although examined with great care by Swainson in the Fauna Boreali-Americana, yet he appears to have laid too much stress upon characters subject to great variation; as size, relative length of quills and colour.

The adult of the Loggerhead is a beautiful bird, and might well have been called *excubitoroides*, for the resemblance in colour and markings to the European *excubitor* is very great. Above, it is of a clear pearl grey colour, with the upper tail coverts, and exterior edges of the scapulars, nearly pure white; beneath pure white; the quantity of white on the tail feathers varies, but generally is in proportion to the age of the bird.

The relative length of quills in the Shrikes is an uncertain character, and differs very much according to age. In the young of this species, the second quill is generally much shorter than the sixth, but in the adult, equals and may even exceed the sixth in length; the proportion of the third, fourth and fifth to each other is also exceedingly various, and indeed in each wing of the same bird it is very common to find the proportions of the quills differing very materially. This I have found to be the case in specimens of the European and both American species.

It is rather strange that this bird so abundant in the southern, western and north western portions of our country, should not be found in the middle and northern Atlantic states. In California it is very common.

66. L. SEPTENTRIONALIS, Gmel. Northern Shrike.

*L. borealis*, Vieill. Swains.

I found our Butcher Bird in the Californian ridge of mountains in November, but

did not meet with it along the coast during the summer, appearing to be replaced by the Loggerhead, which is a summer resident.

PERISOREUS, *Bonap.*

67. *P. CANADENSIS*, (Linn.) Bonap. Canada Jay.

We met with numbers of this plain and familiar bird in the Rocky Mountains of the interior.

CYANOCITTA, *Strickland.*

68. *C. STELLERI*, (Pallas) Strick. Stellers Jay.

This species is occasionally met with in the pine groves of the mountains from New Mexico to California.

69. *C. CALIFORNICA*, (Vigors) Strick. Californian Jay.

*Garrulus Californicus*. Vigors' Zool. Beechy's voyage.

*G. ultramarinus*, Aud. Nutt. non Bonap.

*Cyanocitta superciliosa*, Strick. Annals and Mag. Nat. Hist., 1845.

The Californian Jay has been hitherto confounded by American ornithologists with the Mexican *G. ultramarinus*, accurately described by Prince Bonaparte, in the Journal of this Society, in 1825, and afterwards described and figured by Temminck in the Planches coloriées, 439. It is strange that the Prince himself should have committed the same error of confounding the two species in his Comparative list of the Birds of Europe and North America, quoting at the same time Audubon's plate and description, which is clearly the *Californicus*.

The following are the distinctions between the two species :

CYANOCITTA ULTRAMARINA.

Much larger, 13 to 13½ inches in length.

Upper parts entirely blue; head and cheeks blue also, except space between the eye and bill, which is black.

The blue extending down the sides of the neck, but without a pectoral band.

Throat only, whitish; all the rest of the under parts of a dirty brownish white, darker on the breast.

Length of wing 7 inches.

Tail nearly even, length 6¾.

Tarsus 1¾ inches.

CYANOCITTA CALIFORNICA.

Length 11½ to 12 inches.

Back brown. A broad line of white spots extending over the eye the length of the head, and with the space anterior to the eye and auriculars dusky.

A crescent of blue surrounds the upper part of the breast.

Throat and upper part of breast white, streaked with lines of dusky; all the rest beneath the collar of blue, brownish white.

Length of wing nearly 5 inches.

Tail graduated or much rounded, length 5¾ inches.

Tarsus 1½ inches.



The *C. ultramarina*, by its greater size, blue colour above, and absence of pectoral band, together with its very different proportions, is easily distinguished from the *C. californica*, which is much smaller, has a brown back, a white superciliary line, a dull white throat, and breast surrounded by a collar of blue.

The *G. sordidus*, Swains. (Syn. Bds. Mex.) generally quoted as a synonym of the *ultramarinus*, does not agree very well with it, unless the description were taken from a young bird, in which the tail is irregularly rounded, and the size somewhat less.

The Californian Jay is a very abundant species, and a constant resident. In its actions it is exceedingly restless, and at the same time sprightly and graceful, ever flitting from tree to tree, uttering a harsh grating *jay, jay*, and sometimes altering it to *kay ic, kay ic*. Like all the Jays, they are very fond of scolding, and a troop of them will surround and follow almost any object that attracts their attention, with their teasing disagreeable cries.

CLEPTES,\* *Gamb.* (*Pica, Briss.*)

70. *C. HUDSONICUS*, (Sabine) *Gamb.* Common Magpie.

*Corvus Hudsonicus*, Sabine.

We frequently met with the Magpie on our route from New Mexico to California. It would linger around our camp to pick up the offal, and sometimes boldly steal the meat which was hung on the bushes around.

71. *C. NUTTALLII*, (Aud.) *Gamb.* Nuttall's Magpie.

[*Pica Nuttallii*, Aud.]

I felt great pleasure on arriving at Santa Barbara in Upper California, to see in its native haunts this distinct and beautiful Magpie, discovered by my friend, the indefatigable naturalist and traveller, after whom it is named; among others, a just tribute for the invaluable services he has rendered to natural science, during more than thirty years of his life, spent among us, in untiring investigation of the productions of our country.

In California at least, and where as yet it appears alone to have been found, this Magpie is exceedingly local, being confined, as far as I have observed, to the immediate neighbourhood of Santa Barbara, where, among the beautiful evergreen oaks (*Quercus agrifolia*) of the vicinity, it is abundant.

Sprightly and graceful in its movements, it is a favourite with the inhabitants; and when not molested shows considerable confidence, often being seen about the

\* Κλέπτης, a thief.

It may seem presumptuous to alter the name *Pica*, but if a similar thing is done in other instances, why not in this? *Tyrannula* has been rejected by Gray and Gould because there existed a genus *Tyrannulus*, and those who are interested in the reform of nomenclature, think that a mere difference of termination in generic names, is apt to lead to confusion.

doors of the houses, but becoming remarkably shy and cautious when chased or shot at. During my stay, from frequently shooting at them, although at first they were numerous in small flocks, they at length became so scarce that during the breeding season very few were to be seen, apparently having gone to the ravines of the neighbouring mountains, so that I did not find a single recent nest, although the woods contained many of those of the last year. The old nests were large, and built loosely of sticks like those of the crow, and situated in the topmost forks of the trees, well concealed by the foliage.

CORVUS, *Linn.*

72. C. OSSIFRAGUS, Wils. Fish Crow.

Abundant along the Pacific coast.

73. C. AMERICANUS, Aud. Common Crow.

Also abundant throughout the Pacific coast, as well as in the interior.

74. C. CACALOTL, Wagler. American Raven.

Fitted by its organization for any means of subsistence, there are few parts of North America where the Raven may not be found.

In the arid region between the Rio Colorado and California, its ominous croak renders the desert solitude more dismal, and on the rocky uninhabited Islands off the coast of California, it is the companion of the Fish-hawk and Gulls; but in California, instead of being scattered and solitary, it becomes one of the most abundant and familiar of birds, and in company with its fellow-scavengers, the Turkey vultures and dogs, it is exceedingly useful in consuming the refuse of the cattle which are slaughtered in such great numbers. At the Pueblo de los Angeles, so abundant were they in and around the town, that I have counted in the *corral*, or court yard of a single house, as many as one hundred and fifty at one time.

NUCIFRAGA, *Briss.*

75. N. COLUMBIANA, (Wils.) Aud. American Nutcracker.

We occasionally met with this peculiar bird in the mountains of the interior, among the scattered pine groves.

QUISCALUS, *Vieill.*

76. Q. MAJOR, Vieill. Boat-tailed Blackbird.

This large and handsome Blackbird is very abundant about the Gulf, and occasionally is seen as far north as Upper California.

SCOLECOPHAGUS, Swains.

77. S. FERRUGINEUS, (Wils.) Boie. Rusty Blackbird.

We found this species very common in New Mexico and California, as also the *S. Mexicanus*, Swains., lately described and figured by Audubon as *Quiscalus Breweri*.

STURNELLA, *Vieill.*

78. *S. NEGLECTA*, Aud. Western Meadow Lark.

This nearly allied species, we found abundant on the prairies, in New Mexico, Rio Colorado, and California. In the spring around the Pueblo de los Angeles its delicate and melodious song was everywhere to be heard. About Monterey, in the winter, it kept in and along the margins of the pine woods.

ICTERUS, *Briss.*

79. *I. BULLOCKII*, Swains. Bullock's Oriole.

The males of this beautiful bird arrive at their summer quarters about the Pueblo de los Angeles and Santa Barbara, in California, about the first week in April, and the female in a week or so afterwards. They resort to the retired hedges of vineyards and orchards, and occasionally are seen among the trees in the town. Its song during this joyful season is uttered in a loud clear tone, and sometimes varied, but generally *wek te tek tshe-o tshe-o tshe-o, wek te tek tshe-o*. This is continued at intervals while flitting through the budding trees in search of their insect fare. When it observes any object of suspicion, it utters a few guttural creaking scolding notes, and conceals itself among the leafy boughs.

About the middle of April I saw them commencing to hang their nests in the manner of our golden robin, on the pendulous branches of the willow and other trees surrounding the vineyards, and as far as I remained to see them completed, they were made with the same ingenious interweaving of delicate materials to form a pouch.

AGELAIUS, *Vieill.*

80. *A. XANTHROCEPHALUS*, (Bonap.) Swains. Yellow-headed Blackbird.

Abundant in California.

81. *A. PHENICEUS*, (Linn.) Vieill. Red-winged Blackbird.

Abundant in New Mexico and California.

82. *A. TRICOLOR*, (Aud.) Bonap. Three-coloured Blackbird.

This handsome species, discovered by Mr. Nuttall, and sent to Audubon with the above name, is abundant in California, going in small flocks in company with the other species. Its notes are very different from those of the red-wing, with which it associates, being a kind of guttural squeaking, like that made by a dying animal. The red of the wing cannot be seen when they are closed, looking as if it only had a white band.

83. *A. GUBERNATOR*, (Wagler) Bonap. Two-coloured Blackbird.

This pretty species is abundant, also, in California, and along the western coast of Mexico. It is often found in company with the *pheniceus*, which it so much resembles, together keeping about *corrals* and places where cattle have been.



MOLOTHRUS, *Swains.*

## 84. M. PECORUS, (Gmel.) Swains. Cow Blackbird.

Abundant, in company with the Rusty Blackbird, frequenting, in flocks, the cattle corrals and farm houses of New Mexico and California.

COCCOTHAUSTES, *Briss.*

## 85. C. VESPERTINUS, Coop. Evening Grosbeak.

We first observed this fine species in the mountains of the interior, near the great Salt Lake, in October, going in flocks, mostly of young birds, though some of them in perfect plumage.

They occasionally uttered a loud scream, which resounded through the mountains, and also a slight twitter. Some of them had their bills so clogged with the resin of the pine trees, which grew in the high ravines, and the seeds of which they at that season fed upon, that they looked like second heads. We also saw them at intervals, throughout the ranges of mountains to California, wherever their favourite tree, the pine, grew, and often on the ground beneath them, in flocks like sparrows.

STRUTHUS, *Boie.*

## 86. S. OREGONUS. (Towns.) Bonap. Western Snow Bird.

This species so much resembling the *S. nivalis*, is on the western side of the continent, equally as abundant as that species with us.

On the Rio Colorado, we found them in very large flocks, feeding on the seeds of a tall *Helianthus?* which grew in immense patches along its banks. In winter they are common around the settlements of New Mexico, particularly Taos and on the Del Norte.

In California it is also abundant, and found all the year around Monterey, where they breed, but I could not find the nest. During winter they assemble in flocks, frequenting the pine woods, and in their notes as well as manners, differ but little from our own familiar species.

CHONDESTES, *Swains.*

## 87. C. GRAMMACA, (Say.) Bonap. Lark Finch.

Small flocks of this handsome species, are frequent in the bushy plains and margins of streams during winter.

ZONOTRICHIA, *Swains.*

## 88. Z. FASCIATA, (Gmel.) Gamb. Song Sparrow.

*Fringilla fasciata et ferruginea*, Gmel.

*Fringilla melodia*, Wils.

This species, if indeed the same, is spread over the greater part of North America. We found it in the Rocky Mountains, soon after leaving New Mexico, and in California, as with us, it is one of the most abundant and familiar of birds.

In company with the *P. Townsendii*, and other resident species, they frequent the orchards, gardens, hedges, and every brushy place, often enlivening the winter months with their cheerful song. They commence breeding in the latter part of February and beginning of March, and by the beginning of April have full grown young. The nest here is large and coarse, and generally built on a fence rail, sheltered with weeds, or in some low bush about two feet from the ground, and made of roots, dead stems of weeds, coarse grass, and dead willow leaves, lined inside with fine blades of dried grass. The eggs were of a bluish or greenish ground, very much covered with spots and blotches of reddish brown. I brought but a single specimen, but although it differs in size and in the bill, yet it is insufficient without other specimens to character as different.

89. Z. GUTTATA, (Nutt.) Gamb. Brown Song Sparrow.

*Fringilla cinerea*, Aud. non Gmel.

This species is far from being so abundant as the former, and is found almost exclusively, in marshy and moist grassy places, around ponds and the margins of streams.

90. Z. GRAMINEA, (Gmel.) Swains. Bay-winged Finch.

I found this species in the Rocky Mountains of the interior, in September.

91. Z. GAMBELII, (Nutt.) Gambel's Finch.

*Fringilla Gambelii*. Nutt. Man. Orn. vol. 1, p. 556, 2d edition.

*F. leucophrys*, auc. in part.

The immature plumage of the western White-crowned Finch was described by my friend Nuttall under the above name in his manual of Ornithology, in 1840, without knowing that what he supposed to be the *F. leucophrys* was the adult. Whether it is indeed different from the *leucophrys* of this side of the continent is still uncertain. Yet it seems from the specimens I have compared to present a constant difference in size. The young birds, which I found in immense numbers from the Rio Colorado to California, were never more than 6 inches in length; those which I measured in California were of the same size; an adult male brought from Oregon by Townsend is also only  $6\frac{3}{16}$  inches; and the only adult specimen which I brought from California is scarcely 6 inches in length. Those from this side appear to be always larger; and a young bird which I have, measures  $7\frac{1}{2}$  inches. The measurements of eleven specimens of the *leucophrys* were transmitted to me by my friend Professor Baird, of Carlisle, Pennsylvania, and all average over 7 inches in length, one only being  $6\frac{9}{12}$  inches. It thus seems that about an inch difference in length is constantly found between them. I have not observed in the western one the same broad greyish margins to the feathers of the back, and perhaps in comparing more specimens of the adult other differences will be found. They are exceedingly abundant throughout

the western coast, and in the winter season congregate in very large flocks frequenting the brushy plains, neighbourhoods of the towns, hedges and gardens. The young have the bill of a cinnamon colour; in the adult the bill is yellow; upper mandible, towards the tip and over the nostrils dusky; point of the lower dusky also; feet pale.

92. *Z. AUROCAPILLA*, (Nutt.) Gamb. Yellow-crowned Finch.

*Fringilla atricapilla*, Aud. non Lath.

This fine species, the companion of the former, is almost equally abundant in California. The resemblance to the *Gambelii* is very great, so much so, that unless we looked at the markings of the head and its larger size, it is almost impossible to distinguish them: this is particularly the case with young birds.

93. *Z. QUERULA*, (Nutt.) Gamb. Mourning Finch.

*Fringilla querula*, Nutt. Man. Orn., vol. 1, p. 555, 2d edition.

*F. Harrisii*, Aud.

This fine species is abundant on the frontiers of Missouri, and on the prairies as far as the Rocky Mountains. Its notes are slow, solemn, and singing like those of the *Z. leucophrys*, which it also resembles in its manners.

PLATE IX, Fig. 1.

94. *Z. CHLORURA?* (Aud.) Gamb. Green-tailed Finch.

*Fringilla Blandingiana*, Gamb. Proceed. Acad. Nat. Scien., vol. 1, p. 260.

*F. chlorura?* Aud. Orn. Biog., vol. 5, p. 336.

Above greenish olive; front, line over the eye, ears, line on each side of the throat, and breast cinereous; head rufous red; throat and abdomen white; sides yellowish brown. A white line extends from the angle of the mouth along the sides of the neck; also a whitish spot or line from the nostrils to the eye. Wings and tail dusky; upper part of back, wing coverts, margins of the primaries and secondaries, exterior webs of tail feathers, and general tinge of the under surface of the tail, pale green; shoulder yellowish green; tertiaries margined with brownish white.

Length  $6\frac{1}{2}$  inches, tail rounded  $3\frac{1}{4}$  inches; feet and legs stout, brownish; tarsus  $\frac{7}{8}$ ths of an inch. wing from flexure 3 inches; bill above dusky, below paler. Irids hazel.

I discovered this species in the Rocky Mountains of the interior in September; it was flitting about among the bushes near a small stream, with the usual manners of the sparrows, and uttering a simple *chip*.

It may, perhaps, be the bird which Audubon described and called *chlorura* from Mr. Townsend's imperfect notes, taken from a young bird; but as no measurements are given, it is probable that it may be different, disagreeing as it does in several particulars.



PASSERELLA, *Swains.*

95. P. TOWNSENDII, (Aud.) Gamb. Thrush-like Finch.

*Fringilla Townsendii*, Aud.

*F. meruloides*, Vigors' Zool. Beechy's Voyage.

This fine species is an abundant resident in California. Its habits differ somewhat from the other sparrows, and are more like those of a Thrush, to which it bears a good deal of resemblance. It keeps in retired bushy places, or in underwood, scarcely ever being seen except on the ground; and is only discovered by the noise it makes in scratching among the leaves. It is silent and unsuspecting, and I have only heard it utter an occasional *chip*. Audubon's and Vigors' descriptions of this species, were both published in London in the same year, but the preface of Audubon's book, has several months priority.

SPIZELLA, *Bonap.*

96. S. PALLIDA, (Swains.) Bonap. Pale Sparrow.

This small species was one of the few birds we constantly met with in the desert region between New Mexico and California.

CHRYSOMITRIS, *Boie.*

97. C. PSALTRIA, (Say.) Bonap. Arkansaw Siskin.

This hitherto rare species, and of which so little has been known, I found in California exceedingly abundant and familiar.

In the winter season they rove in large flocks, feeding on willow buds, seeds, &c.; to the twigs of the willow they hang in all postures, sometimes head downwards like Titmice, and keep up a continual twitter; in the vineyards and fields, they are found on the ground scratching after seeds or clinging to the stems of weeds in the same manner as our *C. tristis*.

They commence pairing and building their nests, in the latter part of March or beginning of April. The nest is made in the willow hedges of the vineyards, the orchards or gardens, and is beautifully fastened to about three small twigs, between which it is made, at from six to twelve, or even twenty feet from the ground. The nest is formed of slender strips of vine bark, the cottony down of various plants, mixed with a few slender stems, and lined with willow down and pappus. It is thick and neatly made, and usually contains six white eggs. Some nests have no lining, except the slender strips of vine bark and cottony down that the rest of the nest is made of, and others have a great many small catkins of the willow, mixed in with the outside layer.

The song of the male, during the period of incubation, is a delightful, loud, melodious warble, considerably varied and modulated, almost equalling that of the canary.

As the plumage of the female is not well known, I give the following description of one killed off the nest.

Above greyish brown mixed with yellow olive, particularly on the head; rump light grey; beneath white, mixed with yellow on the throat, breast, and sides; vent and under tail coverts pure white; wings and tail dark brown, the coverts and some of the tertiaries tipped and edged externally with white; tail emarginate, pale beneath, most of the feathers with large whitish spots internally towards their tips. Bill ochre yellow, upper mandible dusky at tip; feet and legs light brown; length  $4\frac{1}{2}$  inches, wings  $2\frac{5}{8}$  inches.

#### ERYTHROSPIZA, *Bonap.*

98. *E. PURPUREA*, (Gmel.) Bonap. Purple Finch.

I found this species common around Monterey in the winter season.

99. *E. FRONTALIS*, (Say.) Bonap. Crimson-fronted Finch.

This handsome songster we first observed in New Mexico, particularly about Santa Fé, where it is an abundant and familiar resident; keeping about the *corrals* and gardens, and building its nest under the *portals* and sheds of the houses. In July they had young ready to fly, which must have been of a second brood, or else they begin to lay much later than in California. Under a long shed or portal, in the *Plaza* or Square of Santa Fé, they had a great many nests, and the old ones would sometimes fly down about our feet, while sitting at the doors, to pick up crumbs, &c. for the young.

In California, it is also an extremely abundant and familiar resident, and called by the inhabitants *Buriones*. During winter they assemble in flocks, frequenting the bushy plains and hill sides, hedges, vineyards, and gardens, living on the various kinds of seeds which are so abundant, and also sometimes doing considerable damage among the grapes. Early in March they commence pairing, and soon are busy building their nests; placing entire confidence in man (which is but too often misplaced,) they persist in building about the houses; on the projecting planks under the portals, under the eaves, in sheds, boxes, or any nook they can find. I found a nest once in a small box of seeds, which had been stuck up over a door. They will also build on the horizontal branch of a tree in the garden, and a great many nests are made in the willow hedges of the vineyards; but they prefer by far the rafters under the sheds and houses, repaying the inmates for the privilege, with their most melodious song, which is continued during summer, from the roof near the nest. The nest is made of small sticks, or stems of weeds, willow catkins, and down of the willow, and lined with horse hair. They usually lay five eggs, sometimes of a plain bluish-white colour only, but generally have a few scattering streaks and specks of dark brown on the larger end. Some nests are made principally

of feathers, cotton or wool, with a few sticks and dried grass, and lined with horse hair. Frequently only four eggs are found in the nest, and they often contain a very few specks or streaks, on one side only.

It would be impossible with words, to describe the song of this western Orpheus, and although California contains many song birds, among others our Mocking Bird, (the King of Songsters, as the Nightingale might be called the Queen;) yet there is none more exhilarating to the feelings, or melodious and tender to the ear, than that of the crimson-fronted Finch.

PIPILO, *Vieill.*

100. P. ARCTICUS, Swains. Arctic Ground Finch.

This species so much resembling our common one, in habits and appearance, is abundant in California.

101. P. FUSCUS, Swains. Plain Ground Finch.

*Fringilla crissalis*, Vig. Zool. Beechy's Voyage.

This plain species, new to our Fauna, was first described by Swainson in 1827, along with the other birds brought from Mexico by Mr. Bullock, in the Philosophical Magazine.\* It is an abundant resident in California, with much the manner of its congeners, from which it differs so much in appearance.

During winter they are found in large flocks in the ravines of the mountains, and scatteringly along the margins of woods and bushy places, in company with the thousands of busy sparrows, all gleaning their abundant fare of seeds. They breed in California, and by the beginning of June I saw the full fledged young; the nest no doubt, is made on the ground, well concealed under a bush, but I never could discover it. It is a remarkably silent and unsuspecting species, never uttering more than a slender *chip* like that of a sparrow.

PHILEREMOS, *Brehm.*

102. P. CORNUTUS, (Swains.) Bonap. Horned or Shore Lark.

We found flocks of this common bird on the Table land; by banks of streams throughout the Rocky Mountains, and even in the most arid plains of *Artimesia*. In California it is also abundant.

PICUS, *Linn.*

103. P. HARRISII, Aud. Harris's Woodpecker.

This fine species occupies, on the western coast, the same place that the *P. villosus* does with us, but seems to have a greater partiality for the pine woods, among which

\*The following is the description as there given, viz: Gray, beneath paler; throat obscure fulvous with brown spots; vent ferruginous. Table land. Temiscaltipec. Total length 8; bill  $\frac{7}{10}$ ; wings  $3\frac{1}{2}$ ; tail 4; tarsi  $\frac{9}{10}$ ; hind toe and claw  $\frac{7}{10}$ .



it feeds much in the manner of that species ; uttering as it flits from tree to tree, and when looking for a new place to peck at, a loud grating *qwick, qwick*.

The young are brownish beneath, as represented by Audubon, but the adult is pure white. A male which I killed on Green River, in September, has the whole top of the head pale red.

PLATE IX. Figs. 2 and 3.

104. *P. SCALARIS*. Wagler.

*P. Nuttallii*, Gamb. Proceed. Acad. Nat. Sci., vol. 1, p. 259.

Male. Above transversely banded with black and white ; upper part of head black, with linear white spots ; hind head with a broad scarlet band half an inch in width ; sides of head and neck black, with a white stripe running from the base of the bill through it, about the length of the head, and also a white stripe running from the top of the eye, and nearly uniting on the back of the neck. Wings on their outer and inner webs with six or seven bands of white spots ; all the wing coverts also with white spots ; tips of primaries and tertiaries tinged with brownish. Upper tail coverts and four middle tail feathers black. Beneath whitish, sides, lower tail coverts, and lateral tail feathers, with numerous spots and bars of black. Irids carmine.

Length 7 inches, wing  $4\frac{1}{2}$  inches, tail 3 inches, tarsus  $\frac{3}{4}$ , bill  $\frac{3}{4}$  inch.

The female resembles the male, but wants the red band, is smaller, and has the bill shorter.

Young with the whole top of the head red, mixed with white and black, the feathers being black at base, white towards the end, and red at the tip. It also has more numerous transverse bars and spots on the back, and wings, and below is tinged with yellowish brown, and more spotted.

This beautiful species, first described by Wagler in the *Isis* in 1829, I found abundant in California at all seasons. It has the usual habits of the Woodpeckers, and sometimes familiarly examines the fence rails, and orchard trees, for its insect fare.

At Santa Barbara I found them breeding, and May 1st discovered a nest in the dead stump of an oak, about fifteen feet from the ground, containing young. The hole for entrance was remarkably small, but inside appeared large and deep. The parents were constantly bringing insects and larvæ. The note, as they fly from tree to tree, is a loud harsh *kreck, kr-r-r-r-ék, kreck*.

105. *P. MERIDIONALIS*, Swains.

*P. Gairdnerii*, Aud.

We found this small species in the Rocky Mountains, and occasionally in California.

MELANERPES, *Swains*.

106. *M. ERYTHROCEPHALUS*, (Linn.) Swains. Red-headed Woodpecker

I found numbers of this widely distributed species, in a belt of oak timber, near the Mission of St. Gabriel, in Upper California.

107. *M. TORQUATUS*, (Wils.) Bonap. Lewis's Woodpecker.

In the before mentioned belt of oaks, this remarkable and handsome species was abundant. Its manners are peculiar, and unlike the generality of Woodpeckers; darting out from the trees after passing insects like a flycatcher, and alighting on the branches again crossways. It has the same peculiar habit that I have often observed in the Red-headed species, when shot at and perhaps hit; that of ascending in short, rapid gyrations like a hawk, to a considerable height in the air, and then descending in the same manner.

108. *M. FORMICIVORUS*, Swains. Ant-eating Woodpecker.

*Picus melanopogen*, Licht. Temm. Pl. Col. 451.

This beautiful species, common in Mexico, was first added to our Fauna by Nuttall, who states in his Manual of Ornithology, vol. 1, p. 662, that he observed it to be a common species in the mountain forests around Santa Barbara, in Upper California. Between the same region and the Pueblo de los Angeles, I also found it common, but had little opportunity of studying its habits.

109. *M. RUBER*, (Lath.) Bonap. Red-breasted Woodpecker.

An abundant inhabitant of the wooded regions of California.

COLAPTES, *Swains.*110. *C. COLLARIS*, Vig. Red-shafted Woodpecker.

We first saw this handsome, and remarkably shy bird, soon after leaving New Mexico, and it continued with us to California, where it is very abundant.

I have often wondered how so large a woodpecker as this, can live among small bushes, particularly as it has none of the flycatcher habits of the Red-headed, and other species of the genus *melanerpes*. We always saw it on the margins of small creeks, where nothing grew larger than a willow bush, and oftener than otherwise on the ground. In California it is found both in bushy places, and in the woods. Its note is a loud sharp *ké ah*, which is constantly uttered.

(*To be continued.*)

ART. VI.—*History and Anatomy of the Hemipterous Genus BELOSTOMA.*

By JOSEPH LEIDY, M. D.

Belostoma is a genus of hemipterous insects, belonging to the section Heteroptera, family Hydrocorisa, found in all the warmer parts of the globe, aquatic in habit, and eminently rapacious. It was separated by Latreille, from the Linnæan genus Nepa, founded upon the antennæ having four articulations, of which the terminal three are pectinate, and all the tarsi bi-articulate and nearly alike.

## DESCRIPTION.

**BELOSTOMA:** body sub-elongated, lanceolate, flattened superiorly; abdomen flattened inferiorly with the central part abruptly carinated; pro-thorax and head depressed.

**HEAD,** sessile, triangular in outline; promuseus inferior, inflected, conical, quadriarticulate; first articulation permanently fixed to the clypeus, the others moveable. Between the first and second articulations, there exists a quadrangular opening, communicating with the interior of the vagina, ordinarily closed by the apposition of the ligula. Labrum small, ovate, posteriorly received into a notch of the clypeus, anteriorly enclosed by the first articulation of the promuseus. Ligula received within the vagina. Eyes large, prominent, distant, triangular in outline, ciliate at the posterior edge. Antennæ very short, pectinate, infra-ocular, ordinarily concealed within a short deep groove; quadriarticulate; terminal three articulations furcate, and ciliated; one branch of the terminal articulation with a short, prominent spine.

**THORAX.** Prothorax: Pronotum quadrate, smooth, convex; lateral margins compressed, convergent, and curving beneath, forming a concave infero-lateral plate bounding the anterior acetabula externally. Prosternum depressed, carinated at the anterior part.

**MESOTHORAX:** Scutellum large, extending as far back as the second abdominal segment. Scapulæ projecting as far back as the commencement of the abdomen, and supporting on the supero-external border, a tubercle or catch, which fits into a corresponding socket on the under surface of the marginal rib of the hemielytra.

**METATHORAX:** Metasternum hexagonal.

**HEMIELYTRA** somewhat shorter than the abdomen and smooth, with the exception of an elliptical patch of fine pubescence a few lines from the membranous portion. Alæ shorter than the hemielytra.

**LEGS:** Anterior pair raptorious; intermediate and posterior pair natatory. Coxæ free, large, and robust. Trochanters large; anterior pair notched externally for the reception of the unguis in the repose of the anterior legs; intermediate and posterior pair fulcrant. Thighs large; anterior pair clavate and very robust, anterior face (when the legs are advanced) densely and finely pubescent, with a double groove and intermediate ridge for the accommodation of the tibia in repose, or perfectly entire in one species; intermediate and posterior pair ciliated posteriorly with respiratory hairs. Tibiæ: anterior pair narrow, and curved, with a groove upon the inner side except in one species, in which they are entire; posterior pair very compressed, broader than the thighs; intermediate and posterior pair fringed on the inner and outer edge by respiratory hairs. Tarsi dimerous: posterior compressed. A single unguis to the anterior tarsi; two to the intermediate and posterior tarsi.



ABDOMEN of six segments, superiorly pubescent, inferiorly smooth, excepting along the course of the spiracula, where there is a line of pubescence as far back as the last segment; margins compressed; posterior three segments alated; ala and dorsal plate of the last segment divided for the reception of the caudal setæ. Caudal setæ long, linear, villose beneath, capable of being entirely retracted within the abdomen.

IMPERFECT STAGES. The larva and pupa are both active; they only differ from each other in size, and in the absence of the rudimentary wings in the former. They are very flat superiorly, and nearly smooth, with the exception of the under part of the abdomen which is pubescent. The antennæ are not completely formed. The tarsi have but a single joint, which by future development, is divided into the two articulations of the imago, and there are two ungues to each foot.

## SPECIES.

*BELOSTOMA grande.*

*NEPA grandis.* *N. fusca flavo maculato.* *Fab. Ent. Syst.* T. 4, p. 61; *Sys. Rhyng.* p. 106. *Punaises de Stoll.* Pl. 7, Fig. 6. *Linn. Syst. Nat.* T. 1. *Lam. An. sans Vert.* 2me Ed. T. 4, p. 164.

*BELOSTOMUM grande.* *Burm. Handb. der Entom.* 2er B. p. 195.

*BELOSTOMA Indica.* *Guérin et Percheron.* *Gen. des Insectes, Hemip.* Pl. 3.

I have before me, while writing, three specimens of this species, one from Bengal and a second from Surinam, belonging to the collection of the Academy, and a third from China, for which I am indebted to Prof. Haldeman, as well as for several other species. By careful comparison, I find them to agree with the descriptions of the above synonyma. They measure from three inches, to three inches two lines in length, and one inch two lines in breadth at the widest part. Colour, testaceous with dark brown maculæ; three of these, well defined, are upon the thighs and tibiæ, and a large one upon each side of the scutellum of the male, and a single larger one in the centre of that of the female. The anterior thighs are very robust, one-third more so in the female than in the male, and have on their anterior aspect, a double groove with an intermediate ridge, corresponding to a single groove with raised edges on the inner side of the tibiæ, which in a state of rest receives the latter, like the handle of a penknife does its blade. The patch of fine pubescence of the hemelytra, is situated about two lines from the membranous portion, and is four lines long.

In none of these specimens do the caudal setæ project beyond the extremity of the abdomen, although they may be withdrawn their full length, which is one inch.

This species is found in the warmer parts of Asia and America. A smaller form is found rather commonly in the lakes, ponds, and other still waters of North America, variously considered as a variety and species. After careful comparison, I think it but a variety of the former. It is well known under the name of *B. americana*. A number of specimens in my possession, vary in their measurement from one inch nine lines, to two inches three lines in length, and from nine to eleven

lines in breadth. The colour and maculations are the same as in *B. grande*, though the latter are not quite so distinct. The larva and pupa of this variety, do not differ from the characters already given; the former averages in length one inch, the latter one inch seven lines.

A species is found in the United States, especially in the Southern States, which is confounded with the latter variety, but which is very distinct, and as I can find no special description of it, I will name it *B. haldemanum*,\* in honour of my friend Prof. S. S. Haldeman, well known as a contributor to natural science. It is readily distinguishable from the others by negative characters: its less robust anterior thighs; the total absence of the double groove of the anterior thighs, and single one of the tibiæ, although the trochanters are notched for the reception of the unguis; and the disappearance of the distinct maculations of the thighs and tibiæ. The specimens measure from two inches to two and a half in length, and from nine lines to one inch in breadth.

There are several smaller insects found in our waters of which I can find no description, and which are generally referred to the genus *Belostoma*, to which they bear considerable resemblance, but differ from it by very decisive characters. Since the foundation of the genus *Belostoma*, several genera have been formed from it, but whether they include the species I speak of, I am unable to say, not having access to the proper authorities upon the subject, and will therefore describe them provisionally under the name of

#### PERTHOSTOMA.

Body ovate, flattened superiorly; abdomen sub-carinated inferiorly; promusculus inflected in a state of repose, cylindrical; anterior extremity of labrum free; eyes large, distant, salient; antennæ very short, infra-ocular, concealed, quadriarticulate, intermediate two articulations ramose, terminal one semi-elliptical; prothorax convex above, lateral margins convergent and somewhat emarginate; hemelytra smooth with the exception of a small round patch of pubescence at the inner angle of the coriaceous portion, where it joins the membranous portion; anterior legs raptorial, intermediate and posterior natatory; anterior coxæ large; anterior thighs very robust, with a double groove and intermediate ridge; anterior tibiæ with a longitudinal groove; posterior tibiæ not more compressed than the intermediate, and less broad than the thighs; tarsi dimerous, divisions indistinct; anterior pair with a single unguis, intermediate and posterior with two unguis; caudal setæ very short and spatulate.

The principal marks of distinction between *BELOSTOMA* and *PERTHOSTOMA*, are, in the form of the promusculus; the form of the antennæ; the form, comparative size, and situation of the patch of pubescence of the hemelytra; the form of the posterior tibiæ; and the size and form of the caudal setæ.

\*In accordance with the views of this gentleman upon scientific nomenclature, I have used a small initial to the specific name instead of a capital.

## SPECIES.

**PERTHOSTOMA TESTACEUM.** Body spatulate-ovate, testaceous; thighs and tibiæ with three distinct maculæ; superior surface of abdomen black, with the edges testaceous; lateral margins of the prothorax compressed, sub-emarginate; elytra levigate with the exception of the round patch of pubescence, at the posterior internal angle of the coriaceous portion; caudal setæ three-fourths of a line in length. Length eight and a half lines, breadth four and a half lines.

Found in stagnant waters in Pennsylvania, &c.

**P. AURANTIACUM.** Pale testaceous, thighs indistinctly maculated; lateral margins of the prothorax sub-emarginate; superior surface of the abdomen deep black, bordered by orange passing into the testaceous colour of the edges; caudal setæ one and one-fourth lines. Length eleven lines, breadth five lines.

Found in the same situations as the preceding. Var. *immaculatum*. Pale luteus, no maculations. Found with the latter.

**IMPERFECT STAGES OF PERTHOSTOMA.** The larva and pupa are very like those of *Belostoma*: oval in shape; upper part of the abdomen testaceous, with the lateral margins maculated with black, under surface pubescent; tarsi with single articulation and two ungues.

The species of *Belostoma* and *Perthostoma*, are found in lakes, ponds, ditches, or other tranquil waters. Possessed of considerable strength and activity, they roam about almost undisputed masters of the place. Not only do other aquatic insects become their prey, but the mollusca, smaller crustacea, and small frogs and fish. Dr. T. B. Wilson informed me, that a workman upon his farm brought to him a specimen of *B. americana*, caught in a small stream, near which he had been at work, and which had a sun-fish (*Pomotis vulgaris*) twice its size struggling within its grasp. A similar instance has been met with by Prof. S. F. Baird, of Carlisle. In the *Encyclopædia Londinensis*, is an engraving of the pupa of *B. grandis*, luxuriating upon the juices of a small frog, and I met with a somewhat similar instance under the following circumstances. I had in a large basin of water some specimens of *Perthostoma*, a number of other aquatic insects, a leech, (*Hirudo decora*) and a frog (*Rana halecina*) two and a half inches long; these I was in the habit of daily examining, when, to my astonishment, one day, I saw the leech attach itself to the frog, and shortly after, while the latter was still possessed of considerable activity, it was attacked by two individuals of *Perthostoma*, under which powerful combination the poor animal was soon destroyed. I have seen *Perthostoma* attack the insects *Gyrinus*, *Hydrophilus*, *Notonecta*, larvæ of *Libellulæ*, &c. The hard shelled insects it destroys by puncturing them at the articulations. A larva of *B. americana*, which I took in Lake George, N. Y., was at the time leisurely appropriating to itself the fluids of a *Limnea clodes*. I have frequently observed *Perthostoma* destroy the mollusca *Physa*, *Limnea*, and *Planorbis*, and it has afforded me much amusement to notice the larvæ, shortly after escaping from the egg, seize upon a *Planorbis parvus* or young *Physa*, with as much ease as if they had been schooled in the process a long time. Dr. R. E. Griffith informed me that, in Maryland, he frequently noticed a



large quantity of the shells of *Physa*, *Limnea*, &c., where *Belostoma* existed, to which he attributed their destruction.

They hold their prey with the fore legs, by folding it between the thighs and tibiæ.

Their bite is exceedingly venomous to the smaller animals, an insect dying in a few seconds after a portion of saliva has been introduced with the oral setæ. When any one of them is held between the fore-finger and thumb, and irritated, it will straighten the promusculus, and a small drop of pellucid liquor will be seen to appear at the extremity. A portion of this fluid I took upon the point of a fine needle, and with it punctured the thorax of a fly, which was followed by death in ten seconds. The same experiment I repeated several times with the same result. Introduced into the abdomen it did not operate so quickly.

The puncture of *Belostoma*, which Dr. Griffith once experienced, he informed me, produces much pain and inflammation.

*Belostoma* and *Perthostoma* are capable of quitting the water, which they but seldom do, unless their situation is nearly dried up, or is depopulated through their voracious appetite, when they fly by night to some other neighbouring and more convenient water.

The female of *Nepa*, including *Belostoma*, according to most authors, deposits her eggs in the soft stems of aquatic plants.

The female of *Perthostoma* carries her eggs upon her back, until the larvæ are nearly ready to escape. The mass of eggs which she thus conveys about with her, I found generally to amount to about 130, and at one period to be one and a half times her own weight. They are ranged regularly side by side, and are cemented to each other and to the elytra, by a bassorine-like substance insoluble in water. When the ova have arrived at maturity, the insect casts the mass from her back, when they lie at the bottom of the water until the young escape. How she ever manages to get them in such a novel situation, I am unable to say; I could not detect anything in the anatomical arrangement of the genitalia to explain it, and the caudal setæ if used as an ovipositor, could not extend one-fourth the necessary distance. Stoll (*Punaises de Stoll*, p. 36, tab. 7, fig. 6,) has represented *Perthostoma? cinerea*, (*Nepa*) with a similar mass of ova upon the back, which he has mistaken for the ova of an aquatic mite. The *Nepadæ* are infested by a species of *Hydrachna*, but the ova of this are comparatively small, of a yellow colour, and are attached by a narrow pedicle irregularly upon any part of the inferior surface of the animal. Beauvois (*Ins. rec. en Afrique et en Amerique*, Pl. 20. fig. 3,) has represented *P.? subspinosa* (*Nepa*), with a mass of ova upon its back, which he correctly attributes to the animal. I am well convinced that such is the case, having seen the larvæ escape from the ova, and also find that the ovaries of the female are empty when the ova are upon her back.

The ova are oval in form, of an ash colour, and have an operculum-like hilum at

the unattached extremity, but have no hair-like appendages as is stated to be the case in the *Nepadæ* generally.

#### INTERNAL ANATOMY.

The description is taken from dissections of *B. haldemanum*.

#### DIGESTIVE APPARATUS.

The oral organs have been sufficiently dwelt upon in the general description of the animal. The œsophagus, narrow and delicate, extends into the metathorax where it opens into the stomach. Its parietes are thin, but present three distinct tunics beneath the microscope, an external homogeneous layer, an internal epithelial tunic, and an intermediate layer of very fine muscular fibres.

The *stomach* is large and irregular in form, and is much sacculated from numerous contractions. In structure it is thin and has three distinct tunics: the external like that of the œsophagus, structureless and homogeneous; internally to this, a second composed of transverse and longitudinal muscular fibres, of which the former are more numerous and internal, and exist especially at the contracted parts of the organ where they are accumulated into widened bands, and it is from this arrangement that the sacculated appearance is produced; the third or lining membrane is composed of a net work of delicate fibres, with circular meshes, within which are situated round glandular bodies, presenting under the microscope a structure of nucleated organic cells. Passing from one glandular body to another, irregularly, are masses of adipose matter, which with the glands project into the cavity of the stomach, and the whole being covered by a delicate epithelium, it gives the inner surface of the stomach a somewhat villous appearance. Opposite to the external contractions, valvulæ or short duplications project into the stomach. The stomach at its posterior part passes insensibly into the duodenal portion of the intestinal canal. This latter is cylindrical, convoluted several times upon itself, becomes rather dilated before joining the ileum, and presents the same structures as the stomach.

At the junction of the duodenum and ileum the hepatic tubes empty.

The *ileum* is almost as long as the duodenum, pretty uniform in diameter, convoluted several times upon itself, and presents a wrinkled appearance which disappears by dilatation. With the exception of the lining membrane, it is constructed like the duodenum.

The *colon*, a dilated portion of the intestinal canal, commences where the ileum terminates. It is short, and is divided by a contraction into two portions, the posterior of which may be considered as the rectum. Projecting forwards, from the anterior part of the colon, beneath the abdominal viscera, there exists a large, capacious cœcum, longer than the colon itself, and longer in the female than in the male, which the insect may use as a kind of natatory vesicle, for I have frequently seen

*Perthostoma* rise to the surface of the water, protrude its abdomen, and squirt a stream of water from the anus for a considerable distance, and then apparently take in a supply of air and disappear.

The *anus* is a valvular opening, at the extremity of a prolongation of the abdomen, situated superiorly and considerably posterior to the genital orifice. The anal prolongation is smooth, triangular at its extremity, and grooved longitudinally on its inferior surface, where it forms the entrance to the generative apparatus. In the female it is somewhat shorter but broader than in the male.

The *salivary apparatus*.—As in all Hemiptera, the salivary apparatus is complex. The salivary glands are four in number; two of these are long, and extend backward as far as the commencement of the abdomen; the others are about one-fourth as long. They lie upon each side of the œsophagus, into the commencement of which they empty, each by a distinct duct. In structure they are of the highest order, being conglomerated. At the head of the longer pair of glands there are placed two small vesicles, side by side, communicating with the duct, and probably serving as reservoirs for the secreted saliva. Besides these, on each side of the œsophagus, there is situated a sigmoid cœcal pouch which opens by a narrow duct into the commencement of the œsophagus, in the vicinity of the termination of the salivary ducts. These either elaborate some peculiar fluid or serve as reservoirs to saliva secreted by the proper glands.

*Biliary tubes*.—These are four in number; they are long, much contorted, and lie closely applied against the *intestinum tenue*. They join the intestine at the junction of the duodenum and ileum, and are connected to each other in pairs at the distal extremity.

#### GENERATIVE APPARATUS.

**MALE:** The testes are placed at the anterior part of the abdominal cavity, one on each side of the stomach. They are irregularly rounded masses, about two lines in diameter, and are composed of a single long convoluted tube. From the testicle passes off the *vas deferens*, at first narrow, it gradually enlarges as it passes backwards, is a little contorted, and finally joins the one of the opposite side to form the *ductus ejaculatorius*, which is a short tube, joining at its other extremity the penis.

The penis in a state of rest, is contracted within a sheath formed by the anal prolongation superiorly, and a triangular, shorter body inferiorly, which I will call the genital prolongation. When projected, the penis is found to be an articulated organ, three lines in length and curved inferiorly. At its extremity it divides into two parts: an upper, in the form of a hook; the lower, spoon-shaped, and between the two exists the urethral orifice.



The genital prolongation has the two caudal setæ projecting from it, which are capable of being entirely retracted within the abdomen, from the great extent of the articulating membrane, between the genital prolongation and last abdominal segment. Immediately posterior to the caudal setæ are two hook-shaped appendages, which are probably used in retaining hold of the female in coitu.

The genital and anal prolongations are articulated with each other at their base, as well as with the sixth or last abdominal segment, so that when the one is retracted the other must follow. They correspond to the dorsal and ventral plates of a seventh abdominal segment.

**FEMALE.** The ovaries are large, and are situated one on each side of the body, extending from within the thorax, at the side of the œsophagus, to the posterior part of the abdomen. Each one is composed of five tubes attached together, and with those of the other side at their filamentary apices. The tubes are of the same length, and within the thorax are straight and narrow, and contain numerous ova in a very undeveloped state, but within the abdomen they become wider, thinner, and much convoluted together, and contain numerous nearly fully developed ova, which together form a large oval mass, occupying with the other the greater part of the cavity of the abdomen.

The *ova* are oval in form, somewhat compressed and curved, and are of a yellow colour, with brown streaks upon the larger extremity, a whitish mark upon the small end, and a round spot upon the convexity of its curve. They are placed within the egg-tubes, with their long axis parallel with the course of the latter, and overlie each other at their extremities.

The five tubes of the ovary form by their junction a short oviduct, which joining with its fellow of the opposite side forms a short vagina, proceeding to the genital orifice between the genital and anal prolongation.

The hooks developed upon the genital prolongation of the male, exist in a rudimentary form in the female.

In *Perthostoma* the *oviducts* are comparatively twice the length of those of *Belostoma*, and the ova are oval, without the especial marks existing upon those of the latter.

*Odoriferous Glands.*—These consist of two moderately long cœcal tubes, situated within the metathorax, beneath the other viscera, and extending into the anterior part of the abdomen. They are convoluted together in such a manner, that after one or two turns the closed extremity is brought close to the termination, both of which extremities are concealed by the passage over them of the ventral cord. They open externally between the coxæ of the posterior legs. The character of the secretion I failed to detect.

## NERVOUS SYSTEM.

Belostoma, when compared to most other insects, presents a considerable concentration of the nervous centres.

The cerebral ganglia are well developed, consisting of two pyriform masses of white matter placed side by side, the narrow portion of which forms the commissures connecting them with the cerebellum. The optic ganglia are larger than the cerebral, and pass from them obliquely forwards and outwards. They are somewhat clavate in form, and terminated by a rounded extremity, from which pass off the optic nerves to the eye. These nerves are numerous, and are divided into two bundles by a styloid process, passing vertically from the bottom of the eye to the top. From the cerebral ganglia there is given off on each side, a small nerve to the antennæ; a commissural filament, the *nervus recurrens*, to the frontal ganglion; and a commissural filament to the respiratory ganglia.

The *frontal ganglion* sends off filaments anteriorly, filaments to the œsophagus, and a principal branch, which proceeds backwards between the cerebrum and œsophagus, to the latter of which it is finally distributed. Immediately after passing the cerebrum, it has formed upon it a minute ganglionic swelling.

The respiratory ganglia, two in number on each side, are connected with each other and with the cerebrum, by exceedingly delicate commissural filaments.

The *cerebellum* or prothoracic ganglion is moderately large, and is connected to the cerebrum by short, thick commissures. It sends off numerous branches, anteriorly to the oral apparatus, laterally to the anterior legs, and to the muscles within the prothorax.

The other thoracic ganglia and the abdominal ganglia are fused into a single, large, cordiform mass, occupying a position at the posterior part of the mesothorax, and connected anteriorly to the cerebellum by the usual double commissure, the cords of which are closely applied together. It is longitudinally and transversely depressed. From its antero-lateral parts it gives off a branch to the hemielytra, a small branch running forward to be distributed to the muscles of the prothorax, branches to the parts within the meso- and metathorax, a branch to the intermediate legs, and a branch to the alæ. From its postero-lateral parts, a branch to the posterior legs, and a branch to the first and second abdominal segments. Posteriorly it gives off five nerves on each side of the median line, which proceed backwards closely united in bands, until each comes near its respective abdominal segment, when it diverges, to be distributed to the parts within the segment, excepting the last, which divides into two branches, which, with a branch from the fourth, are distributed to the genitalia and rectum.

BELOSTOMA, *Lat.*

Antennæ quadriarticulatæ, semi-pectinatæ, sub-oculis insertæ et occultatæ; articulis tribus ultimis furcatis.

Rostrum elongato-conicum, quadriarticulatum. Corpus sub-elongatum, lanceolatum, valde depressum.

Pedes antici raptorii, uniunguiculati. Tibiæ posticæ compressæ, femoribus latiores. Tarsi omnes distincte biarticulati. Hemielytra spatio obliquo elliptico versus portionis coriaceæ apicem subtiliter pubescente. Setæ caudales elongatæ.

Spec. (*grandis*, Fab.) testaceum, fusco maculatum; femoribus et tibiis distincte trimaculatis; femoribus anticis valde robustis, cum stria duplici in margine anteriore; setis caudalibus linearibus.

Long: 3 un. — 3 un. 2 lin. Lat: 1 un. 2 lin. Set. caud. long. 1 un. Habitat in Americæ meridionalis et Asiæ aquis.

Var. *americanum*: testaceum; maculis minus distinctis quam in *B. grandis*. Long: 1 un. 9 lin. — 2 un. 3 lin. Lat: 9—11 lin. Habitat in United States aquis.

Spec. *haldeanum*: testaceum, maculis nullis; femoribus anticis vix incrassatis, margine antico simplici.

Long: 2 un. — 2 un. 6 lin. Lat: 10—12 lin. Habitat in United States aquis.

## PERTHOSTOMA.

Antennæ quadriarticulatæ, sub-oculis insertæ et occultatæ; articulis duobus intermediis ramosis; ultimo semi-elliptico. Rostrum cylindricum, quadriarticulatum. Corpus ovatum, valde depressum. Pedes antici raptorii, uniunguiculati. Tibiæ posticæ sub-compressæ, femoribus angustiores. Tarsi omnes indistincte biarticulati. Hemielytra spatio rotundato ad portionis coriaceæ angulum posteriorem internum subtiliter pubescente. Setæ caudales breves.

Spec. *testaceum*: spatulato-ovatum, testaceum; femoribus et tibiis maculis tribus nigris distinctis; abdomine supra nigro, marginibus testaceis; setis caudalibus spatulatis.

Long: 8½ lin. Lat: 4½ lin. Set. caud. long. ¾ lin. Habitat in Pennsylvania aquis.

Spec. *aurantiacum*: pallide testaceum; femoribus indistincte maculatis; prothoracis lateralibus sub-emarginatis; abdomine supra nigerrimo, margine lato testaceo, intus aurantiaco; setis caudalibus spatulatis.

Long: 11 lin. Lat: 5 lin. Set. caud. long. 1¼ lin. Habitat in Pennsylvania aquis.

Var. *immaculatum*: pallide luteum, immaculatum.

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REFERENCE TO THE FIGURES, PLATE X, OF THE DISSECTIONS OF BELOSTOMA HALDEMANUM.

Fig. 1. Promusculus magnified: *a.* first articulation; *b.* remaining articulations; *c.* quadrangular opening; *d.* labrum; *e.* ligula; *f.* oral setæ.

Fig. 3. Antenna of *Belostoma* much magnified.

Fig. 4. Digestive apparatus: *a.* œsophagus; *b.* stomach; *c.* duodenum; *d.* ileum; *e.* colon; *f.* rectum; *g.* cœcum; *h.* salivary apparatus; *i.* hepatic tubes.

Fig. 5. Portion of the inner surface of the lining membrane of the stomach highly magnified.

Fig. 6. Male generative apparatus magnified, anterior view: *a.* testicle; *b.* vas deferens; *c.* retractor muscles of the penis; *d.* caudal setæ; *e.* extremity of the rectum; *f.* anal prolongation.

Fig. 7. Posterior view of the genito-anal prolongation of the abdomen magnified: *a.* genital prolongation; *b.* genital uncæ; *c.* caudal setæ; *d.* extremity of the anal prolongation.



Fig. 8. Lateral view of the genito-anal prolongation; the penis protruded, and the anal prolongation drawn upwards: *a.* genital prolongation; *b.* anal prolongation; *c.* the uncinated portion of the penis; *d.* the spoon-like portion of the penis; *e.* genital unca; *f.* caudal setæ.

Fig. 9. Female generative apparatus magnified: *a.* ovary; *b.* oviduct; *c.* vagina.

Fig. 10. *a.* exhibits the relative position of an ovum within its tube magnified; *b.* an ovum, magnified, exhibiting the peculiar markings.

Fig. 11. Posterior view of the genito-anal prolongation: *a.* genital prolongation; *b.* undeveloped unca; *c.* caudal setæ; *d.* anal prolongation.

Fig. 12. Odoriferous glands, with the ventral cord concealing in its course the point of their termination.

Fig. 13. Nervous system magnified: *a.* cerebral ganglia; *b.* optic ganglia; *c.* optic nerves; *d.* frontal ganglion; *e.* respiratory ganglia; *f.* cerebellum; *g.* branches within the prothorax; *h.* nervous mass, formed by the fusion of the abdominal with the remaining thoracic ganglia, within the mesothorax; *i.* antero-lateral branches; *k.* postero-lateral branches; *l.* posterior branches.

Fig. 14. Antenna of *Perthostoma*.

Fig. 15. Ova of *Perthostoma*, from the back of the female.

## MISCELLANEA ZOOLOGICA.

BY JOSEPH LEIDY, M. D.

1. *Description of a new genus and species of Entozoa. Cryptobia helicis.\**

In September, 1846, I first gave an account, in our Proceedings, of the discovery of a new genus and species of Entozoa inhabiting the fluid contained within the vessie copulatrice or spermatheca of *Helix albolabris*, *tridentata*, and *alternata*. Since then I have verified the observation, and have also detected it in several other species of *Helix*, viz. *elevata* and *thyroidus*; and also in a species of an allied genus, *Bulimus decollatus*.

The name which I gave it at that time, I was not aware, had been previously applied to a genus of Insecta brachelytra, with the only difference of the latter having the neuter termination "um." I will therefore change the name to—

CRYPTOICUS, minutissimus; forma mutabilissima; organisatione interna cellularum et granulorum.

*C. helicis.* Coloris expers; forma plerumque elongata, ellipsoidi, fusiformi, vel ovata; caudis duabus adversis, una longiori quam altera. Structura interna stomachos duos et granulos numerosos parvos exhibit. Long.  $\frac{1}{23}$  —  $\frac{1}{10}$  lin. Habitat in spermatheca vel "vessie copulatrice" *Helicis albolabris*, *tridentatæ*, &c., et *Bulimi decollati*.

\* Proc. Acad. Nat. Sci., vol. iii. p. 100.

This singular entozoon is a polygastric animalcule. Its varied form and movements are curious to observe; at one moment globular, then oval, ovate, fusiform, sigmoid, crescentic, &c., it appears as if it would outvie the kaleidoscope in its changes. Sometimes it is collected in bunches adhering by the end of one of the cauda to each other, and frequently it may be observed to contract upon either of the larger cellules, causing them to project beyond the outline of the animal. The motions are vibratile, rotary, with a lateral progression, or whirling in circles like the insect *Gyrinus*.

*Cryptoicus*, on account of its locality, might be mistaken for the spermatozoa of the animal, but may be readily distinguished; the spermatozoa of *Helices* generally having either a uniform sigmoid or a spiral body, with an enormous proportionate length of tail, and a slow, vibratile motion.

In the collapsed state of the genitalia of *Helices* I could not detect the *Cryptoicus*.

The subjoined sketch represents some of the varied forms of the animal highly magnified.



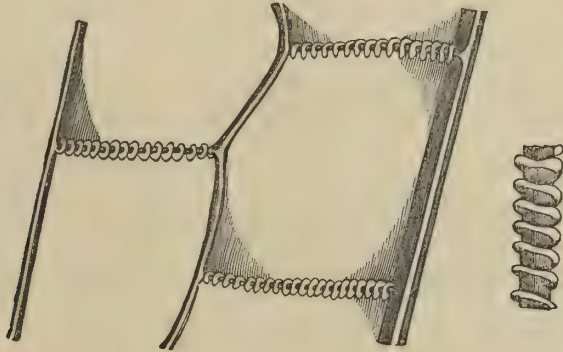
## 2. *On the mechanism which closes the membranous wings of the genus Locusta.\**

The membranous wings or alæ of the locusts while at rest are folded up, like a closed fan, beneath the anterior pergamentaceous wings. These are opened or expanded by the contraction of appropriate muscles (*extensores alæ*) contained within the thorax, the tendons of which are inserted into the ribs or longitudinal veins at the root of the wings. When one of the wings is separated from the body of the insect, and stretched open by the fingers, upon letting go, it will be found instantly to close or resume the position of rest.

The mechanism which produces this closure in the separated wing, as well as when attached to the living animal, I find to be spiral ligamentous bands, wound, like the thread of a screw, around the transverse or connecting veins, which latter are also flexible. By this arrangement, upon the contraction of the alary extensors, the spring-like ligaments, or *ligamenta spiralia* as I will call them, are stretched in the expansion of the wings, and upon the relaxation or cessation of the action of the

\**Proc. Acad. Nat. Sci.*, Vol. iii. p. 104.

muscles, the physical properties alone of the ligamenta spiralia, in resuming their unstretched state, close the wings. These ligamenta spiralia are numerous, and exist in all the species of *Locusta* possessing perfect alæ which I have examined. To this short description I append a drawing of several of these ligaments, magnified, from a preparation in Canada balsam, of one of the alæ of *Locusta Carolina*.



3. *On the situation of the olfactory sense in the terrestrial tribe of the Gasteropodous Mollusca.\**

While no observer of the habits of the terrestrial Gasteropoda, doubts the existence of the sense of smell in them, but on the contrary, asserts positively that it does exist, the anatomist heretofore has not been able to point out its precise seat.

Swammerdam, in his *Biblia Naturæ*, speaks decidedly of the existence of this sense in *Helix pomatia*, but offers no conjecture as to its situation. Blumenbach remarks, under the head of Vermes, "Several animals of this class appear to have the sense of smelling: as many land-snails (*Helix pomatia*, &c.,)" and afterwards adds, "But the organ of this sense is hitherto unknown; perhaps it may be the stigma thoracicum." Cuvier, in his "*Mémoire sur la Limace et le Colimaçon*," after remarking the delicacy of this sense, thinks it probable it may reside "Dans la peau toute entière, qui a beaucoup de la texture d'une membrane pituitaire."

In investigating this tribe of mollusca, I detected an organ which appears to have been entirely neglected, or has escaped the notice of those who have dissected these animals. It is a depression or cul-de-sac, having its orifice beneath the mouth, between it and the anterior extremity of the podal disk, and which in a number of species of different genera is elongated backwards into a blind tube, more or less deep, free, and occupying a situation just above the podal disk within the visceral cavity; in others it is a funnel-shape depression, excavated in the substance of the

\*Proceed. Acad. Nat. Sci. vol. iii. p. 136.



podal disk. In *Bulimus fasciatus* it extends backwards as far as the tail, is one-eighth of an inch in width, and is twice folded upon itself; in *Glandina truncata* it extends the length of the podal disk; in a number of American species of *Helix*, I found it to vary from a superficial depression to a sac the length of the podal disk; in a specimen of *Helix pomatia* of Europe, hardened in alcohol, it proved to be a funnel-shape excavation half an inch deep; in *Succinea obliqua* it is of moderate length; in *Limax* and *Arion* it is a superficial depression; and in an undescribed species of *Vaginula*, a sac half an inch in length and free.

It is composed of two laminæ; a delicate lining mucous membrane and an external layer, having a whitish or reddish glandular appearance. A large nerve, on each side, from the subœsophageal ganglia, is distributed to its commencement, besides which it receives numerous smaller branches along its course, from the same ganglia. Its arterial supply is derived from the cephalic branch of the aorta.

This organ, from its situation, relative size to the degree of perfection of the olfactive sense, its structure, and nervous supply, I think, is the olfactory organ.

ART. VII.—FRAGMENTA ENTOMOLOGICA. Auctore J. L. LE CONTE, M. D.

I. TRIPLACIDUM BOREALI-AMERICANARUM SYNOPSIS.

Libri citati. LACORDAIRE, Monographia Erotylidarum. Paris, 1843.

SAY, Journal Ac. Nat. Sc., vol. iv, p. 89, (Triplax.)

“ “ “ “ v, p. 300, (Tritoma.)

MELSHEIMER, Proceedings Ac. Nat. Sc., vol. iii, p. 175.

TRIPLAX, Fabr.

A. Corpus ellipticum, subelongatum.

- |                           |   |  |  |
|---------------------------|---|--|--|
| rufum; elytris<br>nigris. | { | fascia media transversa rufo-flava, capite antennisque nigris, | 1. FESTIVA, Lac. 208.  |
|                           |   |  | <i>fasciata</i> , Mels. 176.                                 |
|                           |   | concoloribus; capite antennarumque basi rufis, - - -           | 2. THORACICA, Say, iv. 89.<br><i>melanoptera</i> , Lac. 215. |
|                           |   | nigrum; capite, thorace, pedibus antennarumque basi rufis, -   | 3. FLAVICOLLIS, Lac. 218.                                    |

B. Corpus ovatum. TRITOMA, Fabr.

- |  |   |  |   |   |   |   |
|--|---|--|---|---|---|---|
| thorace rufo;<br>elytris nigris;<br>tibiis dilatatis.                  | { | corpus subtus rufum; capite pedibusque rufis, - - -  | 4. AFFINIS, Lac. 224.   |   |   |   |
|  |   | corpus subtus nigrum; capite pedibusque rufis, - - - | 5. *ATRIVENTRIS.  |   |   |   |
| thorace elytrisque concoloribus<br>tibiis dilatatis.                   | { | {  | antennarum art. 3io sequentes 3 æquante.  | nigra; antennarum basi, tarsisque obscure ferrugineis,        | 6. UNICOLOR, Say, v. 300, Lac. 220.   |   |
|  |   |  |   | subelongata, nigra; ant. basi pedibusque læte flavis,         | 7. ANGULATA; Say, v. 300.<br><i>flavipes</i> , Lac. 226.                                |   |
|  |   | {  | supra picea, subtus læte picea; antennarum basi,<br>pedibus, thoracisque limbo pallidioribus, - - - | 8. BRUNNEA, Lac. 222.   |   |   |
|  |   |  | antennarum art. 3io sequentes 2 æquante; supra pallide picea<br>subtus testacea, - - - - - - - - -  | 9. LIVIDA, Lac. 227.  |   |   |
| thorace nigro; tibiis parum dilatatis; capite<br>rufo; pedibus flavis. | { | {  | elytris flavo-ferrugineis, sutura margineque piceis, - - -  | 10. *VITTATA.   |   |   |
|  |   |  | {   | nigra; antennarum basi rufo, - - - - -                        | 11. ERYTHROCEPHALA, Lac. 226.   |   |
|  |   |  |   | nigra; antennarum basi humerisque rufo-flavis, - - -          | 12. *RUFICEPS.  |   |
|  |   | {  | {   | subtus nigra; elytris macula humerali coccinea,               | - - -   | 13. *TÆNIATA.   |
|  |   |  |   | subtus rufa: elytris macula basali coccinea,                  | - - -   | 14. BIGUTTATA, Say, iv. 89.<br><i>basalis</i> , Lac. 225. |
|  |   | {  | {   | elytris antice dimidio coccineis; corpus subtus nigrum,       | 15. PULCHRA, Say, v. 301.<br><i>dimidiata</i> , Lac. 224.<br><i>basale</i> , Mels. 175. |   |
|  |   |  |   | elytris coccineis; abdominis art. 3 ultimis rufis, - - -      | 16. SANGUINIPENNIS, Say, iv. 89.  |   |
|  |   |  |   | elytris flavis, limbo nigro, antice abbreviato (mihi invisus) | 17. CINCTA, Lac.  |   |

5. \**ATRIVENTRIS*.—Nigra, nitida; capite, thorace, antennarum basi, palpis pedibusque læte rufis; elytris punctato-striatis, interstitiis subtiliter punctulatis. Long. .15 unc. lat. .08. Habitat in Carolina Meridionali a Dom. Zimmerman benevole missa.

Ovata, postice subattenuata, nigra, nitida. Caput subtiliter punctatum, læte rufum; antennæ rufæ, clava fusca. Thorax basi capite plus duplo latior, latitudine fere triplo brevior, antice valde angustatus, apice profunde emarginatus, lateribus paulo rotundatis, basi utrinque leviter oblique emarginata; leviter punctatus, læte rufus, nitidus. Elytra latitudine plus sesqui longiora, nigra nitida, leviter punctato-striata, interstitiis subtiliter sparse punctulatis. Subtus nigra, abdominis articulis 3 ultimis medio rufescentibus. Pedes cum coxis rufo-flavi; tibiis versus apicem fortiter dilatatis, angulatisque.

Habitus fere *T. flavicollis*, at paulo convexior.

10. \**VITTATA*.—Atra nitida; capite, thoracisque limbo rufescentibus; antennarum basi pedibusque flavis; elytris rufis, sutura margineque late piceo-infusatis. Long. .15 unc. lat. .09. Habitat Nov. Eboraci minus frequens. *T. pulchra*. Mels. Cab.

Atra nitida. Caput sparse punctatum, obscure rufum, ore infuscato; palpis, antennisque rufo-flavis, his clava nigra; articulo 3io sequentes duos æquante. Thorax basi capite fere triplo latior, latitudine duplo brevior, lateribus paulo rotundatus, antice valde angustatus, basi utrinque oblique emarginatus, lobo intermedio rotundato: punctatus, parum convexus, ater margine laterali rufescente. Elytra latitudine sesqui longiora, profunde punctato-striata, interstitiis valde obsolete punctatis; rufa nitida, vitta communi suturali ad striam 2<sup>ndam</sup> extendente, alteraque submarginali utrinque paulo abbreviata piceis. Pedes flavi; tibiis versus apicem paulo dilatatis.

12. \**RUFICEPS*.—Convexa, nigra nitida; capite, elytrorum macula humerali, antennarum basi, palpis pedibusque rufo-flavis. Long. .14 unc. lat. .08. Habitat in Carolina Meridionali; a Dom. Zimmerman amice data.

Ovata, convexa, postice valde attenuata, nigra nitida. Caput punctatum inter antennis utrinque leviter impressum, læte rufum; antennæ flavæ, clava nigro-picea. Thorax basi capite plus duplo latior, latitudine fere triplo brevior, antice valde angustatus, apice profunde emarginatus, lateribus modice rotundatus, basi utrinque oblique emarginato, lobo intermedio late rotundato; punctatus. Elytra latitudine vix sesqui longiora, punctato-striata, interstitiis subtiliter sparse punctatis; nigra, macula trapezoidali humerali coccinea, margine postico convexo. Subtus nigra, nitida, abdominis articulis duobus ultimis flavo-marginatis. Pedes rufo-flavi, tibiis parum dilatatis.



13. \**TÆNIATA*.—Nigra nitida, elytrorum macula humerali coccinea, palpis, pedibus, antennarum basi, anoque rufo-flavis. Long. .15 unc. lat. .09. Habitat in Pennsylvania, et Carolina.

Ovata, convexa, utrinque subattenuata, nigra nitida. Caput punctatum, inter antennis utrinque leviter impressum. Antennæ nigro-piceæ, basi rufescentes, palpi rufi. Thorax latitudine plus duplo brevior, antice valde angustatus, lateribus modice rotundatus, apice emarginatus, basi utrinque oblique leviter emarginatus, lobo medio rotundato; distinctius punctatus. Elytra latitudine sesqui longiora, leviter punctato-striata, interstitiis sparse subtiliter punctulatis; nigra nitida, macula trapezoidali humerali coccinea, margine postico concavo. Subtus nigra, abdominis articulo ultimo rufo-marginato. Pedes rufo-flavi, tibiis vix dilatatis.

## 2. DE LYCIS BOREALI-AMERICANIS.

Auctores Citati. FABR. Systema. Eleutheratorum.

SAY, Journ. Ac. Nat. Sc., vol. iii.

“ Bost. Journ. Nat. Hist., vol. i.

RANDALL, Bost. Journ. Nat. Hist., vol. ii. Febr. 1838.

NEWMAN, Ent. Mag., vol. v. April 1838.

MELSHEIMER, Proc. Ac. Nat. Sc., vol. ii.

GERMAR, Ins. Nov.

HALDEMAN, Proceed. Ac. Nat. Sc., vol. i.

### GENERUM SYNOPSIS.

§ Caput rostratum.

LYCUS.

§ § Caput subrostratum (h. e. rostrum capite brevius).

1. Antennæ serratæ, articulis subquadratis.

a. Palporum articulo ultimo ovali. Caput exsertum.

DYCTIOPTERA.

b. Palporum articulo ultimo securiformi. Thorax antice leviter productus.

DIGRAPHA.

2. Antennæ flabellatæ: palporum articulo ultimo compresso, extus oblique leviter sinuato.

a. Elytra valde dilatata.

CÆNIA.

b. Elytra vix dilatata.

CELETES.

§ § § Caput breve, fere reconditum.

EROS.

### LYCUS, Fabr.

1. *LATERALIS*, Mels. 11. 302. (*Lygistorus*.)

Ad *Lycos* veros recte pertinet hæc species: nam rostrum elongatum est, thoracem fere superans: *Lygistorus* (Dej.) pro *Dyctiopteram* (Lat.) habeo; beatus tamen hic auctor pro typo generis sui *Lycum sanguineum* (Fabr.) citavit (Regne An. iii.) quem cum *Lygistoris* collocavit Dejean (Cat. 111).

Habitat in provinciis mediis et australibus rarissime.

DYCTIOPTERA, Latr. (*Lygisterus*, Dej. Cat.)

1. \*SUBSTRIATUS.—Niger, thorace canaliculato, transversim biimpresso, lateribus late luteis; elytris rugosis, obsolete striatis. Long. 44 unc. lat. 15. Habitat in provinciis australibus minus frequens.

*Lygisterus substriatus*, Dej. Cat.

Elongatus, niger, opacus, tenuiter pubescens. Caput subrostratum, nitidum levæ: mandibulis rufis. Thorax capite duplo latior, subquadratus, latitudine paulo brevior, antice subangustatus lateribus rectis, apice leviter rotundato, basi fere recte truncato, angulis posticis subacutis; disco fere planus, inæqualis, canaliculatus, transversim profunde biimpressus, niger, lateribus late luteis. Elytra parallela, subtiliter rugosa leviter obsoleteque striata.

DIGRAPHA, Newman. (*Charactus*, Dej. Cat.)

elytris luteis, apice lato nigris fascia nigra transversa	{	una: capite	{	thorax sesqui latior, - - - - -	RETICULATA.
				thorax duplo latior: fascia	integra
		postice sinuata, antennarum articulo 2 <sup>ndo</sup> brunneo, - - - - -	TYPICA.		
		angustiore, - - - - -	*AFFINIS.		
		versus marginem abbreviata, - - - - -	DORSALIS.		
		nulla	{	thorax capite duplo latior, - - - - -	*APICALIS.
thorax capite vix sesqui latior, - - - - -	TERMINALIS.				

†Thorax capite duplo, vel plus duplo latior.

1. DISCREPANS.—Nigra, subtiliter pubescens: thorace lateribus late luteis; elytris reticulatis luteis; fascia lata subrotundata, antice ad scutellum producta, apiceque late nigris. Long. 45-6: lat. 25-3. Habitat ubique sat frequens.

*Digrapha discrepans*, Newman, v. 381.

*Charactus vicinus*, Dej. Cat.

Thorax latitudine paulo brevior, antice angustatus, apice obtuse rotundatus lateribus ampliatis, leviter sinuatis, angulis posticis valde productis acutissimis, basi bisinuato: disco concavus, biimpressus, medio acute carinatus, margine tenui, (sicut in omnibus) incrassato: niger lateribus late luteis.

2. TYPICA.—Nigra subtiliter pubescens; thorace luteo, vitta media nigra; elytris reticulatis luteis, fascia media lata subsinuata integra, apiceque late nigris; antennarum articulo 2<sup>ndo</sup> brunneo. Long. 5-7: lat. 26-35. Habitat in provinciis mediis.

*Digrapha typica*, Newman v. 380.

*Charactus nobilis* Dej. Cat.

Thorax latitudine brevior, antice angustatus, apice obtuse rotundatus, lateribus ampliatis, paulo sinuatis, angulis posticis modice productis, acutissimis, basi leviter bisinuato, dorso concavus, acute carinatus, profundius quadratim biimpressus; luteus vitta media lata nigra.

3. \*AFFINIS.—Nigra subtiliter pubescens; thorace lateribus late fulvis; elytris reticulatis fascia media angusta integra, apiceque late nigris. Long. .45: lat. .23. Habitat in Territorio Missouriensi.

Præcedenti affinis, thorace lateribus rectis, disco latiore nigro, fasciaque elytrali angustiore, recta distincta videtur.

Thorax latitudine brevior, antice angustatus, apice acutius rotundatus, lateribus regulariter ampliatis vix sinuatis; angulis posticis modice productis, acutissimis, basi profundius bisinuato, disco valde concavus, niger, lateribus late luteis; inæqualis, profunde biimpressus, acute carinatus. Scutellum nigrum. Elytra postice leviter dilatata, reticulata, costis alternatim elatioribus, fascia media recta integra, maculaque apicali quadrantem occupante antice rotundata, nigris. Subtus nigrum, femora antica basi lutea.

4. DORSALIS.—Nigra tenuiter pubescens, thorace nigro, lateribus late luteis; elytris reticulatis, fascia lata transversa, ad marginem abbreviata, apiceque late nigris.

Habitat in Alabama: Mus. Dom. Haldeman.

Digrapha dorsalis Newman. V. 381.

Characteres duplicatus Hd. Proc. 1. 303.

Characterus inquinatus Dej. Cat.

Fascia elytrali ad marginem abbreviata valde distincta.

5. \*APICALIS.—Nigra, subtiliter pubescens, thorace antice parum angustato, apice subangulato, flavo, vitta lata nigra; elytris flavoluteis, apice late nigris. Long. .65: lat. .35. Specimen unicum in Missouri inveni.

D. terminali, subtus descriptæ simillima; at thorace latiore, antice parum angustato, lateribus multo magis rotundatis, sinuatisque, disco pone medium non elevato, elytrisque basi subgibbosis facile dignoscitur.

Thorax capite duplo latior, latitudine paulo brevior, antice vix angustatus, apice obtuse angulato, lateribus valde rotundatis, postice sinuatis, basi profunde bisinuato, angulis posticis productis acutissimis; disco modice concavus, late biimpressus, medio carinatus; luteus, vitta lata nigra. Elytra ad humeros subgibbosa, sicut in aliis reticulata, costis æqualiter elevatis; lutea, macula magna apicali trientem occupante cœruleo-nigra.

††Thorax capite vix sesqui latior.

6. TERMINALIS.—Nigra, subtiliter pubescens; thorace nigro, lateribus luteis, elytris reticulatis flavo-luteis, apice late nigris. Long. .55: lat. .32. Habitat ubique minus frequens.

Lycus terminalis Say. iii. 178.

Thorax latitudine non brevior, antice angustatus, apice rotundato, medio subangulato, lateribus vix sinuatis, angulis posticis leviter productis, acutis, basi bisinuato; disco modice concavus, pone medium utrinque profunde impressus, acute carinatus, pone medium anguste rhomboidaliter elevatus; elytra flavo fulva, macula apicali trientem occupante cœruleo-nigra.



7. *RETICULATA*.—Nigra, subtiliter pubescens; thorace fulvo, vitta media nigra; elytris reticulatis luteis, fascia transversa, integra, antice subrotundata, apiceque late nigris; antennarum articulo 2<sup>ndo</sup> brunneo. Long. .55: lat. .31. Habitat in provinciis australibus.

Thorace angusto, elytrorumque fascia integra satis distincta. *Lycus reticulatus* Fabr. ii. 111.

#### SPECIES INVISÆ.

*DIVISA* Newman, v. 381, "elytris fulvis, basi nigris." (An recte descripta?)

*SANGUINIPENNIS* Say iii. 178. Habitat ad Rocky Mountains.

*Dyctiopteris* propius videtur, nec *D. sanguineæ* dissimilis.

#### CÆNIA, Newman.

1. *DIMIDIATA*.—Nigra, thorace subfusco, brevi, carinato antice vix angustato, apice angulato, lateribus sinuatis, angulis posticis valde productis; elytris postice valde dilatatis, acute bicostatis, interstitiis 3-seriatim reticulatis; nigris macula magna humerali trigona fulva. Long. .42: lat. .27. Specimen unicum ad Lacum Superiorem inveni.

*Lycus dimidiatus*. Fabr. ii. 111.

*Cænia scapularis* Newman, v. 381.

Nigra, caput antice canaliculatum. Antennæ breviusculæ, latæ, valde compressæ; articulis 4-10 processu medio interno, longo subacuto. Thorax latitudine duplo fere brevior, subpentagonus, lateribus sinuatis, angulis posticis valde productis, acutissimis; disco niger nitidus, acute carinatus, lateribus apiceque subfuscis, grosse punctatis. Elytra abdomine sesqui longiora, basi thorace paulo angustiora, regulariter valde ampliata, dein rotundata, costis 2 valde elevatis, interstitiis reticulatis, 1<sup>mo</sup> 2<sup>ndo</sup> que lineis tribus parum elevatis, intermedia distinctiore; interstitio marginali linea una fere obsoleta; nigra, macula magna scapulari, trientem occupante, postice ad suturam fere extendente, recteque truncata.

#### CELETES, Newman.

1. *BASALIS*.—Atra, vel atro brunnea, thoracis lateribus, humerisque fulvis; illo carinato, apice producto, lateribus sinuato, angulis posticis valde productis; elytris costis 4 elevatis; antennarum articulis ramo longo interno basali. Long. .3: lat. .13. Habitat in Georgia minus frequens.

Elongata, atra; frons leviter concavus; antennæ subelongatæ, valde compressæ, articulo 2<sup>ndo</sup> rufo, sequentibus latitudine duplo longioribus, ramo angusto, longo, interno, basali auctis; oculi permagni. Thorax latitudine brevior, antice subangustatus, apice medio obtuse producto, lateribus valde sinuatis, basi bisinuata; angulis posticis valde productis: disco concavus, carinatus, prope basin transverse arcuatim impressus; niger, lateribus apiceque fulvis. Elytra ad medium thorace duplo latiora, margine, costisque 4 elevatis, interstitiis uniseriatim reticulatis; nigra humeris anguste fulvis.

Species hæc pro typo generis sui, sub nomine *L. marginelli* (Fabr.) citavit Ill. Dom. Newman V. 381. Mihi autem melius videtur (secundum Ill. Com. Dejean) speciem Fabricianam ad genus sequens adjungere.

2. *MYSTACINA*.—Nigra, thorace lateribus, humerisque fulvis; illo brevi carinato, apice subproducto, emarginato, lateribus sinuatis, angulis posticis productis; disco medio antice elevato; elytris 4-costatis; antennis articulis triangularibus, angulo interno producto. Long. .34: lat. .14.

Specimen unicum ad Lacum Superiorem inveni: ad speciem hanc, vel ad præcedentem referendus est *Charactus mystacinus* Dej. Cat.

Elongata, postice vix dilatata; frons valde concavus: oculi permagni. Antennæ elongatæ, valde compressæ, articulis latitudine non brevioribus, triangularibus, angulo interno producto, acuto. Thorax capite duplo latior, latitudine fere duplo brevior, antice parum angustatus, apice modice producto, summo inciso; lateribus valde sinuatis, basi bisinuato, angulis posticis acutis, productis; disco concavus, margine laterali acutius reflexo, late fulvo; carinatus, medio antice elevato. Elytra postice thorace sesqui latiora, margine, costisque 4 elevatis, interstitiis uniseriatim reticulatis; nigra humeris fulvis.

3. *TABIDA*.—Nigra, thorace lateribus, humerisque fulvis; illo carinato, antice [leviter angustato, apice subangulato, lateribus parum sinuatis, basi truncato; elytris parallelis, 4-costatis: antennis articulis triangularibus, angulo interno producto. Long. .3: lat. 1.

Specimen unicum ad Lacum Superiorem inventum.

Linearis, nigra, frons leviter concavus, punctis 2 profundis inter antennas; antennæ sicut in præcedente: oculi permagni. Thorax capite fere duplo latior, latitudine sesqui fere brevior, antice leviter angustatus, apice subangulatus, lateribus parum sinuatis, basi fere recte truncato, angulis posticis productis acutis; disco parum concavus, carinatus, ad medium transverse impressus, antice leviter elevatus, niger lateribus late fulvis. Elytra parallela, thorace vix latiora, atra, humeris anguste fulvis; 4-costata, interstitiis grossius uniseriatim reticulatis. Pedes nigri, femoribus basi rufo-testaceis.

EROS, Newman. (*Dyctiopterus*, Dej. Cat.)

A. Elytris costis 4, margineque fortiter elevatis.

\*Thorace cellulis 5.

1. *COCCINATUS*, Say I. 155. (*Omalisus*.)

Varietas minor; *MUNDUS*, Say, ibid.

Thorax colore instabilis; nonnunquam fere totus fuscus, raro tamen omnino ruber.

- 2 HUMERALIS.—Niger, tenuiter pubescens; thorace lateribus, humerisque late fulvis; illo cellulo mediano antice carinato, carina ad medium postice bifurcata. Long. .35, lat. .14.

Habitat ubique.

*Lycus humeralis*, Fabr. II. 111.

*Omalisus obliquus*? Say I. 156.

*thoracicus*, Randall, II. 14.

Elongatus, postice parum dilatatus; niger tenuiter pubescens. Caput antice profunde canaliculatum, ore obsolete rufo. Antennæ subelongatæ, leviter serratæ, articulo 3<sup>io</sup> sequentibus sesqui brevior, reliquis subquadratis, basi parum angustatis. Thorax latitudine paulo brevior, subquadratus, antice vix angustatus, apice leviter rotundato, basi levissime bisinuato, lateribus fere rectis, angulis posticis acutis: disco leviter concavus, obscurus, marginibus late fulvis; in cellulis 5 divisus, cellulo mediano subrhomboideo, ante medium acute carinato, carina ad medium bifurcata; cellulis basalibus septo transverso extrorsum tendente, mox evanescente notatis. Elytra acute 4-costata, interstitiis biserialim reticulatis, nonnumquam costula abbreviata obsoleta divisis; nigra, macula magna humerali fulva.

3. OBLITUS.—Niger, tenuiter pubescens; thorace latitudine sesqui brevior, margine tenui fulvo; cellulo mediano antice carinato, carina postice bifurcata. Long. .25—35; lat. .09—13.

Habitat in provinciis mediis; Habitus fere præcedentis, thoracis forma, antennisque differt.

*Eros oblitus*? Nm. V. 382.

Niger, caput antice profunde canaliculatum. Antennæ thorace plus duplo longiores, parum compressæ, subserratæ, articulo 3<sup>io</sup> sequentes æquante, ultimo longiore ovali, subacuto. Thorax latitudine sesqui brevior, subquadratus, antice leviter angustatus, apice parum rotundato, lateribus fere rectis, basi fere recte truncato, angulis posticis subacutis; disco fuscus, margine tenui fulvo; sicut in præcedente impressus. Elytra acute 4-costata, interstitiis minus confuse reticulatis, linea obsoleta basali divisis.

4. INCESTUS.—Niger, thorace latitudine non brevior, margine tenui fulvo; cellulo mediano antice carinato carina postice bifurcata. Long. .3; lat. .11.

Habitat in Pennsylvania.

Præcedenti simillimus, at thorace angustiore, lateribus sinuatis, angulis posticis acutioribus, antennis longioribus, magis serratis, articulo 3<sup>io</sup> sequentibus fere sesqui brevior, distinctus.

5. SCULPTILIS.—Niger, thorace quadrato, antice vix rotundato, lateribus fulvis, cellulo mediano pone medium angustato, lateribus ante medium parallelis. Long. .26; lat. .1.

Habitat in provinciis occidentalibus.

*Omalisus sculptilis* Say, I. 156.

*Dyctiopterus exaratus*, Dej. Cat.



Niger, tenuiter pubescens, fronte antice late impresso. Antennæ crassiusculæ, corporis dimidio longiores, leviter compressæ, vix serratæ, articulo 3<sup>io</sup> sequentes æquante, ultimo ovali paulo longiore. Thorax quadratus, latitudine paulo brevior antice non angustatus, apice vix rotundato, basi truncato, lateribus fere rectis, angulis posticis subacutis; ater, lateribus late fulvis; disco cellulis 5, septis valde elevatis; longitudinalibus antice parallelis, late distantibus, pone medium approximatis, leviter curvatis, parte antica celluli mediani subpentagonali subtiliter carinata; cellulis basalibus fovea magna impressis. Elytra acute 4-costata, interstitiis grossius biserialim reticulatis, basi linea obsoleta divisis.

\*\*Thorace cellulis 4.

6. *TRILINEATUS*.—Ater, thorace latitudine fere duplo brevior, cruciforme diviso, postice canaliculato, antice carinato, lateribus late fulvis. Long. .23: lat. 1.

Habitat ubique.

*Dyctiopterus trilineatus*, Mels. II. 303.

Latiusculus, niger. Caput nitidum, antice late sulcatum. Antennæ longiusculæ, parum compressæ, modice serratæ, articulo 3<sup>io</sup> sequentibus paulo brevior. Thorax latitudine duplo brevior, antice non angustatus, apice rotundato, basi truncato lateribus leviter sinuatus, angulis posticis acutis; niger lateribus late fulvis; disco leviter concavus, septo transverso utrinque leviter obliquo, medio fere obsoleto divisus, antice carinatus, postice canaliculatus; transversim subprofunde biimpressus, impressione anteriore medio angulata. Elytra atra, versus humeros fere brunnea, acute 4-costata, interstitiis grossius reticulatis, basi linea obsoleta divisis; costa subsuturali nonnunquam fere obsoleta.

7. *CRENATUS*.—Ater, thorace latitudine sesqui brevior, antice valde rotundato, angulis posticis acutis disco cruciforme diviso, carinato, marginibus late fulvis. Long. .28: lat. .1.

Habitat Nov Eboraci.

*Omalisus crenatus*, Germar, 61.

*Omalisus cruciatus*, Randall, II. 15.

*Eros alatus*, Newman, Ent. Mag. V. 382.

Elongatus, caput antice canaliculatum, transverseque impressum; ore rufescente. Antennæ elongatæ, parum serratæ, articulo 3<sup>io</sup> sequentibus vix brevior. Thorax latitudine sesqui brevior, antice subangustatus, apice valde rotundatus, angulis anticis nullis, basi truncatus, lateribus sinuatus, angulis posticis acutis: disco parum concavus, fuscus, vel niger, marginibus omnibus fulvis; septo transverso utrinque obliquo, medio fere obsoleto divisus, carinatus, carina postice subtiliore, transversim obsolete biimpressus. Elytra thoracis basi paulo latiora, acute 4-costata, interstitiis grossius reticulatis, linea obsoleta longitudinali divisis.

## B. Elytris costis 9 minus elevatis.

\* Costis alternatim elatioribus.

8. *MODESTUS*.—Niger, thorace latitudine brevior, antice subangustato, lateribus sinuato, postice canaliculato, fulvo macula media nigra. Long. ·34 : lat. ·13.

Specimen unicum ad Lacum Superiorem inveni.

*Lycus modestus*, Say. B. J. I. 153.

Niger, tenuiter pubescens: fronte profunde canaliculato. Antennæ dimidium corporis longitudine æquantur, latæ, valde compressæ, parum serratæ, articulo 3<sup>io</sup> triangulari sequentibus paulo brevior. Thorax latitudine sesqui brevior, antice vix angustatus, apice medio subangulato basi obsolete bisinuato, lateribus sinuatis, angulis posticis truncatis, subacutis; disco leviter concavo, postice profunde breviter canaliculato, antice brevissime carinato, obsolete transversim biimpresso; luteus macula magna quadrata nigra nitida. Elytra thorace non latiora, 9-costata, costis 2, 4, 6, 8 elatioribus, interstitiis uniseriatim reticulatis.

9. *TIMIDUS*.—Niger, thorace latitudine paulo brevior, antice leviter angustato, basi foveolato, lateribus late fulvis. Long. ·3 : Lat. ·12.

Habitat in Georgia. Præcedenti simillimus, at thoracis forma facile dignoscendus.

Niger, subtiliter pubescens, Caput profunde canaliculatum. Antennæ subelongatæ, valde compressæ, distinctius serratæ. Thorax latitudine paulo brevior, antice subangustatus, apice valde rotundato, basi leviter bisinuato, lateribus fere rectis, angulis posticis productis, acutis; disco minus concavus, basi fovea oblonga profunda notatus, pone medium transversim profunde impressus; niger nitidus, lateribus late, apice anguste fulvis. Elytra fere sicut in priore.

\*\*Costis subæqualiter parum elevatis: interstitiis uniseriatim reticulatis.

## a. Antennæ subserratæ.

10. *ÆGER*.—Niger, thorace brevior, antice parum angustato, postice canaliculato, lateribus late fulvis, vix sinuatis: antennarum articulo 2<sup>do</sup> ferrugineo. Long. ·3 : lat. ·12.

Habitat ubique.

*Eros alatus?* Nm. V. 382. (Nimis concise descriptus.)

Niger, subtiliter pubescens; caput inter oculos profunde foveatum. Antennæ subelongatæ, vix serratæ, articulo 2<sup>do</sup> parvo, obscure ferrugineo; 3<sup>io</sup> sequente plus sesqui brevior. Thorax latitudine plus sesqui brevior, antice vix angustatus, apice modice rotundatus, lateribus vix sinuatus, basi leviter bisinuato, angulis posticis acutis paulo productis; disco niger nitidus, lateribus late, apice anguste fulvis: pone medium canaliculatus, transversim profunde impressus. Elytra nigra, macula minuta humerali fulva; 9-costata, costis æqualibus parum elevatis, 8<sup>va</sup> sicut in omnibus basi carinata, carina ante medium obsoleta.

11. *socius*.—Niger, thorace latitudine paulo brevior, antice leviter angustato, postice foveolato, profundeque transversim impresso, lateribus fulvis. Long. ·32 : lat. 11.

Præcedenti simillima at thorace et antennis differt. Habitat ubique.

Niger tenuissime pubescens. Caput antice foveatum. Antennæ subelongatæ, latæ, articulo 3<sup>io</sup> sequente paulo brevior. Thorax latitudine paulo brevior, antice leviter angustatus, apice valde rotundatus, lateribus rectis, basi fere recte truncato, angulis posticis acutis ; disco parum concavus, obsolete transversim biimpressus, pone medium profunde canaliculatus, profundeque transversim impressus, basi summo utrinque profunde impresso : niger nitidus, lateribus anguste fulvis. Elytra 9-costata, omnino sicut in priore.

12. *mollis*.—Niger, thorace fere semicirculari, canaliculato, canali antice dilatata, disco utrinque leviter impresso, lateribus late luteis. Long. ·26, lat. ·1.

*Eros lictor*? Nm. V. 382.

Habitat in provinciis australibus : præcedente angustior.

Niger tenuissime pubescens ; caput vertice profunde transversim impresso. Antennæ subelongatæ, latæ, articulis latitudine vix longioribus, 3<sup>io</sup> sequente sesqui brevior. Thorax latitudine vix brevior, apice cum angulis anticis rotundatus, lateribus non sinuatus, basi fere recte truncatus, angulis posticis subacutis, non productis ; disco medio leviter convexus, canaliculatus, canali antice dilatata ; ad medium obsolete transversim impressus ; lateribus late depressis, vix reflexis, luteis, basi prope angulum impresso. Elytra thorace non latiora, tenuius reticulata, 9-costata, costis 4<sup>ta</sup> 8<sup>va</sup> que paulo evidentioribus.

13. *floralis*.—Niger, thorace brevi, apice valde rotundato, lateribus fere rectis, angulis posticis acutis, pone medium profunde, ante medium obsolete transversim impresso ; lateribus late, apice anguste luteis. Long. ·22 : Lat. ·09.

Habitat Nov Eboraci.

*Dyctiopterus floralis*, Mels. II, 302.

Præcedenti brevior. Caput canaliculatum, impressumque. Antennæ elongatæ, vix serratæ, articulis latitudine sesqui longioribus. Thorax latitudine sesqui brevior, fere semicircularis, apice cum angulis anticis rotundato, quam in præcedente magis producta : lateribus non sinuatis, angulis posticis retrorsum leviter productis, acutis, basi fere truncato ; disco utrinque profunde impresso ; ante medium obsolete, pone medium profunde transversim impressus ; in media basi fovea oblonga, alteraque utrinque transversa notatus : niger, lateribus late, apice anguste luteis. Elytra thorace vix latiora, distinctius reticulata, 9-costata, costis 4<sup>ta</sup> et 8<sup>va</sup> paulo evidentioribus.



14. *NANUS*.—Niger, thorace latitudine vix brevior, antice subangustato, apice rotundato, lateribus leviter sinuatis, angulis posticis valde acutis, lateribus fulvis. Long. .23: lat. .09.

Habitat ubique.

*Dyctiopterus nanus*, Mels. II. 302.

*Dyctiopterus pygmæus*, Dej. Cat.

Parvus, elongatus, ater. Caput vertice profunde impressum. Antennæ elongatæ, articulis latitudine sesqui longioribus, basi parum angustatis. Thorax latitudine non brevior, antice subangustatus, apice rotundato, lateribus leviter sinuatis, basi fere truncatus, angulis posticis acutis; disco niger nitidus, pone medium canaliculatus, ante medium transversim obsolete impressus basi utrinque fovea transversa notatus; lateribus late luteis. Elytra atra, thorace postice duplo latiora, 9-costata, costa 4<sup>ta</sup> distinctiore, interstitiis distinctius reticulatis.

15. *MINUTUS*.—Niger, thorace latitudine sesqui brevior, antice vix angustato, apice rotundato, lateribus sinuatis, angulis posticis acutis; fulvo, vitta lata pone medium dilatata nigra. Long. .20: lat. .08.

Habitat in Pennsylvania.

*Dyctiopterus minutus*, Dej. Cat.

Præcedente latior, niger, caput et antennæ eadem. Thorax latitudine sesqui brevior, antice non angustatus, apice rotundato-angulatus, lateribus leviter sinuatus, basi fere truncatus, angulis posticis acutis; disco postice canaliculatus, ante medium transversim impressus, basi utrinque fovea transversa; luteus, vitta media nigra, pone medium dilatata. Elytra 9-costata, distinctius reticulata, costis æqualibus.

16. *CANALICULATUS*.—Ater, thorace latitudine non brevior, antice non angustato, apice valde rotundato, lateribus vix sinuatis, angulis posticis extrorsum leviter productis; postice canaliculato, marginibus omnibus late luteis. Long. .28: lat. .1.

Habitat in Pennsylvania.

*Lycus canaliculatus*, Say. B. J. I, 153.

*Dyctiopterus assimilis*, Dej. Cat.

Elongatus, ater; caput leviter impressum. Antennæ elongatæ, leviter serratæ articulo 3<sup>io</sup> sequentibus duplo fere brevior; 4<sup>to</sup> 5<sup>to</sup>que æqualibus, latis, triangularibus, 6<sup>to</sup> sequentibusque sesqui longioribus, latitudine duplo longioribus. Thorax latitudine non brevior, antice non angustatus, apice valde rotundatus, lateribus subparallelis, basi fere truncatus, angulis posticis extrorsum prominulis, acutis: disco parum concavus, pone medium canaliculatus, foveis basalibus nullis; luteus, macula magna subquadrata nigra. Elytra atro-brunnea, distinctius reticulata, 9-costata. Femora basi late lutea.

## b. Antennæ valde serratæ, fere flabellatæ.

17. *LASCIVUS*.—Niger, thorace latitudine vix brevior, antice angustato, apice angulato, lateribus rectis, angulis posticis acutis: elytris distinctius reticulatis. Long. .27: lat. .1.

Habitat in Georgia.

Elongatus, niger. Caput profunde foveatum. Antennæ elongatæ, articulo 3<sup>io</sup> sequente sesqui brevior, reliquis triangularibus, latitudine paulo longioribus basi valde attenuatis. Thorax latitudine vix brevior antice angustatus, apice obtuse angulatus, lateribus rectis, basi truncato, angulis posticis acutis; disco niger, pernitidus, antice rugosus, lateribus apiceque late fulvis, utrinque foveatus, basi 3-foveatus, foveis externis obliquis. Elytra thorace vix latiora, acutius 9-costata, interstitiis distinctius reticulatis.

18. *SOLLICITUS*.—Elongatus, niger, thorace latitudine non brevior, antice angustato, apice distinctius angulato, lateribus rectis, canaliculatus, lateribus obscure fulvis. Long. .27: lat. .1.

Habitat in Georgia.

Præcedenti simillimus. Caput latius, minus profunde foveatum. Antennæ eadem. Thorax paulo latior, antice magis angustatus, apice multo magis productus: disco utrinque profundius impressus, canaliculatus, canali antice abbreviata; lateribus et apice minus reflexis, obscure fulvis. Elytra sicut in præcedente.

19. *VILIS*.—Elongatus, niger, thorace latitudine vix longiore, antice angustato, apice valde rotundato, lateribus parum sinuatis, angulis posticis acutis leviter productis: disco canaliculato, canali antice subobsoleta, transversim obsolete biimpresso, basi utrinque transverse foveato; nigro lateribus late fulvis: elytris 9-costatis, distinctius reticulatis. Long. .2: lat. .08.

Antennæ sicut in præcedentibus duobus: ab omnibus aliis satis distinctus. Habitat Nov Eboraci.

## III. PEDILUS, Fisch.

Auctores laudati.—HENTZ. Trans. Am. Phil. Soc. Vol. III. (Pyrochroa.)

NEWMAN. Ent. Mag. Vol. V. 875.

ZIEGLER. Proc. Ac. Nat. Sc. Vol. II. 46.

## SPECIERUM SYNOPSIS.

tobis niger	{	pedibus nigris, - - - - -	1. IMUS, Nm.
		pedibus fulvis, (mihi invisus,) - - - - -	2. FULVIPES, Nm.
thorace rufo,	{	macula magna discoidali, pedibus rufis, - - - - -	3. *FULCHER.
		immaculato pedibus rufis, - - - - -	4. RUFICOLLIS, Z.
		maculato, vel immaculato, pedibus nigris, - - - - -	5. INFUMATUS, Htz.

elytris macula apicali testacea	{	thorace pedibusque nigris, (invisus,) - - - - -	6. LUGUBRIS, Nm.
		thorace rufo, pedibus nigris, (invisus,) - - - - -	7. GUTTULA, Nm.
		thorace rufo, pedibus rufis, - - - - -	8. ELEGANS, Htz.

Habitant in provinciis mediis.

1. IMUS, Nm. V. p. 375.

*nigricans*, Zieg. II. 46.

3. \*FULCHER.—Niger, parum nitidus, antennarum articulo 1<sup>mo</sup>, pedibusque rufis: thorace leviter cordato, macula magna discoidali nigra; elytris punctatis, apice subgibboso, lævissimo. Long. .35: lat. .1.

Habitat in Kentucky; specimen unicum a Dom. Haldeman amicissime datus.

Reliquis paulo angustior; caput orbiculatum, nigrum læve. Antennæ nigræ, articulo 1<sup>mo</sup> obscure testaceo. Thorax capite fere duplo latior, globosus, postice leviter retractus, nitidus lævis, rufus, macula magna, ab apice ad basin extendente nigra. Elytra thorace paulo latiora, parallela, confluentur punctata, leviter pubescentia; apice leviter gibboso, lævissimo. Subtus niger; pedes rufi.

8. ELEGANS, Htz. III. 257.

*hæmorrhoidalis*, Z. II. 46.

5. INFUMATUS, Hentz.

*rufithorax*, Nm. V. 375.

*marginicollis*, var. Z. II. 47.

#### IV. VARIA.

##### HYBOSORUS, McLeay. (Geotrupidarum genus.)

1. CAROLINUS.—CONVEXUS, niger, pernitidus, thorace sparse punctato, angulis posticis acutis, prominentibus: elytris punctato-striatis, tibiis anticis 3-dentatis. Long. .31: lat. .19.

Habitat in Carolina Meridionali: a Dom. Zimmerman sub nomine citato missus.

♂ Oblongus convexus, postice leviter dilatatus, niger, pernitidus. Clypeus punctatus, antice rotundatus, tenuiter marginatus, labro rufo, vel rufo-piceo, margine punctato. Thorax latitudine sesqui brevior, antice angustatus, apice emarginatus, leviter sinuatus, angulis anticis valde acutis: lateribus vix rotundatis leviter sinuatis, basi bisinuato, angulis posticis valde acutis, leviter prominulis; sparse punctatus, magis ad latera. Scutellum læve. Elytra basi thorace paulo angustiora, postice regulariter paulo dilatata, punctato-striata, striis approximatis, interstitio subsuturali paulo latiore; stria 1<sup>ma</sup> postice exarata. Subtus rufo-piceus, sparse, longeque setosus: pedes nigri, femoribus valde incrassatis, tibiis anticis extus 3-dentatis, dente postico minimo: intermediis et posticis extus emarginatis.

Sexus differentia in thoracis lateribus, basique minus sinuatis, angulis posticis minus acutis, vix prominulis.



## CANTHON, Illiger. (Ateuchidarum genus.)

*Coprobium*, Latr.

1. PERPLEXUS.—Brevis, convexus, nigro-cuprascens, pernitidus, thorace minus subtiliter punctato, elytris apice non truncatis, tenuiter striatis subtiliter sparse punctulatis. Long. .18: lat. .12.

Specimen unicum ad Quincy provinciæ Illinois, a Dom. Wilcox lectum, et liberaliter datum.

Habitus fere Chæridii capistrati (Fabr.) Canthoni dissimilis, convexus, nigro-cuprascens, pernitidus. Clypeus vix convexus, margine tenui reflexo, antice 4-dentatus, dentibus externis minoribus: oculi parvi. Thorax latitudine fere triplo brevior, antice angustatus, apice emarginatus, angulis anticis acutis, deflexis, lateribus ad quadrantem ab apice obtuse angulatis, dein fere parallelis, basi rotundato: minus subtiliter punctatus. Elytra latitudine non breviora, regulariter fornicata, postice non gibbosa, apice rotundata, vix truncata, podicem fere omnino tegentia; tenuiter striata, striis ad basin paulo latioribus; interstitiis planis, subtiliter sparse punctulatis. Pedes modice elongati, femoribus non incrassatis, tibiæ anticæ 3-dentatæ, postice subtiliter serratæ: intermediæ et posticæ triangulariter compressæ, non dilatatæ, calcare interna terminali instructæ.

## PHANÆUS, McLeay. (Copridarum genus.)

1. TRIANGULARIS, Say. J. A. C. III. 206. (Copris.)

Specimen unicum ♂ in Texas inventum, ab Ill. Dr. Engelman amice datum.

Striis elytrorum 2<sup>ndo</sup> leviter, 3<sup>io</sup>, 4<sup>to</sup>, 5<sup>to</sup>que profunde basi foveatim dilatatis.

2. TORRENS.—Cupreus, subnitidus, subtiliter rugosus, clypeo ♂ postice breviter cornuto, thoracis disco triangulariter planato; elytris obsolete punctatis, profunde striatis, striis basi dilatatis. ♂ Long. .59: lat. 42. ♀ Long. 74: lat. 46.

Varietatibus quibusdam P. nigrocyanei (McLeay) similis, at interstitiis elytrorum convexioribus, vix conspicue punctatis, necnon colore cupreo distinctus. Habitat ad urbem St. Louis, a Dom. Engelman datus.

Supra læte cupreus, subtus nigro-æneus. Clypeus rotundatus, margine elevato, lineaque elevata utrinque obliqua, ad verticem tendente; vertice in ♀ transversim elevato, in ♂ cornu brevi compresso, acuto armato: subtiliter reticulato-rugosus. Thorax apice emarginato, medio leviter producto, lateribus postice profundissime sinuatus, basi utrinque leviter obliquo, medio obtusissime angulato; angulis posticis obtusis non rotundatis, fovea antica laterali sicut in omnibus notatus: disco ♂ subtiliter scaber, medio triangulariter deplanatus; angulis posticis trianguli hujus tuberculiformibus eminentibus: ♀ rugose reticulatus, postice leviter canaliculatus, antice transversim impressus, elevatusque. Elytra profunde striata, striis ♂ leviter



## § 1. Clypeo bidentato.

1. RELICTUS, Say. J. Ac. Nat. Sc. V. 194. (Scarabæus.)

*dolicaon*, Dej. Cat. 168. Habitat ubique, usque ad Rocky Mountains.

2. NEGLECTUS.—Ovatus, castaneus, pernitidus, thorace grosse punctato, antice impresso, mucronatoque, elytris punctis magnis seriatim positis. Long. .58: lat. .32.

*Scarabæus jivencus*, Dej. Cat.

Abundat in provinciis australibus; rarius in prov. mediis inventus.

Oblongus, leviter ovatus, postice parum dilatatus, rufo-castaneus, pernitidus; clypeus apice acutus, ante apicem minute bidentatus; linea elevata inter antennis; sparse subtiliter punctatus, antice posticeque lævis. Thorax lateribus rotundatus, apice parum emarginatus, tenuiter bimarginatus, ad apicem mucronatus, pone mucronem fovea rotundata profunda: minus sparse grosse punctatus. Elytra profunde grosseque punctato-striata. Pectora pedesque dense pilosa, femoribus pallidioribus.

3. MORIO.—Oblongus, supra niger, subtus castaneus, thorace sparse punctato, antice subito angustato, apice mucronato, leviterque impresso: elytris punctato-striatis. Long. .57: lat. .33.

Habitat in provinciis mediis minus frequens.

*Scarabæus gregarius*, Dej. Cat. 168.

Oblongus, postice non dilatatus, supra niger nitidus, subtus castaneus, dense pilosus; clypeus antice subacutus, minutissime bidentatus, linea acute elevata inter antennis; leviter rugose punctatus, occipite lævi. Thorax antice subito valde angustatus, lateribus ad quadrantem ab apice obtuse angulatis, apice parum emarginato, tenuiter bimarginato, medio acute mucronato, impressione rotunda parum profunda pone mucronem: sparse punctatus, magis ad latera. Elytra thorace parum latiora, punctato-striata, striis externis confusis, fere obsoletis. Podex sparse punctatus.

4. OBSOLETUS.—Subovatus, castaneus, nitidus, thorace antice valde rotundato-angustato, apice mucronato, impressoque, sat grosse punctato, elytris punctato-striatis, striis internis fere obsoletis. Long. .55 lat. .35.

Specimen unum prope Long's peak inventum.

Castaneus nitidus, subtus dense pilosus; clypeus apice leviter truncatus, distinctius bidentatus, linea acute elevata inter antennis, antice dense rugose-punctatus, occipite lævi. Thorax lateribus valde rotundatus, antice valde angustatus, apice paulo profundius emarginato, tenuiter bimarginato, medio breviter obtuseque mucronato, fovea parva profunda pone mucronem: sparse sat grosse punctatus. Elytra punctato-striata, striis externis versus apicem confusis; internis 3 fere obsoletis. Podex sparse punctatus.



## § 2. Clypeo antice linea elevata integra.

5. PYRIFORMIS.—Ovatus, postice valde dilatatus, castaneus, pernitidus: thorace lateribus leviter rotundato, antice valde angustato, densius punctato; elytris grosse punctato-striatis. Long. .67: lat. .43.

Habitat ad furcationem fluminis Platte: habitat etiam in Oregon. Mus. Ex. Ex.

Obesus, valde ovatus, castaneus, pernitidus, subtus dense pilosus. Clypeus apice truncatus, fere in apice ipso linea transversa integra valde elevata; vertice in medio leviter elevato, (magis in ♂;) dense punctatus, vix nitidus. Thorax lateribus paulo rotundatus, antice regulariter valde angustatus, versus angulos anticos obsolete impressus; disco obsolete canaliculatus, dense punctatus, sparsius in medio. Elytra postice dilatata, ibique thorace duplo latiora, valde grosse punctato-striata, striis externis versus apicem confusis. Podex subtiliter punctatus.

## § 3. Clypeo pone apicem 3-dentato.

6. VARIOLOSUS.—Ovatus, postice valde dilatatus, castaneus pernitidus; clypeo lateribus elevato, thorace sat dense punctato, elytris grosse punctato-striatis striis externis confusis. Long. .57: lat. .38.

*Scarabæus variolosus?* Dej. Cat.

“ *tridentatus*, Zimmerman in lit.

Habitat in Georgia minus frequens.

Obesus, valde ovatus, castaneus, pernitidus, subtus dense pilosus. Clypeus apice leviter emarginatus, reflexus, mox pone apicem linea elevata recta transversa 3-dentata; antice utrinque impressus, (profundius in ♂) lateribus marginatus, acuteque reflexus, punctatus, pone oculos lævis. Thorax lateribus leviter rotundatus, antice regulariter valde angustatus; sat dense punctatus, spatio angusto pone medium lævi. Elytra postice valde dilatata, thorace duplo latiora, valde profunde grosse punctato-striata, striis externis confusis. Podex subtiliter punctatus.

7. TRIDENTATUS.—Ovatus, postice modice dilatatus, niger nitidus; clypeo lateribus marginato, valde rugoso, thorace sat dense punctato, elytris grosse punctato-striatis. Long. .64: lat. .37.

Habitat ad Long's Peak.

*Scarabæus tridentatus*, Say. J. A. C. III. 209.

Præcedenti similis, at differt imprimis colore nigro; corpore postice multo minus dilatato; clypeo lateribus latius, minus acute marginato, dense transversim rugoso, vix nitido: thorace lateribus minus rotundatis, disco obsolete canaliculato, striis elytrorum externis minus confusis: interstitio 5<sup>to</sup> punctis 4 vel 5 modicis. (In B. varioloso grosse seriatim punctato.)

NOTA.—In specimine meo tibiæ anticæ bidentatæ sunt; apice oblique truncatæ; dente terminali verisimiliter attrito.

8. CASTANEUS, Mels. Proc. Ac. II. 138.

*obesus*, Dej. Cat. (*Scarabæus*.) Habitat ubique minus frequens.

## ZENOA, Say. (Cebrionidum genus.)

1. PICEA, Beauv. Ins. d'Am. (Melasis.)  
 Dej. Cat. (Callirhipis.)  
*brunnea*, Say. B. J. N. H. I, 152.

2. VULNERATA.—Nigra, punctata, thorace inæquali, vitta media cruentata; elytris lineis 3 elevatis.  
 Long. .49: lat. .15.

Specimen unicum ad St. Louis inventum, et a Dom. Engelman, cum pretiosis multis aliis concinne datum.

Habitus fere præcedentis, grossius punctata elytris que lineis fortioribus: necnon plaga thoracica facile distincta.

Nigra, grosse punctata. Antennæ brunneæ, articulis triangularibus, angulis internis valde acutis, productis. Thorax capite duplo latior, latitudine brevior, antice angustatus, subdeflexus, apice parum emarginato, basi bisinuato, lateribus rotundatis, angulis posticis acutis: disco bifoveatus, foveaque marginali altera ad medium, basi utrinque leviter impressus: niger, vitta lata obscure cruentata. Scutellum cruentatum. Elytra latitudine triplo longiora, costis 3 angustis, quartaque obsoleta; interstitiis subseriatim grosse punctatis. Subtus piceo-brunnea, valde punctata.

## MONOCERUS, Latr. (Anthicidarum genus.)

*Notoxus*. Fabr. olim et nunc auct. Anglic.

1. BIFASCIATUS.—Niger, thorace ferrugineo, cornu antice concavo, postice elevato, lateribus integris; elytris fasciis duabus albis. Long. .14: lat. .05.

Habitat in provinciis occidentalibus minus frequens.

Niger, pubescens: thorax ferrugineus, globosus, cornu antico longo recto, apice rotundato, disco concavo, postice elevato armatus, linea basali arcuata impressus. Elytra densius pubescentia, pone basin leviter impressa, fascia lata antica ad suturam subinterrupta, alteraque ad trientem ab apice albis.

α. Pedibus rufis, corpore subtilius pubescente; duplo minor.

Habitat ad Mississippi scaturigines; an species distincta?

2. ANCHORA, Htz. J. A. C. V, 375.  
*americanus*, Dej. Cat.

Habitat ubique; abundat ad Rocky mountains.

α. Macula laterali obsoleta.

3. *SERRATUS*.—Fusco-testaceus longe albo-pubescens; thorace cornu antice concavo, postice elevato, lateribus serratis; elytris fascia postica, guttisque nonnullis fuscis. Long. .18: lat. .06.

Habitat ad Rocky mountains.

Præcedentibus major, fusco-testaceus, longius pubescens. Caput antice foveatum. Thorax subglobosus, cornu lateribus serrato, disco antice valde concavo, postice valde elevato, parte elevato dorso concavo. Elytra subtiliter punctata, fascia lata pone medium nigra, maculis nonnullis obsoletis fuscis.

$\alpha$ . rufo-testaceus, fascia obsoleta.

4. *MONODON*.—Fabr. Syst. El. I. 289. (Anthicus.)

Habitat ubique: elytris macula subbasali, fascia angulata ad medium, apiceque late nigris.

$\alpha$ . macula apicali evadente.

$\beta$ . elytris testaceis, macula una laterali ad medium.

5. *BICOLOR*, Say. Amer. Ent.

*murinipennis*, Dej. Cat. Habitat ubique, minus frequens.

### CANTHARIS, Geof. (Vesicatoriarum genus.)

#### *Lytta*. Fabr.

1. *FULGIFER*.—Æneo-olivacea, capite, thorace, abdomineque cupreis, politis: antennis tarsisque nigris Long. .9: lat. .26.

Specimen unicum prope Long's Peak inventum.

*Lytta* Nuttalli (Say. J. A. C. III.) similis, at duplo major; colore, thorace disco magis inæquali, lateribusque fortius angulatis differt.

Ænea; caput cupreum, nitidum, politum, sparse punctatum, fronte late impresso. Antennæ nigræ, omnino sicut in *C. Nuttalli*. Labrum cordatum, antice leviter emarginatum, lateribus rotundatis. Thorax latitudine brevior, pentagonalis, lateribus ante medium valde angulatus, dein retractus, basi parum emarginato; disco depressus, inæqualis, antice posticeque profunde transversim impressus, utrinque ad medium valde profunde triangulariter foveatus; cupreus, nitidus, sparse punctatus. Elytra olivaceo-ænea, rugosa, lineis tribus obsoletis elevatis. Pectora pubescentia, viridiænea; abdomen cupreum, punctatum. Pedes viridi-ænei, tibiis tarsisque nigris; trochanteres postici spina brevi armati.

2. *NIGRICORNIS*.—Ænea, vix nitida, thorace campanulato, utrinque punctato, antennis nigris, pedibus rufis. Long. .56: lat. .17.

Habitat ad St. Louis, a Dom. Engelman data.

Ænea, parum nitida: capite thoraceque pubescentibus. Caput quadratum, angulis posticis rectis, subrotundatis, sparse punctatum; labrum profunde incisum.



Thorax capite angustior, latitudine paulo longior, antice attenuatus lateribus valde rotundatus, basi leviter emarginatus, disco leviter depressus, utrinque dense punctatus. Elytra thorace duplo latiora, humeris modice prominulis, rugose punctata, lineis 3 angustis parum elevatis. Antennæ capite cum thorace longioribus, apice incrassatis, articulo 2<sup>ndo</sup> tertio sesqui brevior, articulo ultimo leviter constricto, non acuto, nigræ. Pedes rufo-testacei, genubus, tarsisque fuscescentibus, tibiis intermediis curvatis.

3. FILIFORMIS.—Purpurea vix nitida, thorace fere quadrato, antennis nigris, pedibus rufis, genubus tarsisque fuscis. Long. .33: lat. .09.

Habitat in Texas, a Dom. Engelman amice data.

Linearis, æneo-purpurea, vix nitida. Labrum profunde incisum, lobis divergentibus. Caput breve, quadratum, pubescens, angulis posticis rotundatis, sparse punctatum. Thorax latitudine vix longior, subquadratus, postice tenuiter marginatus, utrinque dense punctatus, tenuiter pubescens. Elytra thorace vix sesqui latiora, parallela, rugose punctata lineis solitis obsoletis. Antennæ sicut in *C. nigricorni*. Pedes rufo-testacei genubus nigris, tarsis fuscescentibus: tibiis intermediis curvatis.

#### PYROTA, Dej. Cat. (Vesicatoriarum genus.)

1. GERMARI, Hald. Proc. Acad. I. 303. (Lyttæ.)

An sequentis varietas?

2. AFZELIANA, Fabr. Syst. El. II. 78. (Lyttæ.) (mihi invisæ.)

3. ENGELMANNII.—Supra flava, antennis pedibusque nigris; capite 4-guttato, thorace 6-guttato, elytris maculis 4, duabus basalibus interdum confluentibus, nigris. Long. .72: lat. .19.

Species hæc pulcherrima Dom. Engelman, botanico celeberrimo, scientia liberalitateque præclaro, grato animo dedicatur. Habitat ad St. Louis.

Supra flava. Caput subrotundatum, sparse punctatum, oculis, maculis duabus parvis verticalibus, alterisque ad angulos posticos nigris. Labrum vix emarginatum, nigrum. Antennæ modice compressæ, capite thoraceque paulo longiores, tenues, articulo 2<sup>ndo</sup> valde abbreviato, nigræ. Thorax capite paulo angustior, latitudine sesqui longior, antice angustatus, apice rotundatus, lateribus parum rotundatus, antice transversim late impressus; nitidus punctis paucis notatus; macula utrinque apicali, altera laterali ad trientem, alteraque prope medium rotundatis nigris. Elytra thorace duplo latiora parallela, tenuiter rugosa, lineis 3 elevatis, luteo-flava, maculis utrinque duabus basalibus oblongis, altera ad medium magna quadrata, fere ad suturam extendente, apiceque late nigris. Subtus nigra, segmentis omnibus flavo-marginatis. Pedes nigri, femoribus basi luteis.

## HELIOPHILUS, Latr. Regne An. (Pedinidarum genus.)

*Heliopates*, Dej. Cat.

1. *LATIMANUS*.—Opacus, niger, subtiliter muricatus, vix conspicue fulvo-pubescens: elytris obsoletissime striatis. Long. .35: lat. .20.

Specimen unicum ad maris oras insulæ Longæ Noveboraci inventum, a Dom. Brevoort amice datum.

Ovalis modice convexus, opacus, niger, subtiliter muricatus, pube fulva brevi, vix conspicua sparse vestitus. Caput latum, antice profunde incisum, vertice leviter impresso: labro magno, apice leviter rotundato, emarginatoque. Antennæ fusiformes, capite duplo breviores. Thorax capite duplo latior, latitudino fere duplo brevior, antice leviter angustatus, apice valde profunde emarginatus, lateribus rotundatis, obsolete crenatis, basi leviter bisinuato, angulis posticis obtusis, non rotundatis; margine late obsolete depresso. Scutellum parvum. Elytra latitudine sesqui longiora, apice leviter acuminata, obsoletissime striata, margine leviter crenato. Subtus distinctius muricatus, tibiis anticis valde compressis, triangularibus, latitudine duplo longioribus, extus obsolete 5-crenatis.

## OPATRUM, Fabr.

1. *FOSSOR*.—Opacum densissime griseo-squamosum, elytris postice obsolete tessellatis, margine antice crenato. Long. .18: lat. .10.

Ad Trenton, et ad 'Bath' Insulæ Longæ in arena alba fodiens lectum.

Ellipticum, convexum, subtiliter granulatum, squamis lanceolatis griseis dense tectum. Caput antice rotundatum, medio breviter acuteque excisum; labro vix conspicuo. Antennæ capite paulo longiores, fusiformes. Thorax capite duplo latior, latitudine fere triplo brevior, antice leviter angustatus, apice emarginato, angulis anticis rotundatis, lateribus valde rotundatis; basi profundius bisinuato, lobo medio rotundato, angulis posticis leviter acutis: margine flavo-ciliato. Elytra latitudine sesqui longiora, obsolete fusco-tesselata, pilis brevibus flavis, vix distinctis, seriatim positis; margine antice crenato. Subtus nigro-piceum, dense punctatum, pilis albis brevibus incanescens. Tibiis anticis ad apicem extus in dentem longum leviter incurvatum productis.

♂ tarsis anticis parum dilatatis; thorace lateribus postice paulo magis rotundato, angulis posticis fere rectis, vel leviter obtusis.

## SPONDYLIS, Fabr.

1. *SPHERICOLLIS*.—*Castaneus, rugose punctatus, thorace subgloboso, callo parvo utrinque ad medium, elytris costis 3 valde obsoletis. Long. .68: lat. .25.*

Habitat ad urbem Savannah, Georgiae: a Dom. L. Harper benevole datus.

*Castaneus, opacus, rugose punctatus. Caput linea indistincta frontali laevi. Mandibulae capite longiores, apice valde acutae, dente parvo interno prope basin, nigrae, apice laeves, basi punctatae. Antennae mandibulis vix longiores, crassae. Thorax latitudine brevior, subglobosus, apice leviter angulatim emarginato, basi truncato, disco modice convexus, utrinque obsolete impresso, callo indistincto laevi. Elytra parallela, subcylindrica, latitudine plus duplo longiora, tenuiter marginata, lineis tribus obsolete elevatis, vix distinctis. Subtus dense subtiliter punctatus, fulvo-pubescentis; tibiis anticis dente apicali externo leviter recurvato; intermediis simplicibus; posticis ala terminali externa munitis; femoribus posticis modice incrassatis.*

## TETRAOPES, Dalman.

1. *FEMORATUS*.—*Punctatus, niger, densius griseo-pubescentis: capite, femoribus, thorace, elytrisque coccineis, his maculis utrinque 4, scutelloque nigris; antennis cinereo annulatis. Long. .56: lat. .21.*

Habitat ad flumen Arkansas prope montes.

*T. tornatori (Fabr.) simillimus, densius pubescens; antennis pedibusque valde distinctus. Caput idem. Antennae corpus longitudine aequantes, nigrae, articulis 2<sup>do</sup> 3<sup>io</sup>que totis, reliquis basi et apice anguste dense cinereo-villosis. Thorax paulo latior, disco utrinque profundius longitudinaliter impressus, maculis 4 rotundis nigris. Scutellum nigrum. Elytra utrinque maculis 4 nigris, 1<sup>mo</sup> humerali, 2<sup>do</sup> prope suturam paulo ante quadrantem, 3<sup>io</sup> pone humerum ad quadrantem, 4<sup>to</sup> subtransversa ad trientem ab apice. Subtus niger densissime cinereo-pubescentis, femoribus coccineis.*

2. *ANNULATUS*.—*Minor, niger, dense griseo-pubescentis, punctatus; capite, pedibus, thorace, elytrique coccineis, his utrinque maculis 3, scutelloque nigris: antennae cinereo-annulatae. Long. .35: lat. .12.*

Habitat ad flumen Platte, versus montes.

*Caput et antennae sicut in praecedente. Thorax impressionibus longitudinalibus nullis; transversis duabus minus distinctis; coccineus, maculis 4 parvis nigris. Scutellum nigrum. Elytra thorace paulo latiora, punctata, densius pubescentia, coccinea, macula parva humerali, 2<sup>do</sup> versus suturam, ante quadrantem, 3<sup>io</sup>que paulo pone medium nigris. Subtus densissime griseo-pubescentis, pedibus rufo-coccineis.*

Variat macula humerali subsuturalique obsoletis.





ART. VIII.—*Descriptions of North American Coleoptera, chiefly in the Cabinet of J. L. Le Conte, M. D., with references to described species.* By S. S. HALDEMAN.

CEPHALOON *Newman.* Ent. Mag., Vol. v.

Body slender: the breadth to the length as one to five: elytra tapering posteriorly, length exceeding three times the width at base: scutel triangular, with the apex rounded: prothorax pyramidal, longer than wide, base rectilinear, scarcely as wide as the elytra, sides rapidly converging to a narrow apex one-third the width of the base: head small, depressed, elongate and protracted, contracted from the eyes anteriorly and posteriorly to the incisure formed by its attachment: eyes lateral and vertical, emarginate anteriorly for the reception of the antennæ: antennæ short, scarcely extending beyond the humerus, slightly thickened towards the apex: first and second articulations obconic, the latter very short, the third cylindrical and as long as the fourth and fifth, which, with the remainder, are subequal and obconic, except the eleventh, which is lengthened ovate: the four terminal articulations are manifestly thicker than the antecedent ones: labrum large, transverse, and rounded before, where it is clothed with hairs: mandibles strong, incurved and acute: maxillæ slender and porrect, the apex clothed with twisted hairs: maxillary palpi with the apical articulation securiform, the penult short obconic, and the preceding one cylindrical: labial palpi 2-articulate, apex obconic: feet long and slender, medial and posterior tibiæ with two terminal spines, tarsi simple, heteromerous, ungues finely pectinate, pulvilli oval.

*C. LEPTUROIDES Newman.* Ent. Mag. Fulvo-testaceous, finely pubescent, eyes and apex of the abdomen above, black; disk of the pronotum more or less fuliginous; apex of the posterior tibiæ and femora, and medial tibiæ, of the same colour, 5 lin. long. This is a narrow insect with slender feet, tapering elytra; prothorax long, diminishing rapidly anteriorly, where it is narrower than the head, the base being slightly narrower than the elytra. *Ichnodes lepturoides* † Dejean.\*

*C. VARIANS Hald.* Finely pubescent, cinereo-fuscous, head and prothorax varying to fulvous; antennæ and feet of the latter colour, apex of the posterior femora and tibiæ

\* The mark † (an inverted †) is here proposed to be placed between the name and the authority when a species has not been characterized, the reversed mark indicating the impropriety of such a practice. In synonymy, a recent name sometimes takes precedence of an earlier one, and it is often inconvenient, particularly in catalogues, to give the reason. When a name has been previously used, let it be denoted by ‖, the double line indicating that there are two supposed distinct species under this name, as—*Cicindela hentzii Dej.* = *C. hæmorrhoidalis* ‖ *Hentz*, the latter having priority in date, but with a name previously in use. When an author cites erroneously, the mark ‡ may be used, as—*Aphodius fimetarius* ‡ *Latr.*, which is not the true *A. fimetarius* *Lin.* (*Scarabæus*.) The practice, in lists of synonyms, of citing a different authority for each work is wrong, as in *Lucanus cervus* *Lin.*, *L. cervus* *Latr.* *R. An.* etc., because Latreille describes the species as that of Linnæus. In the case of the mollusc *Infundibulum trochiformis* *Lam.* (*Calyptra*): *I. trochiformis* *Lea*; the latter citation is correct, as it is here inadvertently described as a new species under a preoccupied name. As many cite, a synonym like this will not inform us whether the citation refers to a supposed new species, (as in this case) or to the placing of the species under a different genus from that in which it was first placed. *Proceed. Am. Phil. Soc.* iv. 371. 1847.

fuliginous; margins of the abdominal segments sometimes fulvous. Rather smaller than the preceding, to which it is closely allied; but besides the darker colour of the elytra and abdomen, the lateral margins of the prothorax are more convex. Both species sometimes possess a dark frontal spot. Lake Superior, and the north-eastern part of Maine.

XANTHOCHROA *Schmidt*. Linnæa entomologica, i. 17.

X. VITTATUS *Say*. Ins. from New Orleans. *Nacerda dorsalis* Mels., Proceed. Acad. Nat. Sci. iii. 55.

DITYLUS *Fischer*. Schmidt, Lin. ent. i. 24.

D. CÆRULEUS *Randall*, (Upis.) Bost. J. Nat. Hist. vol. ii. p. 20.

NACERDES *Steven*.—? Schmidt, Lin. ent. i. 28.

N. MELANURA *Lin.* (Cantharis)—notata *F.* (Necydalis) ii. 371. Inhabits Europe, North America, and South Africa.

ASCLERA *Schmidt*. Lin. ent. i. 38.\*

A. LATERALIS *Mels.* (Nacerda.) Proceed. Acad. iii. 54. *A. elegans* † *Dej.* Pennsylvania and Carolina.

A. SIGNATICOLLIS *Hald.* Brownish cinerous; prothorax black, widest anteriorly, the sides projecting before the middle, surface irregular and minutely scabrous, medial impressed line dilated at both ends; anterior and posterior medial portion, with the front and scutel, yellowish fulvous pubescent; clypeus corneous; elytra minutely scabrous and finely pubescent, with two obsolete costæ. 4 l. long. Georgia. *A. signaticollis* † *Dej.*

A. PUNCTICOLLIS *Say.* (Oedemera.) J. Acad. iii. 273. *A. maculicollis* † *Dej.* Missouri, New York, and Lake Superior.

A. RUFICOLLIS *Say.* (Oedemera.) J. Acad. iii. 271. *Carinata* Newman, Ent. Mag. v., *costipennis* † *Dej.* Black, prothorax bright rufous, distinctly cordate, depressed above, with three dilated impressions, one medial posteriorly, and another more deeply impressed upon each side of the middle anteriorly, the three forming an equilateral triangle; elytra brown, minutely scabrous, each with three raised costæ. 3 l. long. Pennsylvania, Carolina, Missouri.

A. NOTOXOIDES *F.* Black, prothorax rufous varying to flavous, a black longitudinal spot at the posterior angles, and a dot anteriorly upon each side above, the latter

\* This author has not named one of his characterized genera, (Lin. ent. i., 90,) which in my lists of genera and species I have called *Stenaxidea*.



sometimes connected by a pale transverse line; disk slightly impressed upon each side: elytra finely punctate and obsolete costate, the surface clothed with fine hairs. 4 l. long. Carolina and Georgia.

A. THORACICA. *F.* (Dahl. in Dej. Cat.) Black, cinereous pubescent, prothorax rufous, narrowed posteriorly, sides convex, disk with an obsolete impression on each side: elytra parallel, simple, and finely punctate. 3—4 l. long.

#### EUGLENES *Ww.* *Xylophilus* Bonelli.

E. FASCIATUS *Mels.* (Xyloph.) Proc. Acad. iii. 55. Var. *a.* Elytra black, humeri and apex testaceous. New York, Carolina. "Englenes *Ww.*" is used in his Introduction.

E. SIGNATUS *Hald.* Finely pubescent, rufo-testaceous, elytra paler, densely punctate, with a black spot behind the middle near the suture, and a medial one upon the external margin; pectus punctate; eyes black.  $\frac{3}{4}$  l. long. New York, Carolina.

#### MELANDRYA *Fabr.*

M. STRIATA *Say.* Long's Exp. ii. 286—*Costata* †Dej.—*assimilis* †Sturm. New York and Pennsylvania. Rare; abundant in the west and along the great lakes. May—June. The length varies from  $4\frac{1}{2}$  to near 7 lines. Dr. Melsheimer (Pr. Acad. ii. 55,) describes a rufous variety, *a* and *b*, with the frontal impression almost obsolete, beneath and feet chesnut, &c. The former is the *Serropalpus thoracicus*, and the latter *S. bicolor*, of the elder Melsheimer's Catalogue.

M. LABIATA *Say.* Long's Exp. ii. 287. *M. americana* †Dej.—*impressa* †Sturm. 4—5 l. long. New York, Pennsylvania. May—June.

M. EXCAVATA *Hald.* Black: prothorax with a slight tinge of rufous, sides suddenly contracted before the middle and expanding at the anterior margin, forming a strangulation or lateral concavity; the greater portion of the disk is occupied with a deep dilated impression widest posteriorly and bounded by an elevated margin, posterior angles depressed and laterally subrectilinear; head thickly punctate, labrum fulvous ciliate, clypeus obscure rufous, shining; front with three obsolete impressions, one anterior and two converging backwards from the eyes: scutel short and transverse, apex obtuse; elytra coarsely punctate and striate, the alternate costæ rather larger. 7 lines long,  $2\frac{1}{2}$  wide. Western New York.

#### PYTHO *Latr.*

- P. NIGER *Kirby.* Fauna Am.-Bor. p. 164. 4 l. long. Lake Superior and Canada.  
 P. AMERICANA *Kb.* Fauna, p. 165.  
 P. ? PALLIDA *Say.* Journ. Acad. iii. 271.

ORCHESIA *Latr.*

O. GRACILIS *Mels.* *Proceed. Acad.* iii. 57. Penn. and upper Mississippi. A remarkable character of this genus, (at least as far as this species is concerned,) is the oblique pectination of the posterior side of the long tarsal spines.

DIRCÆA *Fabr.*

D. QUADRIMACULATA *Say.* (*Serropalpus*)=*D. americana* †*Dej.* Arkansaw and Missouri ;—*Say* : New York to Georgia, rare.

D. SERICEA *Hald.* Slender, minutely punctured, sericeous ; brown, paler beneath, with a reddish tinge : antennæ, palpi, and feet, pale rufous ; front convex, minutely punctured, thickly clothed with short hair ; eyes black ; margin of the clypeus and of the labrum rufous : pronotum subquadrate, the sides sub-parallel, with the anterior angles rounded, a dilated impression posteriorly towards the exterior angles : scutel minute : elytra four times the length of the prothorax, and gradually tapering from the base. 6 l. long. Pennsylvania.

SERROPALPUS *Hellenius.*

S. SUBSTRIATUS *Hald.* Pale fuscous, somewhat sericeous : eyes, labrum, and mandibles black, front convex, finely punctate, and sparsely hairy : pronotum convex, scarcely transverse, minutely and densely punctured, and clothed with short prostrate hairs ; sides sub-convex, and slightly expanded from the basal angles to a little beyond the middle, forming a slight prominence whence they contract forward to the head ; posterior angles depressed ; middle of the disk with an anterior and posterior obsolete dilated impression upon each side ; exterior margin forming a straight sharp descending edge from the base to beyond the middle : scutel transverse, punctured, apex truncate : elytra minutely punctate-scabrous, the punctures being arranged mostly in transverse series, and having about nine rather indistinct striæ ; feet long slender. 5 l. long 1 l. wide. Northeast boundary of Maine. J. C. Brevoort. This and the following species seem not to belong strictly to this genus, the labial palpi being very small.

S. OBSOLETUS *Hald.* Dark brown, dull sericeous, finely punctate, prothorax simple, sides regularly convex : elytra punctate and obsolete striate.  $4\frac{1}{2}$  l. long. Lake Superior and Oregon. Closely allied to the preceding, but distinguished by the regularly convex sides of the prothorax, and the scarcely striate elytra.

PHAIONA *Hald.*

Allied to MELANDRYA: Body pubescent, rather slender, narrowing towards both ends: maxillary palpi slender, articulations obconic, apical one subsecuriform; eyes with short hairs arising from between the facets: prothorax simple, gradually narrowed, and truncate anteriorly; base faintly emarginate upon each side: scutel small and rounded; elytra simple, gradually tapering to the apex: feet slender; tibiæ bi-spinose: unguis simple.

P. STEROPES *murinus* †Dej. Cat., 237. *Melandrya umbrina* Mels. Proceed. Acad. iii. 55. *Dircæa murina* F. is Newman's Macratia.

HALLOMENUS *Illiger.*

H. LURIDUS *Hald.* Brownish yellow, paler beneath, somewhat glossy and clothed with short fulvous hair: head convex, punctured, dark brown, antennæ and palpi paler; labrum shining dark brown, contrasting with the pale yellow of the margin of the clypeus; eyes black: pronotum transverse, minutely scabrous; anterior angles rounded, posterior ones obtuse, base nearly rectilinear, a little advanced toward the scutel, and having a small fovea upon each side; disk coloured like the head, but becoming paler towards the lateral margins: scutel dark brown, triangular: elytra brownish yellow, brighter at the base, changing into brown along the suture, lateral margin, and apex: wings fuliginous: feet flavous. 2 l. long. Georgia. This is *H. luridus* †Dej. and possibly identical with the next species, the description of which, however, is inapplicable in several important particulars.

H. SCAPULARIS *Mels.* Proceed. Acad. iii. 57.

H. NIGER *Hald.* Shining black, sparsely clothed with fine prostrate hair: mouth and antennæ (?) brown: prothorax impunctate, and with the elytra, finely pubescent, the latter minutely and obsolete scabrous. 1½ l. long. Upper Mississippi.

H. QUADRIPUSTULOSUS *Mels.* Proceed. Acad. iii. 57.

CALASIA *Hald.*

Facies of ORCHESIA: Head free, antennæ . . . . first articulation obconic, base contracted; 2—3 articulations short and slender, conjointly a little shorter than the first and fifth, both of which are exceeded by the fourth; all these articulations are slightly obconic: maxillary and labial palpi with the terminal articulation strongly securiform: prothorax short, obtusely rounded before, and as wide as the elytra behind: tarsi with two short spines. Etym. sanscrit, whence the latin *celer*.

C. SERICEA *Mels.* (Orchesia.) Proceed. Acad. iii. 57.



SCRAPTIA *Latr.* (1807.) Genera ii. 199.

*S. LUTEA* *Hald.* Pale yellow, glossy, pubescent, finely punctate: eyes black, antennæ and abdomen dark brown, basal articulation, palpi, and head, with a tinge of rufous: prothorax with the base subrectilinear and as wide as the elytra: scutel triangular, elytra with a common brown sutural macula behind the middle, and exhibiting a tendency to extend forward along the suture: feet pale.  $1\frac{1}{2}$  l. long. New York.

*S. BI-IMPRESSA* *Hald.* Black, shining, minutely punctured, and clothed with pale hair; beneath and feet pale yellowish brown: pronotum with a large dilated impression at the basal angles: apex of the elytra conjointly emarginate.  $1\frac{1}{2}$  l. long. Lake Superior.

*S. PALLIPES* *Mels.* Pr. Acad. iii. 56. *Var. γ* Head and prothorax without impressions, and with the base of the elytra luteous; the extremity of these, with the margin and suture, fuscous.  $1\frac{1}{3}$  l. long. South Carolina. Zimmerman.

*S. AMERICANA* *Hald.* Dark fuscous, punctate, strongly pubescent; head black, antennæ fuscous, mouth dark luteous, pectus and feet flavous; prothorax and medial basal portion of the elytra obscure yellowish brown, posterior and external margins, with the scutel, fuscous. 1 l. long. North Carolina.—Zimmerman. Missouri territory. *S. americana* †*Dej.* The prothorax is short, and has a slight impression upon each side of the posterior margin. The western specimen has the middle of the pectus fuscous, and the yellow of the under parts less bright.

*S. RUGOSA* *Hald.* Punctate rugose, glossy, slightly pubescent, dark fuscous, prothorax and base of the elytra paler: head, antennæ and mouth, flavous. Maryland—Zimmerman. A slender species, in which the external margins of the prothorax and elytra are continuous. The pronotum is short, with an obsolete dilated impression upon each side of the disk.

*S. FLAVICOLLIS* *Hald.* Black, pubescent, and coarsely punctate; head, prothorax, and feet, flavous: eyes fuscous; antennæ and maxillary palpi flavous, with the apex of each fuscous.  $1\frac{1}{4}$  l. long. New York.

*S. PUSILLA* *Hald.* Black, pubescent, punctate; elytra, pectus and antennæ, with a tinge of fuscous: trophi and feet pale fuscous. 1 l. long. South Carolina.—Zimmerman. New York. = *S. pusilla* †*Dej.*

ANASPIS *Géoff.*

*A. FLAVIPENNIS* *Hald.* Black, apparently impunctate, whitish sericeous: antennæ fuscous; base, with the labrum, clypeus, maxillary palpi, tarsi and tibiæ, paler, approaching yellowish brown; elytra pale brownish yellow.  $1\frac{1}{2}$  l. long. Lake Superior.

PLATYDEMA *Lap. & Brullé*, (1831). *Ann. Sc. Nat.* xxiii. 350.

*P. ELLIPTICA* *F.* (*Mycetophagus*) ii. 566. No. 3. *Lap. Br.*, 380. No. 36. Black, opaque, elytra each with an oblique sanguineous spot. 3 l. long. Rare in Pennsylvania, abundant in the South.

*P. FLAVIPES* *F.* (*Mycetophagus*) ii. 567, No. 11. *Lap. Br.*, 338.

*P. RUFIVENTRIS* *Lap. Br.*, 378, No. 33. Pennsylvania and Georgia.

*P. BASALIS* *Hald.* Subdepressed, black, opaque; head impressed immediately in front of the eyes, coarsely and densely punctate; mouth flavous; palpi, feet, and base of the antennæ rufous: prothorax emarginate in front, with the base bisinuate, finely punctured, an indistinct fovea upon each side near the base: scutellum finely punctured: elytra with strongly impressed punctured striæ: under parts rufo-piceous, strongly and coarsely punctured. 2 l. long. Inhabits from New York to Georgia, in fungi. More elongate than the preceding, with deeper elytral striæ; the head more coarsely punctured than the thorax; and the antennæ are not ferruginous.

*P. ANALIS* *Hald.* Oval, shining black, head distinctly and confluent punctured; irregularly impressed from the eyes converging forwards and meeting along the clypeus, a transverse obsolete impression posteriorly: antennæ . . . base, mouth and feet flavous; prothorax finely punctate, base on each side impressed, lateral margin slightly reflexed, extreme margin faintly rufous: elytra punctate-striate, interstices flat, inflexed margins rufo-piceous: beneath rufo-piceous, coarsely punctured, abdominal segments with a fovea upon each side, two apical ones black. 2 l. long. Distinguished from *P. basalis* by being glossy, and in wanting impressed striæ upon the elytra.

*P. LÆVIPES* *Hald.* Oval, shining black, head depressed, thickly punctate; an impressed transverse line in front of the eyes: prothorax very minutely punctured, moderately emarginate before and bisinuate posteriorly; a fovea upon each side of the base, and a corresponding obsolete one anteriorly; lateral margins reflexed, converging rectilinearly from the posterior angles to beyond the middle; basal angles acute, anterior ones obtusely rounded: scutellum small: elytra strongly striate, striæ punctured, interstices flat, impunctured: antennæ rufous, labrum and palpi ferruginous: beneath piceous, strongly punctate: feet shining rufo-piceous. 2½ l. long, 1 l. wide. Allied to *P. basalis* and *P. analis*, but distinguished from the former by the gloss and pale antennæ; and from the latter by the smoother pronotum and more deeply impressed striæ. Inhabits the Middle States.

*P. LÆVIS* *Hald.* Oval, shining black, smooth: head with a fine transverse impressed line between the eyes; labrum and clypeus rufo-piceous; antennæ, mouth,

palpi, and feet, ferruginous: prothorax simple, convex, anterior margin faintly piceous, and without emargination; anterior angles not produced; base bisinuous; elytra with indistinct lines of punctures: beneath piceous, with a rufous tinge towards the apex of the abdomen. 2 l. long. Rather wider than the preceding, and distinguished by the bright impunctured surface. Carolina—Zimmerman.

*P. RUFICOLLIS* *Lap. Br.* xxiii. 375. = *Neomida sanguinicollis* *Mels.* Pr. Acad. iii. 61.

*P. RUFA* *Mels.* (*Neomida.*) Pr. Acad. iii. 61. Not observed.

*P. PICIPES* *Say.* (*Phaleria.*) Long's Exp. Southern States, Virginia coast.

*P. PICILABRUM* *Mels.* Pr. Acad. iii. 62. Pennsylvania and Maryland. Closely allied to the preceding, but distinct.

*P. SUBCOSTATA* *Lap. Br.* Ann. Sc. Nat. xxiii. 362. Georgia.

*P. CLYPEATUS* *Hald.* Shining black; head strongly and closely punctured except upon the front, where it is more sparse; a broad shallow transverse impression between the eyes anteriorly: prothorax more finely punctured than the head; emarginate anteriorly; base bisinuous, with a fovea upon each side; lateral margin reflexed: scutel scarcely punctate: elytra with strongly impressed striæ filled with impressed punctures; a conspicuous punctate abbreviated stria with six or eight punctures near the scutel; interstices flat, densely and finely punctured: beneath with the epipleura nigro-piceous, thickly and coarsely punctured: mandibles black; labrum, clypeus, and palpi, ferruginous; antennæ and feet piceous. 3 l. long, 1½ wide. New York and Lake Superior.

*P. EXCAVATA* *Say.* (*Diaperis.*) J. Acad. iii. 267.

*P. CYANESCENS* *Lap. Br.* xxiii. 356. Georgia.

*P. ERYTHROCERA* *Lap. Br.* xxiii. 355. Carolina.

*P. BIFASCIATUS* *Say.* (*Diaperis.*) J. Acad. iii. 268. Pennsylvania and Missouri.

The following have not been observed:

*P. AMERICANA* *Lap. Br.* xxiii. 358.

*P. POLITA* *Lap. Br.* " 361.

*P. PALLENS* *Lap. Br.* " 377.—*livida* † *Dej.*

*P. 4-MACULATA* *Lap. Br.* " 383.

*P. CYANEA* *Lap. Br.* " 392.



APHODIUS *Ill.* Muls. Coleop. de France, 178.

A. FIMETARIUS *Lin.* (Scarab.) *A. nodifrons* Randall. Boston J. Nat. Hist. ii. 20. Shining black; elytra and a spot upon the lateral margin of the prothorax, red; femora black or red. 3 l. long. A common European species which is spread from Sweden to the plains of the Mediterranean, and to the summit of the Alps. Rare in the Eastern States.

A. PINGUIS *Hald.* Shining black, beneath and feet piceous, clypeus smooth, pronotum coarsely punctured laterally at base; disk minutely punctured, base slightly reflexed. 3 l. long. Lake Superior. Head transverse, sub-auriculate, truncate anteriorly, margin reflexed: pronotum large and convex, anterior margin piceous; sides reflexed, and continued along the posterior margin: scutel concave, with a few punctures; mesonotum coarsely and densely punctured: striæ of the elytra crenate-punctate. The form is more compact than in *fimetarius*, which it resembles, except in colour. The description of *A. concavus* Say, requires a smooth disk, which in *pinguis* has minute punctures, and is moreover smaller than his *oblongus*, with which he compares *concavus*. It is not likely that he would have overlooked the punctures on the head of *A. pinguis*.

A. CONCAVUS *Say.* J. Acad. iii. 314. Head subhexagonal, with a transversed waved impressed line posteriorly; pronotum coarsely punctured laterally; disk smooth, sides alone reflexed. Inhabits near the Rocky Mountains, (Say,) and at Lake Superior.

A. LÆVIGATUS *Hald.* Shining uniform rufous, an indistinct medial black spot near the lateral margin of the pronotum; hair fulvous.  $3\frac{3}{4}$  l. long,  $1\frac{3}{4}$  wide. Middle and Southern States. Head impunctate; clypeus smooth, semicircular, margin reflexed, with a slight and wide emargination in front, behind which is an indistinct oblong medial fovea; surface elevated at the angles of the emargination: pronotum smooth, an obsolete impression near the anterior angles, which are scarcely advanced; anterior and extreme posterior margin, and a lateral spot, blackish; sides scarcely rounded, and with the base, reflexed; posterior angles obtusely rounded; base subrectilinear, distantly bisinuous: elytra with ten well-impressed striæ; interstices smooth and plane. This is nearly as large a species as *A. oblongus* Say, but besides differing in colour, the head and prothorax are not so transverse, and the former is not auriculate. †Dej. Cat. p. 162.

A. OBLONGUS *Say.* J. Acad. iii. 215. *A. badipes* Mels. Proceed. Acad. ii. 135. Middle and Southern States. Dr. Melsheimer gave a new name, because he supposed that of Say to have been applied to a European species by Scopoli and Illiger. The trivial name *oblongus* of these authors is, however, itself a synonym of *A. rufipes* Lin.

The specimen named *A. pensvallensis* Mels. Pr. Acad. ii. 135, is doubtless European, as it is stuck with a European pin, although caught at a time when these were rarely to be had in this country.

*A. DENTICULATUS* Hald. Shining black, beneath fuscous; clavus of the antennæ fulvous; clypeus with two denticulations on each side of the anterior emargination. 3 l. long,  $1\frac{1}{3}$  wide. Eastern side of the Rocky Mountains. Head coarsely punctured, auriculate, a transverse raised line posteriorly; clypeus distinctly emarginate in front, followed by a secondary emargination, separated and followed by a projecting tooth; lateral margin recurved, and exhibiting a tendency to form two additional denticulations: pronotum with numerous fine punctures and dilated impressed ones, which are more dense laterally; anterior angles scarcely advanced, posterior ones obtusely rounded; lateral and posterior margins slightly recurved; anterior margin with a narrow line of fulvous hair: scutel densely punctured at base: elytral striæ (10) crenate-punctate, intervals flat: epipleura and beneath distinctly punctate, and clothed with fulvous hairs.

*A. LUTULENTUS* Hald. Proceed. Acad. i. 304. Mels. id. ii. 135. *A. corvinus* †D. Black, somewhat glossy, minutely punctate, elytra with the striæ fine and indistinct; male with an indistinct frontal tubercle.  $2\frac{1}{2}$ —3 l. long. Pennsylvania, Carolina; October. Head transverse, regularly hemi-hexagonal, auriculate, widely sub-emarginate; anterior angles acute and projecting in the form of teeth; margin reflexed, sides converging rectilinearly; disk with dilated sub-confluent punctures; front with an obsolete tubercle: pronotum subquadrate, densely punctured like the head; anterior margin with fulvous hair; anterior angles sub-reflexed laterally; scutel sparsely punctured: elytra finely chagrined or minutely scabrous, with narrow sub-crenulate indistinct striæ. Allied to *A. sericatus* of Europe.

*A. CORVINUS* Hald. Dull black, sub-opake, head and prothorax profoundly and densely punctured; elytra punctate striate; interstices plane, convex towards the apex. Long. 3 lin. Head convex and simple above, hemi-hexagonal, sub-emarginate, auriculate, sides rectilinear, margins slightly reflexed; palpi ferruginous: prothorax advanced towards the scutel, uniformly and densely covered with deep dilated punctures: elytra somewhat glossy, black, margins with a rufous tinge; striæ distinct, narrow, with oblong indistinct punctures above, and round distinct ones laterally, these crenulating the interstices posteriorly; pectus with distinct dilated punctures: apex of the abdomen rufous: feet glossy rufous, femora finely punctured.

*A. ATERRIMUS* Mels. Proceed. Acad. ii. 136. *A. 4-tuberculatus* F. i. 75. Dej. Lake Superior, Southern and Middle States. *A. rugulosus* †Dej. is probably the female.



*A. METALLICUS* *Hald.* Shining black, with a greenish metallic reflexion; pronotum sparsely punctate; elytra punctate-striate. Long.  $2\frac{1}{2}$  lines. Maryland, in May. Head hemi-hexagonal, sub-auriculate, widely emarginate in front, margin reflexed; surface scabrous and confluent punctured anteriorly and laterally; above smooth, with fine distinct punctures; and three transverse indistinct tubercles posteriorly: pronotum convex, scarcely margined, with fine and distant punctures: scutel smooth: elytra finely punctate striate: beneath black, feet faintly metallic, posterior femora bright brassy. This species, of which I found but one specimen, is allied to the preceding, but the elytral punctures are more distinct, and the striæ less so.

*A. STERCORATOR* *Fabr.* i. 81. No. 58 (Amer. Merid.) Black; pronotum densely punctured, punctures large posteriorly, and diminishing to a minute size anteriorly: elytra coarsely punctate striate, interstices convex. Long.  $2\frac{1}{2}$ , lat. 1 line. Shining black, feet and margins with a rufous tinge; tarsi palpi and antennæ paler, with a tinge of flavous: head convex, distantly hemi-hexagonal, auriculate, widely emarginate anteriorly, anterior angles obtusely rounded, sides convex, margins reflexed; surface minutely and densely punctate, becoming coarser, towards the margin; posterior portion along the pronotum, distinctly punctate: pronotum convex, deeply and widely emarginate for the reception of the head; anterior angles obtuse and projecting; posterior angles obtuse, and truncate towards the humeri; posterior and lateral margins convex, and margined: elytra coarsely striate; striæ with punctures which have a tendency to crenulate the margins of the interstices: abdomen beneath, and posterior femora, sparsely punctate. Not being confident that this is the true *stercorator*, I give such a description as to render the insect I have in view recognisable.

*A. CURTUS* *Hald.* Short, shining black; beneath, feet, and margins of the head and prothorax rufo-piceous. Long. 2, lat. 1 line. Rocky Mountains. Head finely punctured, hemi-hexagonal, auriculate, margins reflexed, clypeus emarginate; front with three transverse tubercles, the medial one the largest, the lateral ones wanting in a second individual; antennæ and palpi flavous: pronotum convex, slightly margined, finely and densely punctured: scutel impunctate posteriorly: elytra smooth, faintly punctate and crenulate-striate; ninth or sub-marginal stria abbreviated, and deflected into the marginal one anteriorly; eighth still more, and seventh and sixth less abbreviated anteriorly.

*A. RURICOLA* *Mels.* *Proceed. Acad.* ii. 136. (*rusicola*, in error.) *Var. a.* Black above.



*A. STRIGATUS* Say. J. Acad. iii. 212. Inhabits the Eastern, Middle, and Southern States. Say found it as far west as the Rocky Mountains, and Dr. Le Conte at Lake Superior. My brother, Lieut. Horace Haldeman, has sent me specimens from Mexico collected at Jalapa last November.

*A. SPRETUS* Hald. Short, shining black, polished, punctate; feet and translucent margins of the prothorax and elytra dull rufous; frontal suture an elevated line sometimes having a medial tubercle. Long.  $1\frac{3}{4}$ , lat.  $\frac{3}{4}$  line. Middle States. Head hemi-hexagonal, widely emarginate anteriorly, margins reflexed, surface finely punctured; lateral margins rugosely punctate; palpi and antennæ flavous, clava darker: pronotum smooth, convex, margined posteriorly and laterally, disc with scattered punctures of varying size, the larger ones dilated: scutel smooth, medial portion depressed: elytra with an indistinct tinge of rufous, becoming more apparent at the margins; striæ fine, with faintly impressed punctures disappearing posteriorly, and scarcely crenulating the interstices; marginal stria as in *A. curtus*; interstices plane. The elytra and general appearance are as in *A. terminalis*.

*A. SPRETULUS* Hald. Shining blackish fuscous with a tinge of rufous; beneath and feet rufous; pronotum sparsely punctured; elytra crenulate-striate, the two submarginal striæ abbreviated at base. Long. 2, lat  $\frac{3}{4}$  line. Middle States. Head hemi-hexagonal, auriculate, widely emarginate, margin rufous and reflexed; surface smooth, obsolete rugose towards the margin, and punctate upon the posterior margin: antennæ fulvous: pronotum with the anterior margin and an indistinct lateral spot (absent in a second individual) rufous; surface with scattered punctures, which are largest posteriorly and laterally; besides these, the entire surface is regularly covered with minute punctures; posterior and lateral margins reflexed, anterior angles obtuse, not prominent: scutel smooth, with a rufous tinge: elytra with the striæ and crenulations distinct; interstices scarcely convex, except posteriorly; margin and beneath rufous; abdomen darker, and slightly punctate.

*A. (OXYOMUS) ABDITUS* Hald. Dull black, narrow, depressed; head and prothorax densely punctate; elytra obtusely striate, margin of the intervals minutely lineate-punctate. Long. 2, lat.  $\frac{3}{4}$  line. Middle States. Head hemi-hexagonal, auriculate, margins convex and rufous; entire surface more minutely punctured than the pronotum; clypeus lato-emarginate, the emargination terminated by a minute tooth; antennæ and maxillary palpi flavous, the latter sub-securiform: pronotum densely punctured, punctures largest posteriorly and laterally; scabrous with approximate punctures laterally; posterior and lateral margins reflexed; posterior angles very obtuse; anterior angles scarcely projecting:

scutel concave, levigate, and faintly rufous; elytra striatè, striæ indistinctly punctate; intervals flat, convex posteriorly, their internal margins indistinctly lineate-punctate or crenulate; suture bounded with a longitudinal row of minute punctures on each side, a similar series (sometimes obsolete) along the exterior margin of the intervals: feet dark rufous, other inferior parts with a tinge of rufous; sternal plate deeply impressed along the median line, and with the abdomen, densely punctured.

Of three specimens examined, one may be termed indistinctly punctate striate, the punctures or crenulations of the interval extending into the striæ. Its facies is that of *Oxyomus gracilis* Mels., whilst the sub-dentate clypeus allies it to the genus *Ammæcius* Mulsant. I have not yet met with the more recent divisions of this and the allied genera by Erichson.

#### RHYSSEMUS *Mulsant.*

*R. SCABER* *Hald.* Opaque, nigro-fuscous, scabrous, front and four transverse elevated lines on the pronotum, composed of larger elevations; margin of the head, antennæ palpi and feet rufous; elytra porcate. Long.  $1\frac{3}{4}$ , lat.  $\frac{3}{4}$  lin. Hab. Middle States. Head semicircular, obtusely auriculate, margin rufous and reflexed; an obtuse frontal impression terminating in the emargination of the clypeus; disk elevated towards the centre, verrucose, the larger tubercles being central and the smaller ones posterior; pronotum verrucose, transversely 4-sulcate, the intervals with larger tubercles; extreme anterior margin flavous, transversely rectilinear, angles sub-prominent, obtuse; lateral margin convex, not margined; posterior angles and base forming a semicircle; base near the scutel, and lateral margins, ciliate with short thick flavous hairs: elytra rather narrower at base than the prothorax, sides convex, and widening posteriorly to two-thirds of their length, when they contract, the apex being obtusely rounded; convex above, porcate, interstices gemmate catenulate; there are ten principal-elevated lines excluding the sutural one, and six of these are double, a second catenulate row rising from the sulci: abdomen beneath with a transverse row of longitudinal punctures at the base of the segments, and another transverse row of irregular ones upon the middle of each segment.

#### PSAMMODIUS *Gyllenhal.*

*P. ÆGIALIOIDES* *Hald.* Polished castaneous, head and pronotum blackish, antennæ fulvous.  $1\frac{3}{8}$  l. long. Hab. Middle States.

Head auriculate, acutely emarginate, margins reflexed, and faintly rufous; surface densely tuberculate, two elevated lines and two sulci extend diagonally towards the margin from the vertex: pronotum with four transverse sulci filled with approximate dilated punctures; the two posterior ridges are interrupted by the short impressed punctate dorsal line, which extends from the base to the third transverse ridge;



lateral margins rufous, and with the posterior one, ciliate: elytra sulcate and punctate-clathrate, interstices flattened convex: inferior parts castaneous, anterior feet a little paler. In *P. interruptus* Say, (Boston Journ. N. H. i. 178,) the intervals have a row of punctures and their margins are somewhat crenulated.

#### TRICHOPTERYX Kirby.

*T. FUSCIPENNIS* Hald. Ovate, shining black, elytra pale fuscous, feet rufous.  $\frac{1}{2}$  lin. long. Hab. Pennsylvania. Form of *T. attenuata* Gillmeister, *Trichopterygia*, pl. 3, fig. 5. Surface covered with elevated points running transversely in irregular lines: antennæ dark fuscous, base rufous: pronotum convex, pubescent laterally, basal angles pale, acutely produced: scutel large, black, and pubescent: elytra pale fuscous, punctate, and pubescent: abdomen exposed, narrow, pubescent above. The prothorax has the basal angles rather more acute than in Gillmeister's fig. *a*, pl. 3; it is wider than the elytra, and without hair, except laterally; with a high magnifying power it is distinctly aciculate, and in certain positions the elevated points resemble impressions.

*T. ROTUNDATUS* Hald. Broad oval, shining black, densely punctured, pubescent, elytra pale fuscous, antennæ and feet pale rufous.  $\frac{1}{3}$  lin. long. Hab. Middle States. Head whitish pubescent: prothorax considerably wider than the elytra, pubescent, densely punctate; posterior angles produced and acute, embracing the elytra: scutel wide, black, punctate, and pubescent: elytra short, pale fuscous, punctate, and sparsely pubescent, gradually narrowing posteriorly; apex of each slightly rounded: pygidium but little exposed. The prothorax nearly resembles that of *atomaria* Degeer, as figured in Gillmeister's pl. 3, fig. 3, the posterior angles are however more produced, and the entire form is less quadrate.

*T. DISCOLOR* Hald. Oblong, sides subparallel; black, punctate, pubescent; elytra pale yellowish fuscous.  $\frac{1}{3}$  lin. long. Hab. Lake Superior. Head pubescent; antennæ fuscous, base flavous: prothorax pubescent, densely and coarsely punctate; posterior angles moderately produced in an acute angle; sides scarcely wider than the elytra, and slightly narrowed towards the base: elytra subparallel, punctate and pubescent, apex faintly rounded: abdomen exposed, pubescent: feet flavous? The slight convergence of the prothorax and elytra towards the base of the former, produce a lateral outline like that in *brevipennis* Erichson, Gillm. pl. 4, fig. 1.

*T. ABRUPTA* Hald. Shining black, punctate and pubescent, wide, sides subparallel, truncate posteriorly, feet flavous.  $\frac{1}{3}$  lin. long. Hab. Pennsylvania. Outline of *atomaria* Degeer, Gillm. pl. 3, fig. 3, but the prothorax is less contracted anteriorly: head and pronotum thickly punctured and pubescent; the latter scarcely wider than



the elytra, and widest anterior to the base, the angles of which are acute and as much produced as in *atomaria*: scutel punctured and pubescent, rather smaller than in *atomaria*: elytra short, densely punctate and pubescent, apex faintly flavous, outline as in *atomaria*: abdomen pubescent, scarcely exposed; beneath black.

*T. ASPERA* *Hald.* Elongate oval, subparallel, black, pubescent, surface covered with numerous rounded elevated points; antennæ shining black, feet pale fuscous.  $\frac{1}{2}$  lin. long. Hab. Middle States and Lake Superior. Form of *pygmæa* Er.—Gillm. pl. 4, fig. 5, but rather more robust: head, pronotum and elytra, slightly pubescent and asperate: prothorax a little dilated posteriorly, basal angles acute, and produced but little: elytra with the sides slightly convex; apex faintly fuscous, separately and obtusely rounded. From the rarity of the union of black antennæ and pale feet in this genus, it is possible that this species may be identical with *sericans* Er.—Gillm. p. 51, pl. 4, fig. 3; which has these characters, and besides a wide distribution in Europe and Siberia, is stated to occur at Baltimore.

#### PTENIDIUM *Erichson.*

*P. TERMINALE* *Hald.* Polished black, sparsely pubescent; antennæ, feet, and apex of the elytra, flavous.  $\frac{1}{2}$  lin. long. Hab. Pennsylvania in May. Outline of *lævigatum* Er.—Gillm. p. 8, fig. 4, but the apex of the elytra is less suddenly contracted and more obtusely rounded. Head with a few hairs; a lateral fovea in front of the base of the antennæ; eyes coarsely reticulate: prothorax impunctate, the anterior and posterior width subequal; basal angles obtusely rounded; anterior angles advanced and obtuse: elytra sparsely and faintly punctate.

The date of the genus *Trichopteryx* is, according to Gillmeister, 1818; Allibert, (*Revue Zool.* 1847, p. 188,) 1808; and *Erichson* in *Agassiz' Nomenclator*, 1826, the last being probably correct, but in either case it takes precedence of *Ptilium* *Gyllenhal*, the date of which seems to be 1827, having been first characterized by this author in an appendix to his *Insecta suecica*, although previously known as an unrestricted catalogue name. Gillmeister has divided the family (or genus, as he considers it,) into five groups, of which he gives the characters, and which nearly correspond with the following genera:

<i>TRICHOPTERYX</i> <i>Kb. Er.</i>	—Gillm. §i.	p. 41, pl. 3, 4.
<i>PTINELLA</i> <i>Motchulsky.</i>	“ ii.	“ 57, “ 5.
<i>PTILIUM</i> <i>Gyll. Er.</i>	“ iii.	“ 67, “ 6.
<i>PTILIOLA</i> <i>Hald.</i>	“ iv.	“ 76, “ 7.
<i>PTENIDIUM</i> <i>Er.</i>	“ v.	“ 82, “ 8.

To these may be added *NOSSIDIUM* *Er.* and *SPHÆRIUS* *Waltl.* Motchulsky has stated a point overlooked by Gillmeister; namely, that Gyllenhal placed *T. atomaria* and *fascicularis* in the genus *Ptilium*, and he accordingly applies the latter term to the first group, without inquiring how far it may be synonymous with Kirby's name, which he applies to the fifth and part of the third group; another portion of the third with the fifth, forming his genus *Ptinella*. Allibert, *Rev. Zool.* 1847, p. 189, says that *Ptinella* "est un nom impropre qui signifie petit *Ptinus* et non petit *Ptilium*;" an objection which is untenable, the names in question being as distinct as *Callidium* and *Callidema*; nor is it certain that *Ptinella* was intended as a diminutive of *Ptilium*.

ART. IX.—*Observations on the Eocene formation, and descriptions of one hundred and five new fossils of that period, from the vicinity of Vicksburg, Mississippi; with an Appendix.* By T. A. CONRAD.

In the Spring of 1845, I collected about one hundred and nine species of Eocene fossils, most of which appear to be new species. There are sixty univalves, forty-two bivalves, one multivalve shell, and six or seven polyps.

Of these fossils, I can identify two only with species of the Claiborne sands; *Infundibulum trochiformis* and *Conus saurodens*. Very few others are related to species of the Alabama sand strata. *Lucina Mississippiensis*, *Sigaretus Mississippiensis* and *Dentalium Mississippiensis*, are the only shells which might be confounded with species of those deposits.

The Vicksburg group contains three species of bivalves which have much resemblance to Miocene fossils of this country. *Lima staminea* approaches *L. papyria*; *Corbula engonata* is allied to *C. inequalis*, Say; and *Nucula Vicksburgensis*, to *N. obliqua*, Say.

I have not observed a recent species in this group, and yet it is decidedly more modern than that of the Claiborne sands; and as both deposits have but two species in common, I thought it advisable to designate the former, Upper or Newer Eocene, and the latter Lower or Older Eocene, as the two divisions are more distinct than the Older and Newer Pliocenes.

In the American Journal of Science and Arts, I have given a sketch of the Mississippi Eocene, and observed that not\* more than ten species would be found, on comparison, identical with Claiborne shells. I had reference to the sand at Claiborne, and not including the limestone above it. A careful comparison has reduced the number to two species, for the *Dentalium*, which, when at Vicksburg (without a Claiborne specimen for comparison) I had supposed to be *D. thalloides*, is a distinct, though closely allied species.

This newer portion of the Eocene in Mississippi is represented in Alabama by the white limestone at St. Stephens on the Tombeckbe river, and the similar rock which constitutes the uppermost stratum at Claiborne, on the Alabama river; all being admirably connected by the abundance of *Nummulites Mantelli*. There is a similar limestone, in Charleston county, South Carolina, in which I found *Scutella Iyelli* and *Pecten calvatus*, fossils of the Claiborne limestone, and both rocks are probably of the same geological age. The limestone of Tampa Bay, Florida, is included in the

\* In the paragraph alluded to, this word was accidentally omitted. I did not when it was written suppose that ten fossils would be found to correspond with species of the Claiborne sands.



Upper Eocene series, but as yet no fossil has been obtained from it identical with a species of the Carolinas, Mississippi or Alabama, unless it is a specimen of *Carcharias megalodon*, which Captain Powell, of the Navy, found on the bay shore.

The only species of *Crassatella* which occurs at Vicksburg, is more nearly related to *C. tumida* of the Paris basin than to *C. alta* of Claiborne.

*Ostrea sellæformis* characterises the lower division of the Eocene formation. It occurs abundantly beneath the fossiliferous sands of Claiborne; at Vance's Ferry, South Carolina; and on the right bank of James river, below City Point, Virginia. I also refer to this section, the localities at Fort Washington, Piscataway, and Upper Marlborough, Maryland. Other characteristic fossils are *Cardita planicosta*, and *Turritella Mortoni*, the former occurring at Piscataway; at Claiborne, Alabama; and also at Marlbourne, on Pamunkey river, Virginia, the residence of Edmund Ruffin, Esq.

The following table illustrates the two sections of the Eocene:

DIVISIONS.	LOCALITIES.	CHARACTERISTIC FOSSILS.
Upper or Newer Eocene.	Vicksburg, Miss., white limestone of St. Stephens, and of Claiborne, Alabama, and part of that in Charleston co., South Carolina. ..... Limestone in the vicinity of Tampa Bay, Florida. .....	Scutella Lyelli. ——— Rogersi. Pecten Poulsoni. Nummulites Mantelli. ..... Nummulites Floridina. Cristellaria rotella. Ostrea Georgiana.
Lower or Older Eocene.	Fossiliferous sands of Claiborne, and St. Stephens, Al.; of the Washita river, near Monroe, La.; Pamunkey river at Marlbourne, and Eocene green sand, on James river, below City Point, Va.; Fort Washington, Piscataway and Upper Marlborough, Md.	Cardita planicosta. ——— Blandingi. Crassatella alta. Ostrea sellæformis. Turritella Mortoni, &c.

The upper limestone of Shell Bluff on the Savannah river in Georgia, which contains *Ostrea Georgiana* and *Scutella quinquefaria*, overlies strata which contain species of organic remains identical with those of the Lower Eocene of Alabama and Virginia, none of which has yet been found associated with the two characteristic fossils above named. *Ostrea Georgiana* occurs at Jackson, Mississippi, where its position is said to be below the Vicksburg group. It is therefore the line of demarcation between the Upper and Lower Eocene.

#### *Fossils of the Newer Eocene of Mississippi.*

#### DENTALIUM.

D. MISSISSIPPIENSIS. Pl. 11, fig. 1.—Curved, attenuated above, longitudinally striated, the lines alternated in size. Length 2 1-10. Abundant. It differs from *D. thalloides*, nob., in having more numerous and much less prominent lines. It is very abundant.

There is another species which occurs in fragments. It is small, rare, and is smooth, polished and curved.

### FISSURELLA.

F. MISSISSIPPIENSIS. Pl. 11, fig. 2.—Suboval, rather elevated, with numerous unequal radiating lines, and fine transverse lines, giving a minutely granulated appearance to the shell; foramen oval, submedial. Length  $\frac{1}{2}$ . Very rare.

An echinated species occurs, apparently identical with *I. trochiformis* of Paris, and of Claiborne, Alabama.

### SOLARIUM.

S. TRILIRATUM. Pl. 11, fig. 4.—Discoidal, with three thick approximate ridges on the periphery; suture channelled; volutions with oblique impressed lines, and two fine revolving lines on each whorl; base convex, with three revolving impressed lines, that near the umbilicus profound, and with coarse rugose transverse lines. Diameter 7-10. Not common.

### BULLA.

B. CRASSIPICA. Pl. 11, fig. 5.—Cylindrical, narrowing towards the base, smooth and entire; fold at base thick and prominent. Length 2-10.

Abundant on Dr. Smith's plantation, six miles N. E. of Vicksburg.

### CYPRÆA.

C. SPHEROIDES. Pl. 11, fig. 6.—Short ovate, subglobose; posterior end narrow; base rounded; aperture narrow, the margins with numerous teeth. Length  $1\frac{1}{4}$ .

Very rare. Mr. J. D. Anderson, of Vicksburg, found one, and I obtained only one during the two weeks employed in collecting the fossils around Vicksburg.

C. LINTEA. Pl. 11, fig. 7 and Pl. 13, fig. 4.—Ovate, elevated, ventricose, with four approximate equal impressed lines; base ventricose, profoundly striated; labrum margin much thickened, profoundly striated; summit of the labrum prominent; base slightly produced. Length 6-10. Rare.

### NARICA.

N. MISSISSIPPIENSIS. Pl. 11, fig. 8.—Subglobose, revolving lines fine, regular, equal; longitudinal wrinkles very minute; spire very short; suture somewhat channelled; umbilicus rather large. Length 4-10.

### SIGARETUS.

S. MISSISSIPPIENSIS. Pl. 11 fig. 9.—Obliquely oval, with fine very closely arranged wrinkled revolving lines; whorls convex; no umbilicus. Length 8-10.

This species is usually much smaller than the specimen described, and scarcely differs from a species of Claiborne, Alabama. Not very common.

## NATICA.

N. MISSISSIPPIENSIS. Pl. 11, fig. 10.—Subglobose, body whorl flattened above; suture channelled; spire little prominent; base profoundly callous; aperture moderate. Length 8-10.

This rare species I found about seven or eight miles North West of Vicksburg.

N. VICKSBURGENSIS. Pl. 11, fig. 11.—Subglobose, whorls four or five, convex; umbilicus large; columella straight; labium callous. Length 6-10.

This species is common.

## SCALARIA.

S. TRIGINTANARIA. Pl. 11, fig. 14.—Turreted, whorls convex, cancellated with numerous prominent lines, the longitudinal one lamellæform and elevated towards the suture, about 32 in number on the body whorl, which is obtusely carinated; revolving lines equally prominent with the longitudinal, but thicker; base below the carina with minute revolving lines. Length 9-10. Very rare.

## TURRITELLA.

T. MISSISSIPPIENSIS. Pl. 12, fig. 12.—Subulate, volutions flattened, with seven revolving lines on the larger ones, the penultimate line large and prominent; longitudinal wrinkles fine, approximate, much curved, crenulating the revolving lines; the whorls near the apex generally with two prominent distant revolving lines, and a less prominent one margins the suture. Length 3 inches. Not abundant.

T. CÆLATURA. Pl. 14, fig. 16.—Slightly turreted; whorls flattened, with crenulated or beaded revolving lines, about five to each volution; lines of growth sinuous and apparently forming the crenulated character of the striæ; suture profound.

Rare, and in fragments.

## TEREBRA.

T. DIVISURUM. Pl. 11, fig. 13.—Subulate, with nineteen flattened volutions, obscurely turreted; polished and with longitudinal curved ribs, dislocated by an impressed line above the middle of each whorl; ribs obsolete on the body whorl below the impressed line. Length 2 inches. Common.

The ribs are sometimes obsolete on the larger whorls, or replaced by coarse wrinkles, which are generally distinct on the body whorl.

T. TANTULA, Pl. 11, fig. 15.—Subulate, with longitudinal ribs dislocated by an impressed line; whorls with minute revolving lines. Length  $\frac{3}{4}$ . Rare.

Very similar to the preceding, but narrower, far less in size, and distinguished by the revolving lines and by the ribs on the body whorl, which extend to the beak.

## PLEUROTOMA.

P. PORCELLANA. Pl. 11, fig. 16.—Fusiform; smooth and polished; whorls eleven, convex, with two revolving lines near the upper margin; the interstices transversely striated; body whorl with revolving impressed lines, commencing near the upper angle of the aperture; volution contiguous to the apex papillated; labium striated; aperture rather more than half the length of the shell; beak perfectly straight. Length  $1\frac{1}{4}$ .

This shell may perhaps appertain to *Brachytoma*, Swainson.



- P. MISSISSIPPIENSIS. Pl. 11, fig. 17.—Turreted; volutions eight, concave above and plain below, with longitudinal distant rounded ribs; body whorl with revolving lines, commencing in a line with the summit of the aperture; beak short, a little curved. Length  $\frac{3}{4}$ .
- P. SERVATA. Pl. 11, fig. 18.—Fusiform; whorls ten, with rounded longitudinal ribs and prominent strong revolving lines, a fine intermediate line on the body whorl; volutions concave above, with a carinated revolving line below the suture; beak narrow, elongated, slightly bent, acuminate; aperture and canal rather more than half the length of the shell. Length 9-10.
- P. CONGESTA. Pl. 11, fig. 19.—Short-fusiform, volutions nine or ten, with revolving raised lines and longitudinal wrinkles; spire conical-acute; whorls slightly contracted in the middle, with longitudinal curved irregular striæ, interrupted in the middle of each whorl; aperture half as long as the shell; beak slightly twisted. Length 1 1-10th. Very abundant.

It approaches the genus *Brachytoma*, Swainson.

- P. CRISTATA. Pl. 11, fig. 20.—Fusiform, whorls ten, angulated in the middle, except the two from the apex, and with a reflected finely dentate carina; revolving lines distinct, finely crenulated; spire scalariform; from the upper end of the aperture runs a prominent revolving line, much larger than the others; lines on the body whorl below the angle minutely granulated; beak narrow, produced. Length  $\frac{3}{4}$ . Rare.
- P. TANTULA. Pl. 11, fig. 21.—Slender; volutions nine, convex, with longitudinal rounded, slightly curved ribs; spire elevated and acute; suture margined by an indistinct raised line; beak short, narrow. Length 4-10. Rare.

A member of subgenus *Clavatula*, Lam.

- P. TENELLA. Pl. 11, fig. 22.—Fusiform; volutions nine, whorls slightly contracted above, with longitudinal prominent curved lines, and a prominent revolving line near and below the suture; between this and the suture an impressed line; body whorl with strong prominent revolving lines, commencing in a line with the upper end of the aperture, and sometimes alternated in size; ribs frequently obsolete on the body whorl, and terminating at the striated space; beak narrow, somewhat produced. Length 8-10.

It probably belongs to Swainson's genus, *Clavicantha*.

- P. COCHLEARIS. Pl. 11, fig. 23.—Subfusiform, with elevated revolving lines, alternated with fine lines, the interstices with fine longitudinal wrinkled lines; spire elevated, acute; beak narrow, straight. Length  $1\frac{3}{4}$ . Very rare.

The specimen figured is more than twice the size of any other specimen found, though it is an abundant species.

- P. EBOROIDES. Pl. 11, fig. 24.—Turreted; whorls nine, smooth, flattened above, obscurely nodulous or subcostate below; beak short. Length 6-10.
- P. ABUNDANS. Pl. 11, fig. 25.—Turreted; whorls ten, concave above, with a crenulated prominent revolving line just below the suture; convex portion of the whorls with prominent, acute, nearly straight ribs and regular revolving lines; concave portion with minute revolving lines; beak narrow, slightly produced. Length  $\frac{3}{4}$ .

It belongs to subgenus *Clavatula*, Lam.

- P. ROTÆDENS.* Pl. 11, fig. 26.—Narrow-subfusiform, small, with a profound deeply crenulated carina on the body whorl and in the middle of each whorl of the spire; suture margined with a prominent line below and a minute one above; large volution with distinct revolving lines and minute longitudinal wrinkles; beak slightly produced, narrow, straight. Length  $\frac{1}{2}$ . Rare.
- P. DECLIVA.* Pl. 11, fig. 27.—Fusiform, with subangular volutions, with strong prominent revolving lines on the body whorl, alternated in size; the whorl flattened and oblique above the angle, with four unequal revolving lines; lower whorls of the spire with three prominent revolving lines on the lower half, and a fine intermediate line; upper half with three minute revolving lines, and a larger prominent one below and near the suture; aperture and canal about half the length of the shell. Length 1.

Allied to *P. servata*, but wants the longitudinal ribs of that species. Rare.

#### PHORUS.

- P. HUMILIS.* Pl. 11, fig. 46.—Depressed; volutions five, with comparatively large shells and fragments adhering; body whorl very wide, much depressed; base flat; near the periphery concave. Width 8-10. Height  $\frac{1}{4}$ .

I found but one specimen of its shell, which seems to be less elevated than the other species.

#### BUCCINUM.

- B. MISSISSIPPIENSIS.* Pl. 11, fig. 28.—Turreted; whorls eight, three from the apex smooth and entire; the others with longitudinal regular distant ribs and intermediate wrinkles; revolving lines raised, alternated in size; labrum with eleven raised lines within, not extending to the margin; columella striated. Length 5-10. Common.

#### TYPHIS.

- T. CURVIROSTRATUS.* Pl. 11, fig. 29.—Subfusiform; volutions eight, scalariform, varices or ribs profound; tubes long; that near the margin of aperture thick, elongated; beak elongated, spiniform, much curved. Length 1-10. Not common.

#### MUREX.

- M. MISSISSIPPIENSIS.* Pl. 11, fig. 30.—Subfusiform, with three elevated varices, and an intermediate prominent obtuse longitudinal ridge; between two of the varices on the body whorl is a smaller ridge; revolving lines prominent, alternated in size, profound on the varices; longitudinal wrinkles distinct; labium with six prominent lines within, the margin regularly foliated; canal long. Length, 1 7-10.

It belongs to the subgenus *PHYLLONOTA* of Swainson.

#### MELONGENA.

- M. CRASSI-CORNUTA.* Pl. 11, fig. 31.—Fusiform; whorls concave above, and having a series of thick prominent nodes on the angle of the whorls; on the body whorl they are very large and thick, becoming spines towards the mouth, that nearest the margin a very thick long recurved spine; towards the base is a series of thick short spines; revolving lines coarse, unequal, not very prominent, waved; longitudinal wrinkles coarse and distinct. Length of fragment 3.

I found but one specimen of this fine shell, and cut off the base in digging it out of the clay.

The genus *MELONGENA* has no affinity with the type of *PYRULA* of Lamarck, (*FULGUR* of Montford.) Its true position will probably be among the *PURPURINÆ*. I have referred to this genus the *Fusus corona* of Lamarck. The species have a remarkable sinus at the upper end of the labrum.

#### FUSUS.

*F. SPINIGER.* Pl. 11, fig. 32.—Fusiform, with revolving lines, and a series of elevated acute spines on the angle of the large whorl; the series continued on the whorls of the spire near the suture; two upper whorls entire; sides above the tubercles flattened, with the revolving lines fine and indistinct; volutions seven; beak produced; labrum striated within. Length  $1\frac{3}{4}$ . Very rare.

It belongs to the genus *Hemifusus* of Swainson.

*F. MISSISSIPPIENSIS.* Pl. 11, fig. 34.—Narrow-fusiform; volutions eight or nine, convex, with distant profound, rounded ribs, and fine regular ornamental wrinkles; canal much larger than the aperture; labrum striated within; beak narrow, produced, slightly bent. Length  $1\frac{1}{2}$ .

*F. VICKSBURGENSIS.* Pl. 11, fig. 33.—Fusiform; whorls convex, with revolving raised lines alternated in size, and fine longitudinal wrinkled lines; large whorl ventricose; beak somewhat bent. Length  $1\frac{1}{4}$ .

#### FICUS.

*F. MISSISSIPPIENSIS.*—Pyriform, thin and fragile, latticed, with acute prominent lines, the revolving ones largest and distant, the interstices with minute revolving lines; longitudinal lines closely arranged, equal; spire very short, whorls convex, the two nearest the apex entire; large volution flattened at top. Length  $1\frac{1}{4}$ .

#### CHENOPUS.

*C. LIRATUS.* Pl. 11, fig. 35.—Ovate, with a thick dilated labrum; whorls nine, convex, ribbed longitudinally, and with revolving lines; ribs curved, undulated on the body whorl and subnodose above; body whorl gibbous; aperture narrow; callus of the labium profound. Length  $\frac{3}{4}$ . Very rare.

I have adopted the above generic name because as Phillipi observes the *Pterocera lambis* was made the type of the genus *APOORHAI*S.

#### RINGICULA.

*R. MISSISSIPPIENSIS.* Pl. 11, fig. 36.—Ovate acute, whorls five or six, convex, with minute revolving lines; suture profound, margin carinated by a submarginal impressed line; columella two-plaited. Length 1-10. Abundant on Dr. Smith's plantation near Vicksburg.

#### ACTÆON.

*A. ANDERSONI.* Pl. 11, fig. 37.—Oblong subovate; whorls six, with regular impressed revolving lines, interstices minutely striato-punctate; spire acutely conical, whorls convex; lines on the shoulder indistinct; aperture about equal to half the length of the shell. Length 4-10.



An elegantly formed and very rare species, dedicated to James D. Anderson, Esq., of Vicksburg, who first collected the fossils of that locality and studied the species.

### CANCELLARIA.

- C. MISSISSIPPIENSIS. Pl. 11, fig. 38.—Subovate; whorls five or six, turreted; ribs prominent, ten or eleven on the large volution, one or two considerably larger than the others; revolving lines raised, distinct, alternated in size on the lower half of the body whorl; labrum striated within; columella concave, three-plated. Length  $\frac{1}{2}$ .
- C. FUNERATA. Pl. 11, fig. 39.—Oblong-ovate, with large longitudinal ribs and prominent revolving lines; spire rather elevated, turreted, whorls six, convex; two from the apex entire; ribs on the body whorl profound, unequal; labrum with nine prominent lines within not extending to the margin; columella three plaited. Length  $\frac{1}{2}$ . Very rare.

### TRITON.

- T. CRASSIDENS. Pl. 11, fig. 40.—Subfusiform, a little distorted; spire acuminate; whorls latticed, the longitudinal ridge rather distant, prominent; body whorl with the longitudinal ribs distant, and on the angle some of them very prominent or subtuberculous; labrum with one large thick prominent tubercle, and with transverse plates and grains; columella profoundly excavated; canal short. Length 1 6-10.

I have given the name of *crassidens* to this species to distinguish it from *T. cancellinus*, the large tooth on the labrum being very thick and prominent. The large plate on the upper part of the labium is much smaller than the corresponding one in *cancellinus*. It differs in other particulars though the two species are nearly allied.

- T. ABBREVIATUS. Pl. 11, fig. 42.—Short-subovate; whorls six, longitudinally ribbed, and with strong alternated revolving lines; whorls of the spire slightly convex, the two nearest the apex entire, rounded; body whorl inflated, and having one large varix; the ribs about fifteen in number; submargin of labrum denticulate; canal short, oblique, straight; aperture and canal about half the length of the shell. Length 4-10.
- T. MISSISSIPPIENSIS. Pl. 11, fig. 41.—Acutely subovate; volutions six or seven, latticed, the longitudinal and revolving lines subequal; one varix on the large volution opposite to that on the submargin of the labrum, both elevated, narrow or subcompressed; two varices narrow and prominent on three whorls of the spire; submargin of labrum with six teeth; columella with five transverse plaits, and two or three near the upper angle of aperture. Length  $\frac{1}{2}$  nearly.

Of this species I obtained one specimen only.

### CASSIDARIA.

- C. LINTEA. Pl. 11, fig. 43.—Elliptical, with fine closely-arranged revolving lines, crossed by finer longitudinal lines, most distinct towards the margin of the labrum; spire prominent, acute, cancellated; penultimate whorl slightly tuberculated at base; angle of large whorl with unequal small tubercles, wanting towards the labium margin; labium striated above, and with rugose plaits below; submargin of labium striated within, margin entire. Length  $1\frac{1}{4}$ .

## CASSIS.

- C. *CÆLATURA*. Pl. 11, fig. 44.—Short-elliptical, with revolving lines and series of nodes and granules; tubercles profound on the angle of the body whorl; spire prominent, whorls cancellated; the upper half with a profound revolving line; labium granulated and striated throughout, the upper grains indistinct; labrum with transverse prominent lines. Length  $1\frac{1}{2}$ .
- C. *MISSISSIPPIENSIS*. Pl. 11, fig. 45.—Subovate; whorls slightly concave above, the angle nodular; body whorl indistinctly ribbed or waved; revolving lines distinct but fine; body whorl with one sharp compressed varix or carina; apex papillated; pillar with transverse rugose plaits throughout; submargin of labrum regularly and profoundly dentate. Length 9-10. Very rare.

## ONISCIA.

- O. *HARPULA*. Pl. 12, fig. 6.—Obovate, latticed; longitudinal ribs angular, distant, about ten on the large whorl, with a slightly foliated and waved margin; revolving lines large, distant, about twelve on the body whorl; spire scalariform, the ribs divided by an impressed line; submargin of labrum obtusely dentate. Length 1 2-10. Very rare.

## FULGORARIA.

- F. *MISSISSIPPIENSIS*. Pl. 13, fig. 1.—Elliptical, volutions nine, fluted, the ridges distant, acute, and generally one or two of them large, thick and very remote from each other, on the body whorl; spire conical, acute; aperture auriform; columella with nearly equal plaits, not oblique; labium thick, with a sharp margin. Length  $1\frac{1}{2}$ . Common.

## OLIVA.

- O. *MISSISSIPPIENSIS*. Pl. 13, fig. 6, 38.—Subelliptical; volutions six and a half; on the middle of the body whorl is a slightly impressed revolving line. Length 1 1-10. Usual size  $\frac{2}{3}$ . Abundant.

## MITRA.

- M. *CONQUISITA*. Pl. 12, fig. 1.—Fusiform, slender, smooth and polished; whorls eleven, slightly convex; penultimate whorl entire, except at the summit, where there are two impressed lines forming a raised line between them; the other whorls of the spire with revolving lines, and towards the apex the intervening spaces transversely wrinkled; apex acute; body whorl above the aperture, except the lines near the suture, without striæ; inferiorly striated; aperture narrow; labium 3-plaited. Length 1 4-10. Very rare.
- M. *MISSISSIPPIENSIS*. Pl. 12, fig. 2.—Narrow-fusiform, with eight whorls, flattened at the sides and slightly scalariform; whole surface with revolving unequal lines and longitudinal fine wrinkles, obsolete on the lines but distinct on the intervening spaces; aperture more than half the length of the shell; columella 3-plaited. Length  $1\frac{2}{3}$ . Rare.

In the young shell the striæ are prominent over the whole surface, but in adult specimens they become slightly impressed lines on the ventricose portion of the body.

- M. *CELLULIFERA*. Pl. 12, fig. 3.—Elevated-subfusiform; slender; whorls slightly turreted; longitudinally ribbed; interstices with transverse impressed lines, resembling punctæ or cells; beak produced; labium 4-plaited, the second one from the top divided by a slightly impressed line. Length  $\frac{2}{3}$ . Rare.

*M. STAMINEA*. Pl. 12, fig. 4.—Elliptical, whorls eight, slightly turreted, longitudinally ribbed; ribs small, numerous; whorls with distinct impressed revolving lines; body whorl ventricose; aperture about half the length of the shell; pillar 4-plaited, the three upper ones nearly equal. Length 4-10.

*M. VICKSBURGENSIS*. Elliptical, small; whorls slightly convex, with fine longitudinal ribs, obsolete towards the suture inferiorly and wanting on the lower half of the body; suture profound; aperture more than half the length of the shell; pillar 4-plaited, the three upper ones nearly or quite equal in size.

Distinguished from the preceding by wanting the revolving lines, and in being wider in proportion to its length. 3-10.

#### CARICELLA.

*C. DEMISSA*. Pl. 12, fig. 5.—Subfusiform; whorls six, convex, one or two whorls near the apex distinctly striated longitudinally, and with minute revolving lines; upper part of the whorls slightly concave; apex papillated, first and second volutions smooth, entire; beak striated; aperture about two-thirds the length of the shell; columella 4-plaited. Length 1½.

#### SCOBINELLA.

Shell subfusiform, with a deep angular sinus in the labrum as in *Pleurotoma*; spire long, turreted; pillar lip wanting; columella with plaits decreasing in size downwards, as in *Mitra*; canal short.

*S. CÆLATA*. Pl. 12, fig. 8, 9.—Subfusiform; volutions eleven, slightly scalariform; with longitudinal irregular ribs and revolving impressed lines; ribs interrupted on the spire by a tuberculated convex space; suture margined by a row of fine tubercles or grains; labium with four, rarely five plaits. Length 1 3-10.

This singular shell is perhaps more nearly related to *Pleurotoma* than to *Mitra*. The plaits in most specimens resemble those of the latter genus, but in one instance where there are five plates, the middle is the largest and thickest, the lowest one being minute.

#### TURBINELLA.

*T. WILSONI*. Pl. 12, fig. 12.—Fusiform; spire elevated, acute, volutions ten, angular, nodose, the larger volutions somewhat concave above; the upper volutions with revolving lines, obsolete or wanting on the lower ones; beak with coarse, slightly raised revolving lines; aperture narrow; columella with three rather distant compressed plaits, the middle one largest; canal long. Length 5 inches.

The young of this species has distinct lines on every part of the shell, except on the large portion of the body whorl, where they are indistinct and remote. This species is named to commemorate the scientific zeal of Dr. Thomas B. Wilson. It is rare, and generally very imperfect.

*T. PROTRACTA*. Pl. 12, fig. 7.—Fusiform, with about nine volutions, with thick, prominent, longitudinal ridges, and revolving, thick, prominent lines, with a fine intervening line; longitudinal wrinkles distinct; whorls concave above; spire elevated, acute; columella with four plaits, the lower one dentiform; canal long; labrum striated within. Length 1 5-10.



T. PEREXILIS. Pl. 13, fig. 2.—Narrow-fusiform, with convex volutions, having large, rounded, longitudinal ribs, about six on the large whorl; revolving lines strong, prominent, distant, with a fine intermediate line; longitudinal wrinkles minute and ornamental; aperture narrow; labrum striated within; columella with two large plaits; beak long and narrow. Length 1.

Distinguished from the preceding by its narrower outline, fewer and larger plaits on the pillar, &c. It is probably a much smaller species, but as I have one specimen only, its greatest size cannot be determined.

#### PANOPÆA.

P. OBLONGATA. Pl. 13, fig. 12.—Elongated, very inequilateral, ventricose; extremities rounded; umbo prominent, undulated; valves slightly contracted at base in a line with the umbones; valves gaping at both ends. Length  $3\frac{1}{2}$ .

Occurs in its original vertical position, generally with connected valves, but it is extremely friable and difficult to obtain.

#### MACTRA.

M. MISSISSIPPIENSIS. Pl. 12, fig. 14.—Subtriangular, equilateral, very thin and fragile, plano-convex; dorsal margin very oblique, nearly straight, extremity acutely rounded, much above the line of the base, which is regularly curved; summit prominent; lunule elongated, defined by an impressed line; umbonial slope nearly terminal, angulated and carinated by a thin line. Length 1 8-10. Height 1 4-10.

Proportionally more elevated than *M. prætenuis*, of Claiborne, Alabama, and a much larger species. Rare.

M. FUNERATA. Pl. 12, fig. 13.—Triangular, small, convex; much longer than high, equilateral; posterior end angular. Length 3-10. Rare.

#### AMPHIDESMA.

A. MISSISSIPPIENSIS. Pl. 12, fig. 20.—Oblong-oval, somewhat compressed, inequilateral, smooth, with a few distant concentric impressed lines, posterior side with a slight fold, end obtusely rounded; anterior end rounded; cartilage pit very narrow, elliptical; lateral teeth in the right valve distinct, in the left wanting? Length 1 1-10. Height 7-10.

A. PEROVATA. Pl. 12, fig. 21.—Ovate, inequilateral, plano-convex, smooth; anterior end sub-truncated; ligament margin oblique, curving regularly towards the extremity, which is acutely rounded; basal margin rounded; lateral teeth in the left valve; right valve unknown.

#### PSAMMOBIA.

P. PAPHYRIA. Pl. 12, figs. 15, 17.—Oblong-oval, or somewhat rhomboidal; very thin, compressed; posterior side rather wider than anterior; and posterior to the umbonial slope, which is undefined, there are concentric lamellæform lines; anterior margin obliquely rounded; dorsal margin parallel with the base. Length  $1\frac{1}{2}$ . Rare.

- P. LINTEA.** Pl. 12, fig. 25.—Oblong, compressed, with rather fine, very regular concentric lines closely arranged; anterior margin acutely rounded, the extremity in a line above the middle of the valve; posterior side shortest; hinge line rectilinear, oblique; posterior side with acute lines larger and more prominent than those of the middle and anterior side; umbonial slope subangular. Length 1½. Rare.
- P. MISSISSIPPIENSIS.** Pl. 12, fig. 26.—Oblong-ovate, inequilateral, compressed; disk flattened and with slight concentric lines; posterior side with lamellæform lines; dorsal margin oblique; posterior end sub-truncated; umbonial slope undefined; anterior hinge margin slightly more oblique than the posterior; end acutely rounded.

### CRASSATELLA.

- C. MISSISSIPPIENSIS.** Pl. 13, figs. 7, 10.—Ovate-trigonal, inequilateral, thick and ponderous; surface coarsely striated; summits flattened, sulcated; umbo plano-convex, with numerous sulci, obsolete behind the umbonial slope, which is angulated and subcarinated above; posterior extremity truncated, direct; basal margin slightly contracted anterior to the umbonial slope; inner margin crenulated. Length 3. Common.

This species is variable in outline, and allied to *C. tumida* of the Paris basin.

### CARDIUM.

- C. EVERSUM.** Pl. 12, fig. 18.—Ovate, elevated, subequilateral, ventricose, thin, with numerous approximate, slender, rounded ribs, distinctly crenulated anteriorly towards the margins; umbonial slope subangulated; posterior extremity subtruncated, direct; summit very prominent; ribs crenulated on the sides in the middle of the valves, or finely aculeated. Height 1 2-10. Length not quite as much. Rare.
- C. GLEBOSUM.**—Ovate, ventricose, with numerous flat ribs, slightly carinated on the margins and numerous approximate, prominent arched scales. Height 1½.
- Rare, and obtained only in fragments.
- C. DIVERSUM.** Pl. 13, fig. 8.—Trigonal, ventricose, subequilateral, thin, with concentric lines and more approximate fine but obtuse radiating lines; umbonial slope rounded, and the posterior space from the umbonial slope with profound radiating striæ; posterior side slightly waved or contracted; summits very prominent; basal margin rounded in the middle, contracted posteriorly; posterior extremity subtruncated; inner margin densely crenate. Height 1 2-10. Length 1 3-10. Abundant.

Allied to *C. Nicolleti*, nob. When viewed through a magnifier, the interstices of the concentric lines have a singular imbricated appearance.

- C. VICKSBURGENSE.** Pl. 12, fig. 16.—Cordate, ventricose, with about twenty-four ribs; angular and profound; towards the anterior margin obsolete; summit prominent; nearest the anterior end; anterior margin nearly straight and direct; posterior end subtruncated. Height 3-10. Length 4-10 nearly. Rare.

### TELLINA.

- T. PECTOROSA.** Pl. 12, fig. 27.—Subtriangular, elevated, smooth and polished, ventricose, beaks medial; anterior end obtuse, rounded; posterior side somewhat cuneiform, with a slight wave or fold; basal margin profoundly rounded. Length 6-10. Height 5-10.

- T. SERICA. Pl. 12, fig. 28.—Elliptical, inequivalved; beaks nearest the posterior end; concentric lines very minute and closely arranged; anterior side slightly bent or reflected. Length 7-10.
- T. VICKSBURGENSIS. Pl. 12, fig. 32.—Triangular, small, with regular minute concentric lines; anterior end rounded; posterior submargin angular or obscurely carinated, the end obliquely truncated; posterior side shortest, and slightly bent or waved; lateral teeth in the right valve only. Length 3-10. Height  $\frac{1}{4}$ .
- T. PEROVATA. Pl. 12, fig. 29.—Ovate, very thin, very inequilateral, compressed, smooth; posterior side subcuneiform, extremity acutely rounded; lunule very narrow, elongated, lanceolate.

## DONAX.

- D. FUNERATA. Pl. 13, fig. 9.—Triangular, small, convex, with obsolete radiating lines; anterior side short, end truncated, direct; margin within finely crenulated; lateral teeth none. Length 3-10.

Very rare. I found it about eight miles North East of Vicksburg.

## CYTHEREA.

- C. ASTARTIFORMIS. Pl. 13, fig. 13.—Trigonal, elevated, ventricose, subequilateral, with numerous regular concentric grooves and obtuse ridges; lunule not defined; summits prominent; umbo flattened. Length 6-10. Height  $\frac{1}{2}$ .

This shell has a remarkable resemblance on the exterior to some species of *Astarte*. Rare.

- C. IMITABILIS. Pl. 13, fig. 14.—Cordate, inequilateral, plano-convex, with numerous concentric prominent acute ribs; extremities rounded; basal margin regularly curved; lunule ovate, defined by an impressed line. Length 1 7-10. Height 1 3-10. Common.
- C. MISSISSIPPIENSIS. Pl. 13, fig. 16.—Subtriangular, ventricose, elevated, with prominent concentric acute ribs, rather distant, and with irregular intervals and fine intermediate lines; posterior margin somewhat curved; basal margin profoundly rounded; summits prominent; inner margin entire. Length 1  $\frac{1}{2}$ . Height the same nearly. Rare.
- C. SOBRINA. Pl. 13, fig. 17.—Subovate, ventricose, polished; with rather obtuse irregular, distant, concentric, impressed lines; umbo entire; extremities rounded; base regularly curved. Length 1 1-10. Height 9-10.

Very abundant. Almost always with disunited valves. It is quite thick on the anterior side towards the summit.

- C. PERBREVIS. Pl. 13, fig. 18.—Ovate-triangular, elevated, ventricose; the posterior and anterior margins equally declining and very oblique, the anterior one straight, the posterior slightly curved; beaks medial; surface with numerous regular impressed lines; basal margin rounded. Length and height 6-10.

It is of the size, and has somewhat the form of *V. astartiformis*, but the greater elevation, convex umbo, numerous impressed lines, and more rounded base, distinguish it from that species. Rare.



## CORBIS.

C. STAMINEA. Pl. 13, fig. 20.—Suboval, convex, thin, with lamellæform concentric striæ, about thirty-seven in number; posterior side with a slight fold; beaks medial. Length 1. Rare.

## LUCINA.

L. MISSISSIPPIENSIS. Pl. 12, fig. 22.—Orbicular, thin and fragile, with minute obsolete radiating lines; anterior side shortest, the margin obliquely truncated, angular above and elevated; inferior margins rounded; posterior end obtusely rounded; lunule profound; cardinal and lateral teeth wanting. Length 9-10. Height  $\frac{3}{4}$ .

This species very much resembles *L. subvexa* of Claiborne, but wants the impressed line on the posterior side. Rare.

L. PERLEVIS. Orbicular, with lamellæform concentric lines, and very minute obsolete radiating lines, closely arranged; beaks medial; posterior end direct; cardinal teeth small. Length 4-10. Height rather less. Very rare.

## LORIPES.

L.<sup>?</sup> TURGIDA. Pl. 12, fig. 23.—Suborbicular, very thin and fragile, with minute concentric lines; beaks medial; umbo and summit prominent; margins regularly rounded. Height 6-10. Length rather more than 5-10.

L. EBURNEA. Pl. 12, fig. 24.—Suborbicular, slightly oblique, convex, with minute closely arranged concentric lines, and a few larger impressed lines; posterior margin truncated, direct; anterior end and anterior basal margins regularly rounded; posterior basal margin obliquely truncated; beaks nearest the posterior end. Length 6-10. Height 6-10 nearly.

## CORBULA.

C. INTASTRIATA. Pl. 12, fig. 31.—Subtriangular, inflated, rostrated posteriorly; within with fine radiating lines. Length  $\frac{1}{2}$ . Very rare.

C. ALTA. Pl. 12, figs. 33, 34, 35.—Subtriangular, profoundly elevated, slightly oblique; larger valve ventricose; summit very prominent; umbo broad; hinge plate thick, with large teeth; smaller valve somewhat flattened, angular over the umbonial slope. Length 6-10 nearly. Height 6-10.

Occurs abundantly about eight miles North East of Vicksburg, and always water-worn.

C. ENGNATA. Pl. 12, fig. 30.—Triangular, inequilateral, small; valves nearly or quite equally convex, and with angular concentric ridges; posterior slope concave; umbonial slope carinated. Length 3-10.

## CHAMA.

C. MISSISSIPPIENSIS. Pl. 13, figs. 21, 27.—Suboval, irregular, adhering; larger valve ventricose, with numerous irregular radiating lines, squamose inferiorly; upper valve with numerous concentric lines, with numerous small scales. Length  $\frac{3}{4}$ . Height 6-10.

Rare, and occurs on Dr. Smith's plantation, six miles North East of Vicksburg.

## PECTUNCULUS.

P. ARCTATUS. Pl. 13, fig. 24.—Short-ovate, convex-depressed, with little prominent flattened radii, divided by a longitudinal impressed line towards the base; anterior margin truncated; posterior margin nearly rectilinear. Length  $\frac{3}{4}$ . Height 6-10.

Rare, and occurs on the bank of Yazoo river, about fourteen miles from Vicksburg.

P. MISSISSIPPIENSIS. Pl. 13, fig. 25.—Orbicular, ventricose; length and height equal; disk with slightly prominent fine radii, minutely crenulated; series of teeth uninterrupted; inner margin finely crenulated.

## NUCULA.

N. SERICA. Pl. 13, fig. 29.—Subelliptical, with minute regular concentric closely arranged lines; anterior end acutely angular; posterior end acutely rounded; posterior side shortest. Length  $\frac{1}{2}$ . Common.

N. VICKSBURGENSIS. Pl. 13, fig. 26.—Obliquely subtriangular, convex, with minute obsolete radiating lines about the base; lunule elliptical, very large and impressed. Length  $\frac{1}{3}$ . Rare.

## KELLIA.

K. OBLONGA. Pl. 13, fig. 28.—Oblong, convex, very thin, smooth, inequilateral; anterior side longest; anterior extremity regularly rounded; posterior extremity truncated; base rounded. Length 3-10. Rare.

## ARCA.

A. MISSISSIPPIENSIS. Pl. 13, figs. 11, 15.—A species of Arca occurs in great abundance at Vicksburg, which Lesueur obtained many years since and named it, but I have forgotten the name, and know not whether he published it in Europe or not. It is rhomboidal, ventricose, with rather distant ribs in the right valve, slightly grooved in the middle; in the left valve ribs double and granulated; inner margin profoundly toothed. Length 8-10.

## BYSSOARCA.

B. LIMA. Pl. 13, fig. 23.—Trapezoidal, cancellated and granulated; radii largest on anterior and posterior slopes, but becoming obsolete towards the posterior extremity; end angular, margin above obliquely truncated; anterior end widely truncated, nearly direct; basal margin undulated, irregular and very variable in outline; hinge line crenulated under the beaks, profoundly toothed towards the extremities; cardinal area with lines strongly defined and angulated under the apex. Length 2 9-10. Rare.

B. MISSISSIPPIENSIS. Pl. 13, fig. 32.—Trapezoidal, with numerous closely-arranged radiating lines, crenulated by fine concentric lines, the crenulation most distinct anteriorly, where the radii are largest; anterior end truncated or a little convex, direct; posterior margin obliquely truncated above; basal margin widely and profoundly arched; hinge line long, linear, minutely crenulated, expanded towards the extremities, and with prominent teeth; cardinal area with fine very closely-arranged lines, angulated under the apex. Length 1 6-10.

Differs from the preceding in having a longer hinge, finer radii, &c., and is a much smaller species and more abundant.

B. PROTRACTA. Pl. 13, fig. 36.—Trapezoidal, elongated, with numerous radiating lines, some of which are double, and others alternated in size and finely crenulated; dorsal margin parallel with the base; anterior margin truncated; posterior a little concave, oblique, end very acutely rounded or subangular; basal margin slightly contracted; hinge line long, rectilinear, very regular and gradually increasing in width towards the extremities from the apex; cardinal area wide, depressed, concave, with a few fine impressed angular lines. Length  $1\frac{1}{2}$ . Height  $\frac{1}{2}$  nearly.

A pretty species, of which I found one valve only.

#### AVICULA.

A. ARGENTEA. Pl. 12, fig. 10.—Ovate-subquadrangular, thin and fragile, ventricose above, smooth and entire? anterior wing sharply angular; posterior wing not produced, rectangular at the extremity; posterior end angular, extending beyond the hinge line and much above the line of the base; anterior margin and base form a regular rounded outline. Height  $1\frac{1}{2}$ . Length 1 4-10. Not common.

#### MODIOLA.

M. MISSISSIPPIENSIS. Pl. 12, fig. 19.—Slightly arched, elongated, ventricose, with rather fine closely arranged radiating lines wanting on the anterior side; region of umbonial slope inflated; posterior end acutely rounded; beak angulated posteriorly; substance of shell silvery and perlaceous. 2-10ths from beak to base. Rare, except in one spot, where I obtained several specimens and fragments.

#### PINNA.

P. ARGENTEA. Pl. 13, fig. 31.—Triangular, with straight margins and acute summit; compressed; substance highly polished and silvery; valves with longitudinal radii on more than half the disc, about thirteen in number; anterior side with rugose, obtuse, oblique, finer and more approximate lines. Length  $2\frac{1}{4}$ . Rare.

#### LIMA.

L. STAMINEA. Pl. 13, fig. 30.—Subovate, oblique, inflated, with fine radiating lines; ears very small, scarcely defined; posterior margin rectilinear. Height 4-10.

Very similar in outline to the Miocene species, *L. papyria*, but it is much smaller, and has more numerous lines anteriorly. Rare.

#### PECTEN.

A valve of a small species was obtained. It is orbicular and entire, and resembles *P. calvatus*, (Morton.)

#### OSTREA.

O. VICKSBURGENSIS. Pl. 13, figs. 5, 37.—Plicated; very irregular and adhering; the upper valve not flat, but swelling in an irregular manner. Height  $1\frac{3}{4}$ .

There is nothing peculiar about this shell, yet it is clearly distinct from any other species of the American Tertiary hitherto described. Common.



## PHOLAS.

*P. TRIQUETRA*. Pl. 13, fig. 3.—Subtriangular, depressed and angulated posterior to the middle, and with an impressed line from beak to base; surface with oblique lines anteriorly, and a few radiating towards the margin; posterior side reflected, and with oblique lines meeting the anterior ones at an angle; a few obsolete radiating lines, one more conspicuous than the others, near the margin. Length 6-10. Height  $\frac{1}{4}$ .

I found one valve only, which occurred on Dr. Smith's plantation.

## MADREPORA.

*M. MISSISSIPPIENSIS*. Pl. 13, fig. 22.—Rounded; cells numerous, very unequal in size, prominent, some of them very large, the sides with strong longitudinal lines, and the interstices with minute closely arranged longitudinal lines; rays about fourteen, minutely crenulated on the edge, alternated with a short plate; centre with irregular grains. Diameter 6-10.

*M. VICKSBURGENSIS*.—Irregular, ramose, somewhat flattened; cells unequal in size, with a slightly prominent margin; submargin depressed, striated; rays alternated with a short plate; centre granulated.

A larger species than the preceding, the branches being sometimes an inch in diameter. Abundant.

## TURBINOLIA.

*T. CAULIFERA*. Pl. 13, figs. 33, 34.—Somewhat turbate, rather long, with fine equal granulated longitudinal lines; base stem-like; rays ramose; larger end oval. Length 8-10. Rare.

## LUNULITES.

Two or three species of *Lunulites* occur in the Eocene of Vicksburg.

*L. VICKSBURGENSIS*.—Cap-shaped, or somewhat conical, with very small cells, generally equal in size, subangular, and between each series is a minute impressed radiating line; interior striæ ramose and very minutely crenulated. Height  $\frac{1}{4}$ .

All the foregoing species of organic remains are now included in the collection of the Academy.

## APPENDIX.

*Descriptions of New Eocene Fossils in the Cabinet of LARDNER VANUXEM.*

The following organic remains were obtained from Eocene rocks in St. Matthew's Parish, Orangeburg District, South Carolina, by Lardner Vanuxem.

## NUCULA.

- N. MUCRONATA.* Pl. 14, fig. 2.—Elliptical, convex in the middle, with equal, laminated, not closely arranged lines, about seventeen in number; anterior side longest, the end acutely pointed; a submarginal furrow emarginates the base; posterior side slightly contracted, end obtusely rounded or subtruncated. Length 9-10. Height 6.
- N. CAROLINENSIS.* Pl. 14, fig. 3.—Somewhat elliptical, convex, with rather closely-arranged prominent concentric lines, wanting on the posterior side, which is rather shorter than the anterior and regularly rounded at the end; anterior submargin with a narrow groove, bounded by a subcarinated line; anterior side narrowed and rather obtuse at the end. Length  $\frac{1}{2}$ . Height  $\frac{1}{4}$ .
- N. SUBTRIGONA.* Pl. 14, fig. 4.—Subtriangular, ventricose, nearly equilateral, with numerous prominent concentric lines; anterior side pointed, flexuous; submargin angulated: anterior margin sinuous, end angular; ligament margin straight; basal margin profoundly rounded. Length  $\frac{2}{3}$ . Height  $\frac{1}{4}$  nearly.
- N. CALCARENENSIS.* Pl. 14, fig. 5.—Subovate, ventricose, with minutely closely-arranged concentric lines; anterior side longest, pointed, slightly recurved, without a submarginal groove or fold; base profoundly rounded. Length 7-16. Height  $\frac{1}{4}$ .

## CARDITA.

- C. VIGINTINARIA.* Pl. 14, fig. 12.—Suborbicular, inequilateral, ventricose, with about thirty square radii, about as wide as the interstices; umbonial slope rounded; anterior margin subtruncated. Length 7-8. Height 7-8.
- C. CAROLINENSIS.*—Suborbicular? profoundly ventricose, with about thirty very prominent square radii, on the anterior side sharp, recurved and crenulated; lunule very broad and cordate, deeply impressed; hinge thick; pit anterior to the cardinal tooth small and profound.

This is a fragment of the right valve, about five-eighths of an inch long.

- C. BILINEATA.* Pl. 14, fig. 9.—Subrhomboidal, very inequilateral, with about twenty-four wide, flattened radii, with very narrow interstices, a carina in the middle of each rib, with an impressed line on each side of it; ribs crenulated anteriorly; carina somewhat tuberculated on the posterior side of the shell. Length  $\frac{3}{4}$ . Height 9-16.
- C. SUBQUADRATA.* Pl. 14, fig. 10.—Trapezoidal, compressed; valves flattened in the middle; radii about twenty-five, broad on the disk, with very narrow interstices, and each rib with a crenulated carina in the middle; posterior to umbonial slope the ribs are smooth, not carinated; anterior side short, rounded at the end; posterior margin obliquely truncated. Length 6-10. Height 7-20.

C. SUBROTUNDA. Pl. 14, fig. 11.—Orbicular, inequilateral, ventricose, with about twenty-eight rounded prominent narrow radii; ligament margin very oblique, short; ends obtusely rounded; inner margin slightly crenulated. Length  $\frac{1}{2}$ . Height  $\frac{1}{2}$ .

### TURBO.

T. BILIRATUS.—Turbinate; volutions four, flattened above; body whorl with two distant revolving carinated lines, and intermediate fine revolving lines; volutions of the spire with a carinated line below the middle. Length  $\frac{2}{3}$ . Width  $\frac{2}{3}$ .

### CERITHIUM.

C. BICOSTELLATUM.—Turreted; volutions eight or nine, angular and carinated below the middle; body whorl bicarinated. Length  $\frac{5}{8}$ .

C. SILICEUM. Pl. 14, fig. 1.—Turreted; whorls rounded below, contracted or concave above, and with revolving lines; suture profound. A fragment. Width  $\frac{2}{3}$ .

### INFUNDIBULUM.

I. CARINATUM. Pl. 14, fig. 6.—Depressed, with a suddenly elevated acutely conical spire, and a carinated line revolving at the suture. Length of fragment  $\frac{5}{8}$ .

### TELLINA.

T. SUBEQUALIS. Pl. 14, fig. 8.—Somewhat elliptical, nearly equilateral; posterior end acutely rounded; anterior slightly bent, end rounded. (A cast.) Length  $1\frac{1}{4}$ . Width  $\frac{5}{8}$ .

### MADREPORA.

M. PUNCTULATA. Cylindrical, ramose, with prominent cells; whole surface ornamented with fine, equal, punctate, impressed lines. Diameter  $\frac{1}{2}$ .

*Locality.* St. Matthew's Parish, Orangeburg, South Carolina. Vanuxem.

A species highly ornamented by the punctate vermicular lines. It occurs much larger than the specimen described.

All the preceding fossils are from the Eocene rocks of St. Matthew's Parish, Orangeburg District, South Carolina. Not one species of this locality is known in the lower Eocene of Claiborne or elsewhere, nor in the upper Eocene of Vicksburg, and therefore the relative age of the deposit is uncertain, but it unquestionably belongs to the Eocene period. Near this rock Mr. Vanuxem found quite a different class of shells, consisting of casts in indurated clay. The relative position is undetermined. Two of the shells are described and named *Tellina subequalis* and *Lutraria petrosa*.

In Vanuxem's collection there is a cast, from the Eocene near Long Branch, New Jersey, resembling *Nautilus zig-zag*, (Sow.) It is more compressed than that species, and the angles of the septa appear to be in contact near the periphery. It is more like a Goniatite than a Nautilus, and belongs to Montfort's genus



## PELAGUS.

P. VANUXEMI. Pl. 14, fig. 15.—Length  $2\frac{3}{4}$ . Diameter 1 5-16.

## PECTEN.

P. ELIXATUS. Pl. 14, figs. 13, 14.—Suborbicular; inferior valve ventricose, with fourteen wide, elevated, rounded ribs and concentrically wrinkled; superior valve flat; ears equal.

*Locality.* Near Santee Canal, South Carolina, in white friable limestone, (Upper Eocene.)

*Lower Eocene Species.*

## CARDITA.

C. DENSATA. Pl. 14, fig. 24.—Obliquely cordate, ventricose, thick, with about twenty-five flattened costæ obsolete towards the base, narrow, profound, elevated and crenulated on the umbo; umbo very prominent at the apex; anterior basal margin obliquely subtruncated; posterior extremity truncated, direct; cardinal area very thick and dilated, the teeth oblique. Height  $1\frac{1}{2}$  inch. Length the same.

*Locality.* Claiborne, Alabama.

This pretty species abounds in entire specimens in the argillaceous stratum near low water mark in the Claiborne Bluff. I found none in the upper beds. Compared with *C. planicosta*, it is much smaller, comparatively shorter, thicker, and may always be readily distinguished by the crenulated ribs on the umbo.

## CYTHEREA.

C. SUBIMPRESSA. Pl. 14, fig. 26.—Ovate, slightly ventricose, smooth and polished, with concentric slightly impressed lines on the anterior side; anterior side short, rather acutely rounded; posterior side produced, acutely rounded at the extremity; dorsal margin long, oblique, slightly curved; beaks prominent; lunule lanceolate, defined by a slightly impressed line. Length  $1\frac{1}{2}$  inch. Height 8-10 inch.

*Locality.* Marlbourne, Hanover county, Virginia. Mr. Ruffin.

This species may be distinguished from *C. æquorea*, by its greater comparative length, smaller size, and in wanting the strong furrows of that species. Mr. Ruffin obtained several entire specimens.

C. LENIS. Pl. 14, fig. 19.—Longitudinally ovate, thin, ventricose; anterior extremity acutely rounded; posterior end direct, subtruncated; disk with impressed concentric lines, distinct on the sides but obsolete in the middle of the valves; lunule long, cordate, defined by an impressed line; inner margin entire.

*Locality.* Occurs with the preceding.

*C. LICIATA*.—Pl. 14, fig. 20.—Suboval, thin and fragile, convex-depressed; surface with minute, closely arranged concentric lines; anterior margin rather acutely rounded; posterior margin obtusely rounded or subtruncated obliquely outwards, the extremity rounded; lunule lanceolate, defined by an obscure line; beaks prominent and profoundly curved towards the anterior margin. Length 1. Height 8-10.

*Locality*. Marlbourne, Hanover county, Virginia. Mr. Ruffin.

This species is related to *C. ovata*, Rogers, but is more compressed, less dilated posteriorly, the striæ more numerous and distinct on the middle of the valves, while the *ovata* has there only lines of growth.

*C. EVERSA*. Pl. 14, fig. 21.—Suborbicular or lentiform, ventricose; surface with fine, closely arranged concentric lines; anterior and posterior extremities rounded; basal margin profoundly rounded, and forming a regular curve from the extremities; umbo broad, with a prominent apex; lunule ovate-acute, marked by a well defined impressed line; cardinal teeth robust. Length  $1\frac{3}{4}$ . Height  $1\frac{1}{2}$ .

*Locality*. Marlbourne, Hanover county, Virginia.

This shell has much the exterior aspect of an ARTEMIS. Mr. Ruffin has one specimen with both valves. It occurs at Marlbourne, the residence of Edmund Ruffin, Esq., who is making important investigations in the Eocene deposits of that locality. He has kindly sent me beautiful specimens of *Cardita planicosta* and *Cardium Nicolleti*, together with the new species of CYTHEREA above described.

*C. PYGA*. Pl. 14, fig. 18.—Suboval, ventricose, thick, with closely arranged robust concentric lines; umbo wide, prominent above; dorsal margin very oblique, rounded; posterior extremity obtusely and obliquely rounded inwards; anterior extremity much narrower than the posterior, and more acutely rounded; lunule lanceolate, defined by a distinct impressed line; cardinal teeth robust. Length  $1\frac{3}{8}$ . Height  $1\frac{1}{4}$ .

*Locality*. Potomac river, Stafford county, Virginia. Mr. Bruff.

I am indebted to Mr. Bruff, of Washington, for an opportunity to describe this species. The specimen is a right valve, very perfect, and in outline has some resemblance to *C. liciata*, but is larger, thicker, more ventricose, with much wider umbones, &c.

#### NUCULA.

*N. IMPROCERA*. Pl. 14, fig. 23.—Elongated, very inequilateral, convex, polished, and having fine indistinct concentric lines; anterior side produced, bicarinated; the upper margin incurved towards the apex; extremity angulated.

*Locality*. Marlbourne, Hanover county, Virginia. Mr. Ruffin.

*N. CLAIBORNENSIS*.—Pl. 14, fig. 22.—Ovate-acute, compressed, polished, entire; ligament and anterior dorsal margins nearly rectilinear; anterior side longest; posterior end regularly rounded; anterior basal margin nearly straight.

*Locality*. Claiborne, Alabama.

*N. PARILIS.* Pl. 14, fig. 31.—Ovate, ventricose, with concentric lines; beaks medial; anterior end pointed, angular; posterior end regularly rounded; anterior submargin carinated, hinge margin very oblique, straight from the apex, except near the end, where it is somewhat angulated.

*Locality.* Upper Marlborough, Maryland.

#### LITHODOMUS.

*L. CLAIBORNENSIS.* Pl. 14, fig. 27.—Very thin and fragile, inflated; posterior hinge margin obliquely truncated, the extremity regularly rounded; lines of growth distinct.

*Locality.* Claiborne, Alabama.

#### CERITHIUM.

*C. SOLITARIUM.* Pl. 14, fig. 28.—For description see Vol. vii. p. 147.

*C. NASSULA.* Pl. 14, fig. 29.—For description see Vol. vii. p. 156.

*C. CLAIBORNENSIS.* Pl. 14, fig. 32.—Turreted, with longitudinal oblique crenate ribs and obscure revolving lines; body whorl without ribs, and having in place of them a few indistinct lines; near the suture is a series of prominent tubercles; angle towards the base bicarinate; base flattened, and having two fine revolving lines.

*Locality.* Claiborne, Alabama.

A fragment only was found, which the figure represents.

#### FUSUS.

*F. PACHYLEURUS.* Pl. 14, fig. 25.—For description see Vol. viii. p. 190.

#### MITRA.

*M. TEREBRÆFORMIS.* Pl. 14, fig. 30.—Subulate; whorl eight or nine, slightly convex, with obtuse longitudinal varices and sharp equal prominent revolving lines, four in number on each whorl of the spire; beak very short; labrum dentate within.

*Locality.* Claiborne, Alabama.



## REFERENCE TO PLATE XI.

- Fig. 1. *Dentalium mississippiensis*.  
 2. *Fissurella mississippiensis*.  
 3. *Infundibulum trochiformis* ?\*  
 4. *Solarium triliratum*.  
 5. *Bulla crassiplica*.  
 6. *Cypræa sphaeroides*.  
 7. ——— lintea.  
 8. *Narica mississippiensis*.  
 9. *Sigaretus mississippiensis*.  
 10. *Natica mississippiensis*.  
 11. ——— vicksburgensis.  
 12. *Turritella mississippiensis*.  
 13. *Terebra divisurum*.  
 14. *Scalaria trigintanaria*.  
 15. *Terebra tantula*.  
 16. *Pleurotoma porcellana*.  
 17. ——— mississippiensis.  
 18. ——— servata.  
 19. ——— congesta.  
 20. ——— cristata.  
 21. ——— tantula.  
 22. ——— tenella.  
 23. ——— cochlearis.

- Fig. 24. *Pleurotoma eboroides*.  
 25. ——— abundans.  
 26. ——— rotædens.  
 27. ——— decliva.  
 28. *Buccinum mississippiensis*.  
 29. *Typhis curvirostratus*.  
 30. *Murex mississippiensis*.  
 31. *Melongena crassicornuta*.  
 32. *Fusus spiniger*.  
 33. ——— vicksburgensis.  
 34. ——— mississippiensis.  
 35. *Chenopus liratus*.  
 36. *Ringicula mississippiensis*.  
 37. *Actæon andersoni*.  
 38. *Cancellaria mississippiensis*.  
 39. ——— funerata.  
 40. *Triton crassidens*.  
 41. ——— mississippiensis.  
 42. ——— abbreviatus.  
 43. *Cassidaria lintea*.  
 44. *Cassis cælatura*.  
 45. ——— mississippiensis.  
 46. *Phorus humilis*.

## REFERENCE TO PLATE XII.

- Fig. 1. *Mitra conquisita*.  
 2. ——— mississippiensis.  
 3. ——— cellulifera.  
 4. ——— staminea.  
 5. *Caricella demissa*.  
 6. *Oniscia harpula*.  
 7. *Turbinella protracta*.  
 8, 9. *Scobinella cæлата*.  
 10. *Avicula argentea*.  
 11. *Loripes eburnea*.  
 12. *Turbinella wilsoni*.  
 13. *Mactra funerata*.  
 14. ——— mississippiensis.  
 15, 17. *Psammobia papyria*.  
 16. *Cardium vicksburgense*.  
 18. ——— eversum.

- Fig. 19. *Modiola mississippiensis*.  
 20. *Amphidesma mississippiensis*.  
 21. ——— perovata.  
 22. *Lucina perlevis*.  
 23. *Loripes turgida*.  
 24. ——— eburnea.  
 25. *Tellina lintea*.  
 26. *Psammobia*.  
 27. *Tellina pectorosa*.  
 28. ——— serica.  
 29. ——— perovata.  
 30. *Corbula engonata*.  
 31. ——— intastriata.  
 32. *Tellina vicksburgensis*.  
 33, 34, 35. *Corbula alta*.

\* This shell was referred to in the remarks inadvertently placed under the head of *Fissurella*, p. 113.

## REFERENCE TO PLATE XIII.

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| <p>Fig. 1. <i>Fulgoraria mississippiensis</i>.<br/>         2. <i>Turbinella perexilis</i>.<br/>         3. <i>Pholas triquetra</i>.<br/>         4. <i>Cyprea lineata</i>.<br/>         5. <i>Ostrea vicksburgensis</i>.<br/>         6. <i>Oliva mississippiensis</i>.<br/>         7. <i>Crassatella</i>.<br/>         8. <i>Cardium diversum</i>.<br/>         9. <i>Donax funerata</i>.<br/>         10. <i>Crassatella mississippiensis</i>.<br/>         11. <i>Arca mississippiensis</i>.<br/>         12. <i>Panopæa</i>.<br/>         13. <i>Cytherea astartiformis</i>.<br/>         14. ———— <i>imitabilis</i>.<br/>         15. <i>Arca mississippiensis</i>.<br/>         16. <i>Cytherea mississippiensis</i>.<br/>         17. ———— <i>sobrina</i>.<br/>         18. ———— <i>perbrevis</i>.</p> | <p>Fig. 19. <i>Cytherea semipunctata</i>.<br/>         20. <i>Corbis staminea</i>.<br/>         21. <i>Chama mississippiensis</i>.<br/>         22. <i>Madrepora mississippiensis</i>.<br/>         23. <i>Byssoarca lima</i>.<br/>         24. <i>Pectunculus arctatus</i>.<br/>         25. ———— <i>mississippiensis</i>.<br/>         26. <i>Nucula vicksburgensis</i>.<br/>         27. <i>Chama mississippiensis</i>.<br/>         28. <i>Kellia oblonga</i>.<br/>         29. <i>Nucula serica</i>.<br/>         30. <i>Lima staminea</i>.<br/>         31. <i>Pinna argentea</i>.<br/>         32. <i>Byssoarca mississippiensis</i>.<br/>         33. 34, 35, <i>Turbinolia caulifera</i>.<br/>         36. <i>Byssoarca protracta</i>.<br/>         37. <i>Ostrea vicksburgensis</i>.<br/>         38. <i>Oliva mississippiensis</i>.</p> |
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## REFERENCE TO PLATE XIV.

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| <p>Fig. 1. <i>Cerithium siliceum</i>.<br/>         2. <i>Nucula mucronata</i>.<br/>         3. ———— <i>carolinensis</i>.<br/>         4. ———— <i>subtrigona</i>.<br/>         5. ———— <i>calcarensis</i>.<br/>         6. <i>Infundibulum carinatum</i>.<br/>         7. <i>Lithodomus carolinensis</i>.<br/>         8. <i>Tellina subequalis</i>.<br/>         9. <i>Cardita bilineata</i>.<br/>         10. ———— <i>subquadrata</i>.<br/>         11. ———— <i>subrotunda</i>.<br/>         12. ———— <i>vigintinaria</i>.<br/>         13. 14, <i>Pecten elixatus</i>.<br/>         15. <i>Pelagus vanuxemi</i>.<br/>         16. <i>Turritella cælatura</i>.<br/>         17. <i>Pelagus vanuxemi</i>.</p> | <p>Fig. 18. <i>Cytherea pyga</i>.<br/>         19. ———— <i>lenis</i>.<br/>         20. ———— <i>liciata</i>.<br/>         21. ———— <i>eversa</i>.<br/>         22. <i>Nucula claibornensis</i>.<br/>         23. ———— <i>improcera</i>.<br/>         24. <i>Cardita densata</i>.<br/>         25. <i>Fusus pachyleurus</i>.<br/>         26. <i>Cytherea subimpressa</i>.<br/>         27. <i>Lithodomus claibornensis</i>.<br/>         28. <i>Cerithium solitarium</i>.<br/>         29. ———— <i>nassula</i>.<br/>         30. <i>Mitra terebræformis</i>.<br/>         31. <i>Nucula parilis</i>.<br/>         32. <i>Cerithium claibornensis</i>.</p> |
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ART. X.—*Description of a new BUCEROS, and a notice of the BUCEROS ELATUS, (Temm.), both of which are in the collection of the Academy of Natural Sciences of Philadelphia.* By JOHN CASSIN.

BUCEROS, *Linn.*

Pl. 15.

B. ALBO-CRISTATUS, nobis.—Capite habente cristam, erectam, albamque; plumis totis subtiliter nigro terminatis; multis etiam ad basem nigris hoc colore sursum per scapum extendente. Rostro nigro; macula magna, flavido-alba, ab basi ad mandibulæ superioris medium extendente. Corpore toto, alis, caudaque nigris, nitore nonnullo virescente. Remigibus, primariis et secundariis, maculis apicalibus, parvis et albis primariorum nonnullis maculis parvis et albis pogonio externo. Cauda longissima, gradata; duabus rectricibus intermediis cæteris longioribus pollicibus nonnullis; totis margine apicali large albo terminatis.

Long. tot. (exuvix) ab rostri apice usque ad caudæ finem, 30 poll.; caudæ 17 poll.

*Hab.* In Africa occidentali.

Head with an erect crest, which is white, every feather minutely tipped with black; many feathers of the crest are also black at their bases, with that colour extending upwards along their shafts. Bill black, with a large yellowish white spot extending from the base to the middle of the upper mandible. Whole of the body, wings, and tail black, with a green lustre. Primary and secondary quills with small white spots at their tips; several of the primaries have also small white spots on their outer webs. Tail very long, graduated, the two middle feathers exceeding all the others by several inches; all the tail feathers largely tipped with white.

Total length (of skin) from tip of bill to end of tail, two feet six inches, of which the tail alone measures seventeen inches.

*Hab.* Western Africa.

The specimen above described, I received several years since from Robert MacDowell, M. D., surgeon, attached to the colonial government of Sierra Leone, an enthusiastic naturalist, who obtained it on the banks of St. Paul's river.

This species resembles no other which I have seen, or of which I can find a description, and may at once be recognized by its white erect crest and long tail.

From the same gentleman I have received several other specimens of this genus, also, from Western Africa, one of which is the *Buceros elatus*, Temm., of which a figure of the head and bill is given in Pl. Col., 521, and another, perhaps the female of the same species; as such, however, I do not feel warranted in describing it at present, the bills of the two specimens differing more materially than I have been accustomed to see in the same species.

Two crania of the *Buceros elatus* are in the collection of Dr. Morton, one of which is undoubtedly from Western Africa. As this species appears to be known only from the figure of the cranium and beak above alluded to, I take the liberty of giving a description of the specimen which I suppose to be a male.



B. ELATUS, Temm.—(Pl. Col., 521, accuratissima figura cranii et rostri) (♂ juv.?) Corpore et alis totis nigris, subtus pallidioribus, parvo aut nullo virore metallico. Occipite subcristato, plumis latis, laxis et nigris. Rectricibus duabus intermediis nigris; omnibus cæteris toto albis.

Long. tot. exuviæ, ab rostri apice usque ad caudæ finem 36 pollices.

*Hab.* In Africa occidentali.

Body and wings entirely black, paler beneath, with little or no metallic lustre. Occiput with a sub-crest of broad lax feathers, which are black. Two middle tail feathers black, all the others entirely white. Total length (of skin) from tip of bill to end of tail three feet.

*Hab.* Western Africa.

The supposed female is very similar in the general colouring of the body, wings and tail, with the whole head and neck rufous chestnut, which colour extends to the upper part of the breast.

ART. XI.—*Descriptions of three new species of the genus ICTERUS, (Briss.); specimens of which are in the Museum of the Academy of Natural Sciences of Philadelphia.*

By JOHN CASSIN.

ICTERUS, *Brisson.*

Pl. 16, fig. 1.

I. MACULI-ALATUS, nobis.—Capite toto, dorso, alis et cauda, nigris; hoc colore ad pectus, ut in cæteris hujus generis speciebus, extendente. Scapularibus, alarum tectricibus minoribus, et corpore toto subtus a pectore ad caudam, flavis; hoc colore in pectore et scapularibus intensiore. Alarum tectricibus majoribus maculis apicalibus, albis, subrotundis, fasciam in alam conspicuam facientibus. Remigibus primariis, pogonio externo, prope apicem, attenuatis, et ubi coarctantur, extus albo-marginatis.

Lon. tot. exuviæ, ab rostri apice usque ad finem caudæ 7½ poll., alæ 3 8-10, caudæ 3 4-10 poll.

*Hab.* Mexico; prope Vera Cruz.

Whole head, back, wings and tail black; this colour extending to the breast, as in other species of this genus. Shoulders, lesser wing coverts, and entire under parts of the body, from the breast to the tail, yellow, darkest on the breast and shoulders. Greater wing coverts with rounded white spots at their tips, forming a conspicuous bar on the wing. External webs of primaries attenuated near their tips, and at the point of attenuation edged (externally) with white.

Total length of skin from tip of bill to end of tail 7½ inches, wing 3 8-10, tail 3 4-10 inches.

*Hab.* Mexico, near Vera Cruz.

This species resembles no other which I have met with, and may readily be recognized by its conspicuous and peculiar white bar on the wing, formed by large white spots at the tips of the greater coverts. Upon examination it will be found that these spots are on the outer webs only.

I have seen one specimen only of this species, which belonged to the Rivoli collection.

Pl. 16, fig. 2.

I. AURICAPILLUS, nobis.—Capite supra nitide aureo flavo. Persona vittam frontis formante, oculos in totum complectente, ad pectus excurrente, nigra. Dorso, alis et cauda eodem colore. Scapularibus, uropygio, caudæ tectricibus superioribus, et corpore toto subtus (a pectore) flavis. Alis et corporis partibus cæteris prorsus sine albo.

Long. tot. exuviæ, ab rostri apice usque an finem caudæ 7 poll., alæ 3 6-10, caudæ 3½ poll.

*Hab.* Mexico et America meridionali.

Head above bright golden yellow. Mask forming a frontal band, fully including the eyes and extending to the breast, black, which is also the colour of the back, wings, and tail. Shoulders, rump, upper tail coverts, and entire under surface of the body, (from the breast,) yellow. No white on the wings or on any other part of the body. In a specimen which is probably that of a young bird, the black of the chin is mixed with yellow; no white whatever on any part of the plumage.

Total length from tip of bill to end of tail, about 7 inches, wing 3 6-10, tail 3½ inches.

*Hab.* Mexico and South America.

Resembles *Icterus cucullatus*, Swainson, more than any other species known to me, but *I. cucullatus* is very conspicuously marked with white on the wings, which is not the case in the species now described.

The *I. cucullatus* has black shoulders, its bill also is longer and more slender, and in other respects is entirely different.

After a careful examination, with the advantage of the Academy's large collection of *Icteri*, I am rather surprised that I can find no description which will apply to this species, although I have seen it occasionally in collections for the last ten years.

Of the four specimens now in the collection of the Academy, two from the Rivoli collection are labelled Mexico, one also from that collection is without label of any kind, and the fourth was received by me from Brazil. I have also seen specimens said to be from the island of Trinidad.

## Pl. 17.

I. GIRAUDI, nobis.—Adultus. Persona lata, vittam frontis formante, oculos in totum complectente, ad pectus excurrente, læte nigra. Alis et cauda nigris, sine maculis albis. Corpore toto supra, subtus a pectore, capite supra, et scapularibus nitide, citrino-flavis. Plumis totis sine albo. Juvenis, plumarum flavo saturate, tincto cum aurantio sordide aut cambogio. Alis virescenti-marginatis. Valde juvenis, plumarum flavo pallido, nigro in gulam inconspicuo.

Long. tot. exuviæ, ab rostri apice usque ad finem caudæ 8 poll., alæ 1 4-10, caudæ 4 poll.

*Hab.* Prope Bogota, in Nova Grenada.

Adult. Mask broad, forming a frontal band, fully including the eyes, and extending to the breast, fine black. Wings and tail black, with no white marks whatever. Head above, entire body above and below from the breast, and shoulders bright lemon yellow, no white on any part of the plumage.

Young. Yellow, the whole plumage tinged with dull orange or gamboge colour. Wings edged with greenish. Very young. Yellow parts of plumage paler, in some parts nearly white, black on the throat scarcely apparent.

Total length, skin of adult, from tip of bill to end of tail about 8 inches, wing 1 4-10, tail 4 inches.

*Hab.* Bogota in New Grenada.

Resembles *Icterus Xanthornus*, (Linn.) more than any other species with which I am acquainted or have found described, but is larger, and has the mask much broader.

In *I. Xanthornus*, the gular black scarcely exceeds the width of the under mandible, but in the species now described, it fully includes the eyes and the whole base of the bill. *I. Xanthornus* has also white markings on the wings, which is not the case in any state of plumage represented by the five specimens now described.

I have named this beautiful species in honour of Jacob P. Giraud, Jr., Esq., of the city of New York, author of "The Birds of Long Island," and other important contributions to American Ornithology.



ART. XII.—*Monograph of the Fossil Squalidæ of the United States.* By ROBERT W. GIBBES, M. D., of South Carolina. Correspondent of the Academy of Natural Sciences, &c.

“When CUVIER closed his researches in this department, he had named and described for the guidance of the geologist, ninety-two distinct species of fossil-fish; nor was it then known that the entire geological scale, from the *Upper Tertiary* to the *Grauwacke* inclusive, contained more. AGASSIZ commenced his labours, and in a period of time little exceeding fourteen years, he has raised the number of species to sixteen hundred. And this number, great as it is, is receiving accessions almost every day.”—*The Old Red Sandstone*, by Hugh Miller.

“Grandiaque effossis mirabitur ossa sepulchris.”—*Virgil*, 1. *Georgic*. 493.

My collection of fossils is rich in the teeth of *Squalidæ*, from the Tertiary beds of South Carolina. I say rich, in comparison with the meagreness of the public museums and private cabinets with which I am acquainted. With the aid of the admirable work of PROFESSOR AGASSIZ, “*Sur les poissons fossiles*,” I have been able to identify many of them; and finding several new forms, I have concluded to attempt their classification and description. Following the minute distinctions of that eminent observer, I had extended my list largely with new species, when a favourable opportunity occurred of submitting my specimens to his inspection.

With the candor of a conscientious lover of true science, and the kindness and liberality of a mind free from all selfish consideration, he informed me that many of his species had been described from single specimens and the observation of others—that farther knowledge has induced him to reject several species and to unite others—and that he had formerly considered as forming distinctions, characters not sufficiently fixed to constitute uniform differences. In the present effort for the advancement of American Palæontology, it becomes me at the threshold to acknowledge the essential aid of the labours of this eminent naturalist, to whom I am indebted for the ability to arrange this synopsis. With his acknowledgement, “*mais c’est aussi la partie la plus difficile de l’Ichthyologie, celle sur laquelle, de l’aveu même de tous les naturalistes, l’on possède le moins de renseignements précis, celle enfin qui, avec le temps, devra recevoir les additions les plus considérables*,”—I trust that others may be induced to extend what I have commenced. With the

exception of the figures published by DR. MORTON,\* and a few by DR. HARLAN,† no attention has been given by American naturalists to the fossil *Squalidæ*. In the publications on Tertiary Geology, by CONRAD, VANUXEM, LEA, ROGERS, HODGE, &c., they are merely noticed as occurring, but no attempt has been made to arrange or describe them.

In some of the early works on Fossils, we find notices of the teeth of *Squalidæ* under the names of *Bufo-nites* and *Glosso-petræ*,‡ and in SIR JOHN HILL'S "HISTORY OF FOSSILS," (London, 1748,) are some very good figures of species easily recognized in our collections. His general description being condensed, I take from it the following graphic and comprehensive though poetical paragraph :

"In shape they are usually somewhat approaching triangular, and some simple, others tricuspidate or having a smaller point on each side the large one ; some of them are very long, others shorter, and some very broad in proportion to their length ; others as remarkably slender, and narrow ; many also of them are quite straight, but they are not unfrequently met with crooked, and are bent in all the different directions, some inward, some outward, and some sideways, either to the right or left. Many of them have their edges plain, others are serrated more or less deeply, and some of them are undulated or shaped like the figure of a flaming sword at their extremities, and more slightly serrated besides ; they are of as various sizes as figures, the larger ones being found of between four and five inches long, and the smaller of less than a quarter of an inch. They are found of vast numbers in Germany, but no where so common as in the island of Malta."

Malta seems even in our time to be the prolific source of these fossils, as M. AGASSIZ mentions the frequency of specimens in various European collections marked from this locality.

In attempting to trace the history of fossil *Squalidæ*, I find little to refer to that M. AGASSIZ has not given, and I am forced again to acknowledge, as DR. MANTELL has emphatically done in his "MEDALS OF CREATION," as to fossil Fishes, that to his great work am I indebted for a large portion of my text.

Formerly the character of the skeleton, whether osseous or cartilaginous, and the number and position of the fins, were the bases of classification of Fishes, but the observation and experience of the distinguished naturalist I have named, have caused him to arrange them by the form and structure of the scales. His division into *orders* has been continued into *genera*, founded on his own and the microscopic researches

\* Synopsis of Organic Remains, &c. † Medical and Physical Researches.

‡ Scilla was the first who detected as the teeth of sharks the supposed *Glosso-petræ* (petrified tongues of serpents). Even at this day I have had them sent to me as petrified birds-tongues.



of PROFESSOR OWEN, of London, who has given to the world a splendid result of laborious and scientific study in his ODONTOGRAPHY.\*

The family of *Squalidæ*, which it is proposed here to illustrate, belongs to the first order of AGASSIZ, denominated PLACOIDS (from πλαξ, a broad plate). The skin is irregularly covered with enamelled plates, sometimes large, but often in the form of small points, forming shagreen in sharks, and tubercles in rays. Of these families no remains are found in a fossil state other than teeth and vertebræ; though an exception should be noticed in the discovery of the *mouth of an Hybodus*, lately reported by SIR PHILIP EGERTON, from the secondary of the Isle of Wight, in which the cartilaginous alæ were traceable, and a part of the anterior cranial cavity.†

The *Squalidæ* constitute a large portion of the fossil remains of Fishes, and are confined to the *secondary* and *tertiary* formations. An interesting observation of AGASSIZ'S is here worthy of notice.

“ De la comparaison des espèces fossiles avec les espèces vivantes, il résulte un fait bien curieux, conforme à ce que l'étude du développement génétique du règne animal nous apprend de tous les groupes bien étudiés, c'est que les types génériques qui prévalent dans la création actuelle, ou n'ont pas de représentans parmi les fossiles, ou bien sont limités aux terrains tertiaires et crétacés; tandis que les genres qui paraissent isolés dans notre époque, comme les genres *Mustelus* et *Cestracion*, sont représentés par de nombreux genres analogues dans toute la série des terrains secondaires.”‡

Notwithstanding the differences we observe in the many forms of teeth of sharks, they all possess one essential character of structure, namely, a base or osseous root, of variable form, fixed in the integument, and a crown or exposed portion projecting into the mouth, covered with a greater or less thickness of enamel, assuming many modifications by which the genera are characterized. These teeth only adhere to the integuments and the covering of the jaw, and possess great mobility. They are usually in rows, of which the anterior having been used fall out and are replaced by others; and new teeth are constantly forming within to succeed the outer as they are lost. The base of these teeth is large and wide, rounded and hollowed or grooved, but never conical nor terminated in acute points; the root is osseous, more or less compact or spongy, without any inner cavity. The crown is variable in form and size in different genera, and even in different parts of the same jaw. In some which are subulate and more or less triangular and compressed, those in the anterior portion of the jaw are straighter and sharper than those in the posterior parts, which are oblique and obtuse. There are marked differences sometimes in the teeth of the

\* Odontography: or a Treatise on the Comparative Anatomy of the Teeth; their physiological relations, mode of development, and microscopic structure; illustrated by upwards of one hundred and fifty plates. By Richard Owen, F. R. S., &c. London. 1845.

† Quarterly Journal of the Geological Society, London, vol. i, p. 198. ‡ Poissons Fossiles, vol. iii. p. 75.



upper and lower jaw, being straighter and more acute in one than in the other. When the front teeth are similar to those at the sides, they are usually smaller and more pointed, and at the symphysis in both jaws often there is a small tooth, or several of a peculiar form.

The teeth are also characterized by serratures varying in size, and by small lateral denticles, which are not always present in young teeth and do not form specific distinctions, though in adults assist in referring them to species.

Professor Agassiz has pointed out a distinction between *Carcharias* and *Carcharodon*, in the dentine of the former presenting a hollow cone, while in the latter it is solid, the only character they have in common being their microscopic structure. As the latter genus is one of the most prolific in species and prominent in size and form, I commence the series with it.

### Genus CARCHARODON, *Smith*.

#### SPECIES.

1. *C. MEGALODON*, *Agass.*  
*Var. RECTIDENS*, *Agass.*  
     " *SUBAURICULATUS*, *Agass.*
2. *C. ANGUSTIDENS*, *Agass.*  
*Var. LANCEOLATUS*, *Agass.*  
     " *HETERODON*, *Agass.*  
     " *MEGALOTIS*, *Agass.*  
     " *AURICULATUS*, *Agass.*  
     " *TURGIDUS*, *Agass.*  
     " *SEMISERRATUS*, *Agass.*  
     " *TOLIAPICUS*, *Agass.*
3. *C. ACUTIDENS*, *Gibbes.*
4. *C. MORTONI*, *Gibbes.*
5. *C. LANCIFORMIS*, *Gibbes.*
6. *C. SULCIDENS*, *Agass.*

The general form of the teeth of *Carcharodon* is that of an isosceles triangle, those in the upper jaw being usually a little larger than in the lower, and not as dissimilar as the upper and lower teeth of *Carcharias*. At the symphysis they are almost entirely straight; the next have their edges sloping, and the last are almost without the middle cone. In the lower jaw they are pointed and sloped similarly on both edges; but what distinguishes them particularly from those of the upper jaw, is a very perceptible furrow in the enamel at the base of the crown. The whole circumference of the cutting edges is covered with fine notches, (dentelures) very

distinct and uniform in the teeth of both jaws. In many fossil species there are lateral denticles on both edges at the base of the cone, which assist in distinguishing species, but are not uniform characters. In the geological distribution of the species of this genus, it is a remarkable fact that a large number are found fossil, while there is but a single representative in the recent *C. lamia*; and the reverse is the case with *Carcharias*, which includes numerous recent species, and has but few fossils. AGASSIZ mentions only one, and doubts of another. The genus *Carcharodon* is not found beyond the *Tertiary*, the oldest remains being found in the *calcaire grossiere* (Eocene.) In Europe he mentions the SWISS *molasse*, (Miocene,) as prolific in this genus, while in South Carolina I find the Eocene more largely productive of them. I have received a few from the former localities, while I have them abundantly from the Eocene. I learn from PROFESSOR AGASSIZ that Mr. Tuomey, who has collected *Squalidæ* in the Tertiary beds of Virginia, has found more specimens of *Carcharodon* in the *Miocene*.

1. *C. MEGALODON*. Figs. 1 to 9.—The general form is equilateral, the anterior and posterior edges differ somewhat in the upper and lateral teeth, in consequence of the slope and obliquity backwards. The marginal indentations are uniform over the whole contour of the edges. The enamel is thin but strong, and extends to the root on the outer surface, while there is a large triangular space between them on the inner. This space in large and old specimens is rough with longitudinal cracks or superficial fissures. The thickness is very considerable, in which it differs from the European co-species. The inner face is prominent and the outer flat, in some depressed next the edges and elevated in the middle, giving an undulated appearance. The root is very thick, forming one-third or more of the depth of the tooth; it is concave on the lower surface between the basal extremities, which are rounded or flattened and for the most part symmetrical. The osseous structure is dense and compact, and frequently cracked with fissures. The enamel is also usually striated with longitudinal cracks.

Fig. 1 is a lower tooth, and fig. 2 an upper lateral one; fig. 4 is of the variety *C. rectidens*, and figs. 5 and 6 of *C. subauriculatus*, both which Agassiz now refers to this genus; fig. 3 is probably a symphysial tooth; figs. 7 and 8 are young teeth, the last destitute of dentelures and probably from the extreme posterior portions of the jaw; fig. 9 resembles *C. sulcidens*, but intermediate specimens prove it to belong to *C. megalodon*. I have various specimens from the *Eocene* of South Carolina, and *Miocene* of Virginia and Maryland. The largest individual measures six and a half inches in height, and five inches across the extremities of the root.

Professor Owen in his *Odontography* (p. 30) says :

“Fossil teeth, precisely corresponding in form with those of the *Carcharodon*, occur abundantly in the tertiary formations of both the old and new continents; some of these teeth exhibit the extraordinary dimensions of six inches in length, and five inches across the base. If, therefore, the proportions of these extinct *Carcharodons* corresponded with those of the existing species, they must have equalled the great mammiferous whales in size; and, combining with the organization of the shark its bold and insatiable character, they must have constituted the most terrific and irresistible of the predaceous monsters of the ancient deep.”

“In the United Service Museum there are preserved the jaws of a *Carcharodon*, of which the upper one measures four feet and the lower one three feet eight inches, following the curvature. The length of the largest tooth is two inches, the breadth of its base one inch nine lines: the total length of the shark was thirty-seven feet.”

MR. CHARLESWORTH has given a good figure of *C. megalodon* in the *Magazine of Natural History*, (Vol. i. 1834,) and considers it from the *Miocene*, and AGASSIZ views it as proper to the *Medial Tertiary*. In the United States we must consider it as common to both.

There are several fine specimens in the Museum of the Medical College of the State of South Carolina, at Charleston, from the *Eocene*, and others in the Academy of Natural Sciences of Philadelphia, but their locality is not given.

Professor Hitchcock, in his “Geology of Massachusetts,” p. 431, has given a figure of a tooth from the *Eocene* of Gay’s Head, which is probably *C. megalodon*.

In my autograph collection of distinguished men, I have the originals of the following letters, indicating that in 1806 Dr. William Reid, of Charleston, had forwarded to Mr. Jefferson specimens of *C. megalodon*, from the Eocene beds of Cooper river. I am indebted to J. Harleston Reid, Esq., for the specimens and the letters:

“CHARLESTON, S. C., FEBRUARY 11th, 1806.

“*Sir*,—Observing you attentive to Natural Philosophy as well as to other branches of science, I take occasion to present you with a fossil, which you may consider a curiosity, and not unworthy of your contemplation. It was found on Ricehope Estate on Cooper river, in forming a canal twenty feet under the surface of the earth, and ten feet above the level of the river swamp. It lay with several others of similar form, in a stratum of earth resembling decayed sea shells, two hundred feet distant from the swamp. I likewise send you a broken one, lest your Excellency should choose to direct a chemical analysis on it. From my experiments, they prove dentous. The curious here have concluded these fossils to be the teeth of some monster unknown at this day.

“I remain with all due respect and the highest consideration, your Excellency’s very humble servant,

WILLIAM REID.”

THOMAS JEFFERSON, ESQ.



“Th: Jefferson presents his thanks to dr. Reid for the curious fossil teeth he has been so kind as to forward to him, and which have been safely received. he will immediately send them to the Philosophical Society at Philadelphia, which is the best disposition he can make of them for obtaining satisfactory enquiry into their character and origin. he prays dr. Read to accept his salutations and assurances of respect.

*Washington, Feb. 23, '06.*”

2. *C. ANGUSTIDENS*, *Agassiz*. Figs. 10 to 38. PROFESSOR AGASSIZ has decided to refer to this species several which he has described by other names, and among them *C. lanceolatus*, *C. heterodon*, *C. megalotis*, *C. auriculatus*, *C. turgidus*, *C. semi-serratus*, and *C. toliapicus*. At the time his descriptions were given he had seen but few specimens, and rather hastily decided upon characters which subsequent experience and the examination of many specimens induce him to refer to one species. My collection contains a very full series of individuals of many varieties of form of *C. angustidens*. Figures are given of them all. While *C. megalodon* is broad and flat, this species is more lanciform and narrower—the former is destitute of lateral winglets while this is characterized by them well developed on both sides—in some specimens distinctly separate from the principal cone, while in others placed on the same base, the enamel being continuous over both at the radicle. In nearly all the individuals the crown is perpendicular, occasionally tending slightly inwards but oftener outwards. The bodies are arched on the inner surface, flat outwardly, and are covered with a dense firm enamel, usually preserving a beautiful polish, the apex is more or less acute and the edges indented with well marked serratures, which in the winglets are so prominent as to make them appear often as if separated into several. In the larger specimens the root is thick and prominent on the inner face and somewhat concave on the outer, its branches are generally symmetrical. In old teeth there is an interspace void of enamel next the root on the inner face, while on the outer the enamel extends to the root.

Figs. 10, 11, 12, represent what Agassiz described as *C. angustidens*; figs. 13, 14, 15, 16, *C. turgidus*; figs. 17, 18, *C. toliapicus*; figs. 19, 20, 21, 22, 23, *C. lanceolatus*; figs. 24, 25, 26, 27, 28, 29, *C. megalotis*; figs. 30, 31, 32, *C. heterodon*; figs. 33, 34, 35, 36, are lateral teeth resembling *C. semi-serratus*; figs. 37 and 38, are probably lateral teeth of an old individual from their greater thickness, and of the variety *C. heterodon*.

Most of my specimens are from the *Eocene* of South Carolina. Fig. 12 is from the *White limestone* (*Eocene*) of Alabama, and fig. 13 from the same deposit in Wayne county, Mississippi. For these specimens I am indebted to C. S. Hale, Esq., of Mobile. The largest variety in my cabinet is from the *Eocene* Green sand of Santee,

South Carolina, the locality whence I procured the bones of *Basilosaurus*, *Dorudon*, *Pristis Agassizi*, *Crocodylus macrorynchus*, &c. Fig. 14 belongs to the Medical College of South Carolina, and is from the bank of Ashley river (Eocene.) Fig. 15 is from the marl of Ashley river, and was presented to me by Dr. William G. Ramsay, of Charleston.

3. *C. ACUTIDENS*, *Gibbes*. Figs. 39 to 44.—I published this new species in the Proceedings of the Academy of September last, from which I take the description :

This beautiful species resembles *C. angustidens*, Agassiz, but is very acutely pointed. Of four specimens which are in my cabinet, the largest cone (fig. 39) 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 depressions 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 my specimens are straight, (figs. 40, 43, 44,) but I have two which are oblique, figs. 39, 41. All are from a locality of (Eocene) Santee limestone in Orangeburg district, South Carolina, with the exception of fig. 41, which is from the marl of Cooper river, sent to me by Col. John Harleston, of Elwood.

There are several of this species in the cabinet of the Academy, labelled from New Jersey, and I have a cast of a fine one found in New Jersey, by Mr. C. Barclay, of Troy, New York.

4. *C. MORTONI*, *Gibbes*. I have only two specimens, both broken. That which is figured, (fig. 45) and of which a cast is in the collection of the Academy, was probably four inches deep and three inches across the root; 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 the bulk of the tooth; it is concave, but the extremities being broken, the form cannot be given; the structure of

the dentine is not as compact as in *C. megalodon*. I have named this fine species in honour of the distinguished pioneer of Tertiary Geology in the United States, Dr. Samuel George Morton.

This species appears to be rare. I have seen a single specimen in the cabinet of F. S. Holmes, Esq., of Charleston, and have met with none elsewhere.

5. *C. LANCIFORMIS*, *Gibbes*. Figs. 46, 47, 48, 49, 50, 51.—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 Copper rivers, South Carolina.

6. *C. SULCIDENS*, *Agassiz*. Figs. 52, 53.—These are remarkable for their pointed form and flatness and thinness. They have the form of an isosceles triangle, and are about one-third deeper than long in their bodies. The inner face is a little rounded, the outer is flat, appearing even concave. On the inner face near the base of the enamel there is a series of plaits or folds, which causes grooves or vertical furrows. The root forms a fourth, sometimes a third of the height of the tooth, it is regularly concave and is recognized always by its spongy appearance. The base of the enamel is nearly parallel to the base of the root, at least on the outer face.

I have two large specimens from the *Miocene* of Darlington, South Carolina, one of which is figured, fig. 52, and several from the *Eocene* of Orangeburg, South Carolina, of which fig. 53 is the largest.

Of Professor Agassiz's other species which he retains, I have not met with specimens from the United States of the following:

<i>C. PRODUCTUS.</i>	<i>C. LEPTODON</i>
<i>C. POLYGYRUS.</i>	<i>C. ESCHERI.</i>





ART. XIII.—*Descriptions of Plants collected by William Gambel, M. D., in the Rocky Mountains and Upper California.* By THOMAS NUTTALL.

\*GAMBELIA.†

Natural order, SCROPHULARINÆ. Tribe ANTIRRHINÆ.

Calyx 5-parted, nearly equal. Corolla hypogynous, the tube cylindrical, saccate at the base; orifice narrowly pervious, the border bilabiate, the palate rather prominent, smooth; upper lip erect, the lower spreading, all the segments nearly equal and oblong. Stamina four, arising from the base of the corolla tube, included, didynamous: no sterile filament: anthers bilocular, oblong. Ovarium bilocular, with many ovules, seated upon a glandular torus. Style simple, clavate, entire. Capsule subglobose, 2-celled, opening below the summit by two or three irregular apertures. Seed, [not seen.]—A spreading bush, with verticillate, entire, coriaceous leaves, and axillary and terminal conspicuous scarlet flowers. Allied to *Galvezia*, but with a prominent palate and a saccate spur at the base of the corolla.

G. SPECIOSA.

A bush about three to four feet in height, full of bright scarlet flowers. The older branches covered with a smooth grey bark, all of them cylindric. The younger branches leaves and flowers more or less hairy, with a soft pubescence. Leaves rather small, coriaceous, ternate, verticillate, and apparently evergreen, with a few obscure reticulated vessels, running over the under surface; their form oblong, rather obtuse, entire and attenuated at the base into a short peduncle: there are no stipules or bractes, though the leaves diminish to a very small size as the terminal inflorescence advances. Length of the leaves about one and a half inches, the breadth about half an inch. Peduncles axillary by threes shorter than the lower leaves. Calyx unequal, 5-parted, the segments linear-lanceolate. Corolla about an inch in length and tubular, with a conspicuous saccate spur at the base; the border, personate, the lower 3-lobed, lip with a somewhat prominent smooth palate; upper lip 2-lobed, somewhat erect, and deflected at the sides. Stamens didynamous, arising from the base of the tube, the pairs a little unequal, the filaments with a chaffy down at the base. Style a good way shorter than the corolla, gradually clavate above and perfectly entire, and a little curved at the summit: a glandular torus round the base of the germ. Capsule subglobose, hirsute, two-celled, opening below the summit by two or three irregular roundish foramina; the placenta attached chiefly to the centre of the dissepiment. The imperfect seeds appear to be narrow and angular, but the perfect seed I have not seen.

†In honor of Dr. William Gambel, a naturalist, who has explored Upper California, and particularly elucidated the ornithology of that country.

Though so different in habit yet closely allied to *Antirrhinum*; the tubular corolla, smooth palate, and entire stigma, being nearly all that distinguishes it from that genus; the seed may also prove different, but that is at present unknown. It is a plant highly worthy of cultivation, and flowers very early in the spring.

HAB. In the island of Santa Catalina on the coast of California. Flowering in the month of February.

\*CROSSOSOMA.†

Calyx 5-leaved, imbricated, somewhat coriaceous and persistent, the leaves unequal and concave, with colored margins. Corolla of five subsessile, oval petals. Stamina perigynous, about twenty-five, on a fleshy disk; anthers adnate. Ovaries two to five, united at base into a short stipe, 1-celled; ovules many, attached to the ventral suture in a single crowded series. Stigmas thick and sessile, recurved. Capsules two to five, coriaceous and cylindric, opening longitudinally and inwards, many-seeded. Seed roundish-reniform, nearly surrounded by a deeply fringed arillus. Embryo not seen.—A Californian shrub, with alternate, entire, crowded, exstipulate leaves, and 1-flowered, short, terminal branchlets; flowers white.

C. CALIFORNICA.

A tortuous shrub, about four feet high, with a hard whitish wood. The bark light grey and very bitter, while the wood and leaves possess very little taste. Leaves entire, cuneate-oblong, and small, somewhat coriaceous, smooth, apparently evergreen, obtuse, or acutely terminated with a small cartilaginous point; the nervures few and somewhat reticulated: one to one and a half inches long, by about half an inch broad. Flower branchlets, resembling peduncles, about two inches long, with two leaves towards the base. The flower, a white Piony in miniature, and about the size of an apple blossom. The calyx of five concave, somewhat coriaceous, persistent leaves, with white petaloid thin margins. Petals five, white, oval, with short claws, seated as well as the stamens, on the thickened disk of the calyx. Stamina about twenty-five, persistent nearly with the ripening capsules; filaments a little longer than the linear, adnate anther, anthers, 2-celled, opening lengthways. Carpels two, three, four, rarely five, coriaceous. Stigmas thick, sessile, and recurved. Capsules recurved, coriaceous, turgid, united at the base, free above, and divaricate, one-half to three-fourths of an inch in length. Seeds very numerous, pale testaceous, roundish-reniform, smooth and somewhat compressed, so nearly covered with a copious fringed arillus, as to appear almost packed in tow; the cavity of the testa being curved, indicates probably the form of the embryo.

After examining many of the seeds, I find the rigid coriaceous testa, in every instance empty, so that the nature and character of the germ remains unknown, and the real affinities of this curious plant are therefore uncertain. It is probably *Polygamous dioicus*, as the stamens appear destitute of pollen.

† From *κροσσοσ* *fringe*, and *σωμα* *a body*; in allusion to the fimbriate arillus.



From any affinity yet discoverable, this curious plant may well form a sub order *CROSSOSOMEÆ*, with the æstivation of the coralline calyx imbricate, its base occupied by a fleshy disk. Stamina indefinite. Ovaries three to five, verticillate, cohering at the base into a common stipe; ovules very numerous, pendulous. Capsular follicles tardily dehiscent, many-seeded; the hylum surrounded by a large fringed arillus.

HAB. Abundant on the borders of streams in the island of Catalina, off the coast of Upper California. Flowering in February.

### TRIFOLIUM.

T. §. \**PHYSANTHA*. (*Involucrarium*.) With the calyx 5-cleft, one or two of the divisions smaller. Corolla marcescent. The vexillum transformed into a physiform sac, which at length envelopes the very small wings and monopetalous carina. Stigma capitate. Legume stipitate, two to five-seeded, included in the calyx.

T. \**STENOPHYLLUM*. Annual, branching from the base; leaves ternate, smooth and linear, distantly serrulate; stipules subulate, sparingly denticulate; peduncles elongated, filiform. Heads small and nearly round, the vexillum, at length, forming a membranous inflated sac of equal breadth throughout, embracing the small wings and small carina, which is monopetalous, with but one broad claw attached to the vexillum.

With all the aspect of the involucrate clovers. Flowers brownish, the keel deeper coloured. Stamens diadelphous. Pod stipitate, flat, two-seeded, seeds obcordate. Stigma small, capitate. About four to six inches high: leaves about one or two lines wide.

HAB. The island of Santa Catalina, and San Pedro, Upper California. Flowering in February.

T. \**GAMBELII*. Perennial and decumbent, smooth, branching from the base; leaflets roundish-oval or cuneate-oval, obtuse, very minutely and sharply serrulate; stipules membranaceous, dilated, entire, with subulate, slender points; peduncles about the length of the leaves; involucre about 8-cleft, the segments lanceolate, acuminate; teeth of the calyx trifid, or simple, with setaceous points; legume stipitate, three to five seeded; wings longer than the vexillum.

A large, robust species, with shortish branches, very large stipules, and heads of large flowers, which appear to have been whitish, with purple tips to the carina; heads of flowers one to one and a half inches across; the vexillum very wide below; so as to conceal the other petals; the wings and carina are also united; leaflets three quarters of an inch long, and about the same breadth.

HAB. Island of Catalina, St. Simeon, and Pueblo de los Angeles.

T. \*CILIATUM. ☉. Smooth and erect, but little branched; lower leaves on very long petioles; leaflets cuneate-elliptic or oblong, obtuse, minutely and sharply serrulate; bractes adnate, subciliate, herbaceous, entire and acutely acuminate; capituli axillar and terminal, rounded, many-flowered, destitute of involucre, but subtended by a cicatrised circle of points; the flowers attached to a cylindric torus, often ending in a long subulate point beyond the capitulum; segments of the calyx unequal, one of the teeth small, the rest lanceolate, sharply acuminate and bristly ciliated with stiff hairs; vexillum enclosing the other petals, which are small; legume flat, stipitate, about one-seeded.

Stipules herbaceous; the leaves rather thick and strongly veined, with forked vessels; calyx nearly the length of the ochroleucous flower. This is again a *PHYSANTHA*, but without a proper involucre.

HAB. Pueblo de los Angeles, Upper California.

T. \*DENUDATUM. ☉. Smooth, stem erect, a little branched, lower leaves on very long petioles; leaflets obcordate or oboval, minutely and sharply serrulate; stipules membranaceous, entire and setaceously acuminate; capituli axillary and terminal, rounded, many-flowered, without an involucre, but with a cicatrised circle in its place, the flowers attached to a conic torus of the same structure; segments of the calyx subequal, linear-lanceolate, sharply acuminate, nearly the length of the small ochroleucous flower; pod stipitate, about two-seeded.

About a span high; a rather small annual, and very smooth in every part. Leaflets about three-quarters of an inch long, three to four lines wide. Flowers small, with the teeth of the calyx very long and conspicuous.

HAB. With the above, which it much resembles, but the vexillum is not unusually inflated.

T. \*DIVERSIFOLIUM. ☉. Small and smooth, branching from the base; leaflets linear or oblong, obtuse, perfectly entire, or repandy and rather sharply serrulate towards the apex; stipules nearly entire, with subulate points; peduncles longer than the leaves; heads very small, eight to ten-flowered; involucre six to eight-parted, the divisions entire, ovate, obtuse; calyx nearly half the length of the short flowers, the teeth simple and acute; legume two-seeded.

Remarkable for the diversity of its foliage, some of the leaflets being linear and quite entire, others with the same slightly serrulate; in other plants they are cuneate-oblong, and even emarginate. The plant about a span high, with reddish flowers and a deep purple tipped carina.

HAB. Near St. Simeon, Upper California.

#### ASTRAGALUS.

A. §. MICROLOBIUM. Annual or perennial? Flowers various. Legume small, scarcely exerted beyond the calyx, one-seeded.

A. \*CATALINENSIS. ☉. Nearly erect and much branched; stipules ovate, distinct, leaflets linear, deeply emarginate, five to seven pair, as well as the stem, scattered with appressed hairs; flowers ochroleucous, in capitate heads; segments of the calyx subulate, obtuse, thickly clad with rough white and black hairs, the segments all inclined to the lower side; legume scarcely exerted, scabrous.

A very distinct species, much branched from the base and rather decumbent. The leaves smooth, narrow, and deeply emarginate, petioles about an inch long. Peduncles often exceeding the leaves, terminating in short, oval, dense spikes or heads, of nearly sessile small flowers, scarcely exerted beyond the calyx, deeply divided, and thickly clothed, almost hidden under a mass of rough black and white hairs, the segments subulate, but appearing obtuse with a tuft of hairs, very soon dividing above nearly to the base; bractes minute; vexillum oval, with a broad embracing claw; wings small and obtuse as well as the keel. The legume scabrous, oval, obtuse, dark grey, with a deep introflected suture, the cells one-seeded, the seed obcordate. Style slender, stigma capitate.

HAB. On the island of Catalina, in Upper California. Flowering in February.

A. \*NIGRESCENS. Annual; nearly erect and much branched; stipules ovate, acuminate; leaflets cuneate-linear, deeply emarginate, nearly smooth; flowers ochroleucous, in short oval spikes, at length nodding; segments of the calyx subulate, acute, clothed with shortish black hair; legume ovate, acute, and villous, a little exerted; cells one-seeded.

HAB. With the above, which it greatly resembles, but different in the calyx and pod; flowers less crowded and pedicellate, the calyx not so deeply divided, nor clothed with such long rough hairs; bractes minute, chaffy, subulate: stipules partly united at the base.

### PHLOX.

P. \*BRYOIDES. Densely cæspitose, very small; leaves closely imbricated in four rows, the ciliar pubescence extending beyond the points of the oblong-lanceolate, very acute short leaves; flowers scarcely exerted; segments of the calyx obtuse; those of the corolla cuneate, entire.

Nearly allied to *P. muscoides*, but distinguishable by forming separate imbricated branchlets, and by the leaves being so short, as to be buried in the down of the margins of the leaves.

HAB. On the dividing ridge of the Rocky Mountains. (Nuttall.)

P. \*NANA. Dwarf and many-stemmed; viscidly pubescent; leaves rather long and linear, acute, the upper ones alternate; peduncles few, from the the terminal branches, and as well as the calyx pilose; flower exerted, with the tube twice the length of the calyx segments; border of the corolla longer than the tube, segments cuneate, emarginate.

Flower large and red. Stems many from the same perennial root, four to five inches high; the lower leaves one and a half inches long, from one to two lines wide, quite flat, and more or less clothed with a small glandular pubescence. Flowers few, and as large as any in the genus, segments of the calyx linear and acute; the tube of the corolla about twice its length. Corolla more than an inch across. Cells of the ovarium two-seeded.

HAB. Rocky Mountains, near Santa Fé.



## POLEMONIUM.

*P. \*VISCOSUM.* Dwarf; every part covered with a short, viscid pubescence; leaves nearly as long as the short flower stems, segments rounded, ovate or subcordate, very small and short; flowers in small terminal clusters; corolla much longer than the elongated lanceolate segments of the calyx; ovaries two or three in each cell.

Stems thickish and rigid, somewhat caespitose. About four or five inches high, the leaves on longish petioles. The leaves and calyx covered with a short viscid bitter pubescence, leaflets scarcely more than a line long, about the same breadth. Calyx large, with lanceolate rather acute segments.

HAB. On rocky ledges towards the sources of the Platte. Flowering in June. (Nuttall.)

## GILIA.

*G. \*MULTIFLORA.* Biennial, erect and much branched from the base; stems low and pubescent; leaves pinnatifid, mostly trifid, segments narrow linear and mucronulate, above simple; flowers disposed in sessile or pedicellate axillary clusters; tube of the corolla about twice the length of the curved calyx; the segments of the corolla oblong and mucronulate; stamens somewhat exerted.

A biennial, about a foot high, or rather less. The leaves apparently thick and slightly pubescent, the lower ones only trifid, the upper or greater number simple, the primary leaves probably pinnatifid. Flowers violet blue, inclining to rose red, the tube of the corolla about twice the length of the calyx, enlarging towards the orifice, segments of the border oblong, spreading, minutely mucronulate. Stamens exerted beyond the orifice of the tube, unequal in length, anthers round. Style long and slender, with a small trifid stigma. Flowers disposed in clusters of from five to ten up the greater part of the simple branches, some of the clusters sessile. Calyx obconic-campanulate, membranaceous between the teeth, which are long, subulate, and pungent. Capsule oval, not exerted, cells four to five-seeded. Seeds angular, pale brown. Allied apparently to *G. glomeriflora*, but that appears to be a low shrub with orange coloured flowers.

HAB. Sandy hills along the borders of the Rio del Norte, New Mexico. Flowering in August.

*G. LONGIFLORA.* (*Cantua longiflora*, Torrey.) Found abundant in sandy places along the banks of the Rio del Norte, growing beneath the shade of pine trees. Flowering in August and September. A very remarkable and showy plant with white flowers. Very few of the leaves are properly pinnatifid, being mostly trifid, a few with two pair of segments. Tube of the corolla often as much as two inches long. Leaves mostly trifid.

§. \*ALLOPHYLLUM. Annual. Leaves dissimilar and broad, obscurely three to five-parted, with distinct partial petioles. Stem diffusely branched, the flowers small, partly funnel-form, disposed in cymose racemes. Capsule oval, the cells two-seeded; the seeds roundish, not angular. Closely allied to *Collomia*, but with the cells of the capsule two-seeded.

G. \*DIVARICATA. Annual, diffusely branched and subdecumbent, viscidly puberulous; leaves alternate, digitately united at the base; leaflets three to five, lanceolate acute, attenuated into a petiole, two or four much smaller than the others; branches forked, ending in cymose racemes; calyx obconic, divided nearly to the base, enlarging with the ripening of the fruit; the segments lanceolate acute, viscid; corolla small and slender, the tube more than twice the length of the small calyx; segments of the border oblong; stamens somewhat exerted, anthers roundish, stigma small. Capsule oval, not extending beyond the short enlarging calyx; seeds roundish, teeth two in a cell, rather large.

HAB. Monterey, Upper California.

§. \*CHRYSANTHA. Annual, pubescent. Leaves sessile, opposite, palmately divided, with entire linear segments. Flowers fastigiate, somewhat corymbose on filiform peduncles, (yellow) segments of the calyx acute. Corolla funnel-form, with a short tube, the segments oval and entire. Anthers ovate. Stamens exerted beyond the throat of the corolla. Ovules in the capsule about twenty.

G. \*AUREA. Corolla smooth, about twice the length of the calyx; segments of the leaves short and hispid, three to six.

A handsome and showy annual, growing about a span high, with short, hispid, opposite sessile leaves, divided into five or six segments below, above about 3-cleft. Stem mostly simple and branching above, the flower branches purplish and a little viscid, terminating in compound trichotomous clusters; peduncles slender, often near an inch long. Flower apparently bright yellow, as large as that of many *Phloxes*, funnel-formed, with a tube not exerted beyond the calyx, its base purple. The calyx segments united two-thirds of the way, the teeth lanceolate and acute; stigmas exerted, long and filiform; seeds about twenty in each capsule, when moistened covered with a jelly as in *Collomia*.

HAB. Santa Barbara. Flowering in April.

§. \*ELAPHOCERA. Perennials or biennials, with the leaves often sparingly pinnatifid towards the extremity, or entire and linear, fleshy. Flowers in condensed clusters, capitate or in spikes, generally white. Corolla tubular, with a deeply 5-cleft, spreading border. Stamens shortly exerted or even with the summit of the tube. Stigmas very short. Ovaries two to four in a cell, rarely one.

G. CONGESTA. (Hooker.) Common in the Rocky Mountain region.

G. \*CREBRIFOLIA. Perennial and branching from the base; leaves entire, linear, acute and fleshy, smooth, crowded so as to conceal the stem; flowers in capitate clusters; stamens exerted to the length of the corolla segments.

HAB. Big Sandy Creek of the Colorado of the West. Flowering in July. (Nuttall.)

G. \*SPICATA. Perennial; leaves linear, fleshy; flowers in clusters, spiked; stem and calyx lanuginous, segments of the calyx linear acute and viscid; tube of the corolla exerted; stamens at the summit of the tube.

HAB. On the hills near Scott's Bluffs of the Platte. Flowers white, segments oblong. (Nuttall.)

G. \*TRIFIDA. Biennial; radical leaves linear; cauline trifid towards the extremity, fleshy and smooth; flowers clustered in spikes; stem and calyx pubescent, segments of the calyx linear and very acute; tube of the corolla exerted; stamens at the summit of the tube.

HAB. With the above, which it greatly resembles, except in the leaves; cells of the capsule each with three or four ovules. About a span high. (Nuttall.)

G. \*PUMILA. Perennial? branching from the base; flowers in terminal clusters, subtended by long leaves, woolly at their base; leaves fleshy, trifid at the extremities; segments narrow, linear, spinulose at points; corolla small, the tube exerted; stamens extending a little beyond the orifice of the tube.

Three or four inches high, with a few slender branches, the leaves nearly all at the summits of the branches beneath the flowers, an inch to one and a half inches long.

HAB. Near the first range of the Rocky Mountains of the Platte. Flowering in May. (Nuttall.)

G. (*Collomioides*) \*FILIFOLIA. ☉. Erect and rigid; stems smooth below, nearly simple; leaves mostly trifid; the segments setaceous and rigid; capituli corymbose and whitely woolly; tube of the corolla about the length of the calyx; segments of the border lanceolate; stamens shorter than the corolla.

Six to eight inches high, slender and rigid. Flowers small and blue, clusters or heads of flowers both axillar and terminal.

HAB. Near Santa Barbara, Upper California.

#### LEPTOSIPHON.

L. \*BICOLOR. Branching from the base; leaves three, five to seven-cleft, the lowest much shorter; lower segments oblong-linear, cuneate, the upper subulate, all more or less roughly ciliate; segments of the calyx subulate-lanceolate; tube of the corolla three times the length of the funnel-formed border, its segments oval and rounded; stamens about half the length of the border.

A very elegant species, bearing apparently very few flowers at a time. About four inches high, branching considerably from the base, somewhat scabrous, with a



whitely pubescent purple stem. Tube of the flower very long compared with the length of the border, whose segments are oval, of a fine rose red with a yellow throat, making a very bright appearance.

HAB. On moist rocks, on the Oregon near the outlet of the Wahlamet; the only place where we saw it. (Nuttall.)

### FENZLIA.

F. \*SPECIOSA. Copiously branching from the base, nearly glabrous; leaves linear, entire; flowers pedunculate, (concolor, nearly white?) border of the corolla as long as the elongated segments of the smooth calyx.

Closely allied to *G. dianthoides*, yet decidedly distinct. We have seen many specimens, and they are usually a span high, (in place of two or three inches,) much branched from the base, branches with opposite branchlets. Leaves narrow, linear, and as well as the upper parts of the stems a little pubescent. Flowers inclined to form a trichotomous loose panicle. Segments of the calyx narrow, linear, shorter in proportion than in *G. dianthoides*. Corolla widely funnel-formed, the segments broadly obovate, the border denticulate; the corolla yellowish-white, and with the throat of the same colour. Style and stigmas scarcely exerted beyond the throat of the corolla; the stigmas rather long and filiform. This section is so perfectly natural and distinct from all the other *Gilias*, that we cannot help regretting its abolition as a genus.

HAB. On the island of Catalina. Flowering in February;

F. \*CONCINNA. ☉. Very dwarf and somewhat pubescent, branching from the base; leaves linear, flowers nearly sessile; segments of the calyx longer than the cup.

A very elegant but minute plant, scarcely more than an inch or an inch and a half high, with a much shorter but nearly as broad a flower as that of *F. dianthiflora*, of a delicate rose purple with a yellow base, and five purple spots. The calyx is somewhat hirsute, ovules in each cell, about twelve in a double series, angular with a concave depression.

HAB. Near San Diego, Upper California. Flowering in May. (Nuttall.)

### LEPTODACTYLON.

L. \*CÆSPITOSUM. Diffusely cæspitose, herbaceous and smooth; leaves imbricated, the segments about three, flat, with sharp subulate points; the tube of the corolla exerted; segments cuneate, entire.

A very distinct species from *L. hookeri* and *L. pungens* of Torrey, which are suffruticose. In this the flower is white, something resembling a *Phlox*, but the base of the border is somewhat concave; ovules few. This species formed dense tufts of one or two feet in diameter, but only two or three inches high.

HAB. On the borders of the Platte, and hills near Scott's Bluffs. Flowering in May. (Nuttall.)

### EUTOCA.

E. \*ALBIFLORA. ☉. Glandularly pilose and viscid; stem erect and branching; leaves broad-ovate, shortly petiolate, subcordate, angularly biserrate; racemes curved, elongated, many-flowered, calyx segments spatulate-linear, obtuse; corolla not much longer than the calyx; capsule many-seeded.

In many respects this species resembles *E. viscida*, except that the flower is more than twice as large and of a deep blue; the serratures and side of the leaves are also different. The pubescence is terminated with black glands, and the seeds are rugose, the capsule ovate, with a short style and stigma.

HAB. Santa Barbara, Upper California.

E. \*SPECIOSA. ☉. Stem erect and simple; leaves broad-ovate, subcordate, doubly serrate, almost lobed, beneath strongly nerved, and, as well as the stem and calyx, hispid and viscidly glandular; racemes at the summit of the stem, several, circinate, not elongated; flowers on short pedicels; segments of the calyx spatulate linear; capsule with more than fifty roundish, very rugose seeds.

Nearly allied to *E. grandiflora*, the flowers being equally large and showy, of a fine blue. Stem two to three feet high, very stout; the leaves large, almost lobed on the margin; style and stigmas very long, filaments hairy on the lower part. The viscid pubescence is black, and of a heavy resinous rather disagreeable smell, almost like that of Rue. It communicates an almost indelible stain to clothing.

HAB. Near St. Diego, Upper California. (Nuttall.)

### \*EUCRYPTA.†

Calyx five-parted, without external appendages; lobes oval or ovate. Corolla tubular campanulate, half five-cleft, deciduous, without internal appendages; the lobes rounded; the æstivation with three segments exterior and two interior. Stamens five, equal, arising from the base of the corolla, smooth, somewhat exerted; anthers small and oval, nectary none. Ovary depressed, globose, one-celled; placentas two, free, externally septiferous, each with four dissimilar ovules. Style elongated, very shortly bifid. Stigmas minute. Capsule two-valved, dividing parallel with the placenta, presenting four roundish, rugose seeds; concealed in the adnate parietes, as it were, of each of these valves are (when perfect) two other seeds, which are even and elliptic! separated from the other seeds by a perfect membranaceous partition, parallel with the deep concavity of the valves, and each of these partitions is again divided internally by a proper transverse septum; so that the capsule is in fact four-celled, with closed partitions, and the division of the adnate

† So called in allusion to the concealed cells of the capsule.

placentas presents the large circular cavity of the capsule, as if merely one-celled, with two hemispherical valves! Seed with a corneous, large albumen; embryo straight, minute, central, not half the length of the albumen. Annuals with bipinnatifid leaves, and the flowers in loose racemes.

E. \*PANICULATA. ☉. Flowers in a loose terminal panicle; stem viscid; uppermost leaves pinnatifid, segments of the calyx oval, obtuse.

About one to two feet high, somewhat hairy and viscid. The leaves bipinnatifid; the segments short, and toothed bluntly. Flowers small, yellowish-white, rather more than the length of the calyx, disposed in loose, naked, terminal racemes, with long peduncles. Calyx cup-shaped, increasing with the fruit; the segments oval and obtuse. Corolla pubescent, tubular-campanulate, shortly 5-cleft, before opening, with three of the segments external. Stamens equal, with slender filaments; anthers small and oval; style longer than the germ, with a very short bifid stigma. Capsule depressed, globose, apparently 1-celled, each of the placentas becoming adnate to the sides of the valves, with about four rugose seeds, two to four other even, elliptic seeds concealed behind the placental lamina, one or two behind each. The rugose epidermis of the seed swells up into a pulpy mass on being moistened.

HAB. Island of Santa Catalina, Upper California. Flowering in March and April.

E. \*FOLIOSA. Leaves all bipinnatifid, hirsute; racemes not longer than the leaves; segments of the calyx ovate, acute.

HAB. With the above, which it much resembles, but a lower, less viscid plant, with rather smaller flowers and capsules.

### COLLOMIA.

§. \*PICRACOLLA. Calyx obconic, scarcely cleft to the middle, with foliaceous segments. Flowers racemose, scattered. Intensely bitter to the taste.

C. \*LINOIDES. Leaves narrow-linear, scattered, ending in a short mucro; flowers small, scattered, subsessile, the calyx shorter than the tube of the corolla.

HAB. Banks of the Platte. (Nuttall.)

### PHACELIA.

P. \*CANESCENS. Canescent and hirsute; leaves spatulate, oblong or sublanceolate, entire; racemes condensed into circinate clusters; corolla twice the length of the calyx; stamens exerted, the filaments pilose.

A perennial dwarf species, about a span high, with many stems from the same root. Radical leaves whitely and densely pilose, with two sorts of pubescence, rather silky. Radical leaves two to three inches long, by three-fourths of an inch in width, on



longish petioles. Upper leaves nearly sessile; calyx very hirsute; corolla pale lilac rose; ovary with four seeds; stamens much exerted; it has a general resemblance to *P. circinata*. The *P. integrifolia* of Torrey, has four very rugose convex elliptic seeds.

HAB. In the Rocky Mountains, and Blue Mountains of Oregon. (Nuttall.)

P. \*GLANDULOSA. Annual or biennial, very pilose, with a soft, short, shining pubescence; the stems and calyx covered with blackish, viscid, resinous glands; leaves pinnatifid, the segments somewhat toothed, short and roundish; flowers shortly pedicellate in crowded circinate spikes; segments of the calyx oblong; stamens exerted; style pilose.

Four to six inches high, with a long tap root, as in biennials. Leaflets two to three lines long, toothed and rounded, somewhat oblique, resembling almost the frond of a small fern. Flowers blue and showy. Capsule four seeded; seeds elliptic concave; internally, where attached to the placenta, roughened all over with minute asperities.

HAB. About Ham's Fork of the Colorado of the West, on dry, bare hills. (Nuttall.)

#### NAVARRETIA.

N. \*MINIMA. ☉. Smooth, dwarf, depressed and branched from the base; leaves somewhat bipinnately divided, with few and divaricate, subulately sharp segments; floral leaves simply pinnately dissected; calyx with three of the segments usually entire; corolla longer than the tube of the calyx; ovary cells 2-seeded.

Seldom more than an inch high; segments of the leaves quite acicular; flowers small and white, the tube exerted a little beyond the calyx; the stamens slightly exerted.

HAB. Plains of the Oregon, near Walla-Walla. (Nuttall.)

#### ERIOGONUM.

E. \*ACAULE. Very dwarf, stemless and caespitose, the caudex much divided, leaves whitely tomentose, oblong-linear, reflected so as to be semi-cylindric; involucre wholly sessile, few flowered, 4 or 5-toothed, the teeth very obtuse.

A very remarkable dwarf species, forming dense tufts, independent of the subterraneous woody caudex, not an inch high, whitely tomentose. Leaves about a line wide and about three or four long. Flowers yellow and bright, externally somewhat pubescent, as well as the germs.

HAB. On the summit of the Rocky Mountains, near the Colorado of the West, at the highest land.

E. \*ANDINUM. Stemless, caespitose, the caudex much divided; leaves small and spatulate, wholly and whitely tomentose, reflected on the margin; scapes all radical, terminating in a single capitulum; involucre divided nearly to the base, the segments about eight, leafy; flowers yellow, small.

With a woody brown subterraneous stem, terminating with cæspitose tufts of white, softly tomentose leaves; scape two or three inches high, with a small umbel of bright yellow flowers, which are pubescent externally, and reflected from the multifid involucre, which is divided into eight small, leafy appendages. Germ smooth. Stigmas rather long. Considerably allied to *E. cæspitosum*, but with the leaves scarcely half the size, much narrower, the flowers yellow, not ochroleucous, and scarcely half the size of those of the *E. cæspitosum*.

HAB. With the above. † (Nuttall.)

*E. INTRICATUM.* (Benth.) Annual, very smooth, excepting the under surface of the leaves, which are tomentose; leaves all radical and small, roundish reniform, on long petioles; stems many, all from the base, naked and scapoid, terminating in a single involucre, or corymbosely terminated by two or three; involucres double, the outer or bractes short and 3-cleft, the inner 8-toothed and strongly ribbed, bearing tufts of abortive filaments; perigonium smooth, (purple.)

*E. denudatum.* . Nutt. Proceed. Acad. Nat. Sci. Feb., 1848.

An annual about a span high, with numerous long, slender, almost filiform, naked stalks, like so many radical scapes, but bearing here and there a minute leaf or leaves. The leaves (in the only specimen I have obtained,) are very small, scarcely exceeding those of garden thyme, and roundish-reniform; very smooth above, of a thick consistence, and with a circumscribed tuft of white tomentum beneath. Some of the stems are proliferous, sending up secondary stalks, subtended also by a few small leaves; involucre smooth, with eight broad ribs, and as many terminal teeth; a 3-cleft short involucellum, of the same consistence with the involucre. Perigonium, purple, smooth; stamens nine; anthers purple; germ smooth. A great number of slender, infertile filaments arising from the inner base of the involucre.

HAB. In the Rocky Mountains of Upper California.

*E. \*RACEMOSUM.* Scape naked and whitely tomentose, as well as the elliptic ovate leaves, sparingly forked at the summit, with the solitary involucres sessile and forming a spike; involucre very woolly, obsoletely toothed, subtended by a 3-cleft sheathing involucel or bractes; perianth smooth, oblong, attenuated at the base, (flowers ochroleucous?)

Scape about eighteen inches high, leaves on longish petioles, very white beneath; racemes, five or six, produced from shortish forks of the scape towards its summit; flowers numerous, rather large, woolly filaments among the fertile ones in the involucre.

HAB. Colorado of the West.

*E. \*ELLIPTICUM.* Suffruticose; barren branchlets at the base of the scapoid stem; leaves elliptic or oblong-elliptic, beneath whitely tomentose, above nearly smooth; umbel compound, the forked divisions and general umbel involucre; the involucels leafy and spreading; involucre campanulate, lanuginous, 6-cleft, the segments rather longer than the tube, very many-flowered; perianth exerted, oblanceolate, attenuated to the pedicel, smooth, (or pubescent?)

† These two remarkable species were collected by myself, in 1834.

A low suffruticose plant, with infertile leafy branchlets at its base, with a woody caudex. Leaves about an inch long, attenuated into a longish petiole, with scape-like flower stems, terminating in twice compounded umbels, all of them subtended by leafy bractes; bractes also appear on the partial pedicles below the flowering summit. The involucre almost cup-shaped, and shallow, with its leafy divisions reflected; flowers bright yellow, and very large and showy; oblanceolate very much attenuated to the jointed peduncle; filaments pubescent at the base; achenium smooth, embryo concentric, inverted.

HAB. Rocky Mountains. (Nuttall.)

β. MEGACEPHALUM. Leaves oblong, subelliptic; perianth *pubescent*; umbel simple.

More dwarf than the preceding, with narrower, shorter stalked leaves, and very short, rayed, simple umbels. Perhaps a different species, but very nearly allied.

HAB. With the above.

E. \*GENICULATUM. Suffruticose, low and considerably branched; stems clustered; leaves linear, somewhat oblong, revolute on the margin, pubescent above, tomentose beneath; umbels simple, of few rays, the involucre of the umbel long and leafy; proper involucre campanulate, many-flowered, lanuginous; the border many-cleft, the divisions spreading and nearly as long as the cup; flowers yellow, numerous and small, obconic, externally pubescent towards the base.

A small shrub or suffrutex, about a span high; the branches clustered; with knots and decayed sphacelous remains on the lower part; leaves small and clustered; umbel of only two or three rays, short, many-flowered; about half the size of the preceding species; embryo concentric.

HAB. In the Rocky Mountains, on the western slope. (Nuttall.)

E. \*CERNUUM. ☉. Leaves all radical, round oval, upon longish petioles, very whitely tomentose beneath, less so above; scape smooth, two or three times dichotomous; involucre solitary, pedicellate, smooth; pedicels exserted, at length cernuus; involucre bractes 3-cleft, acute, appressed; teeth of the involucre acute; flowers few and small; segments of the perianth undulated.

A rather small species, eight to ten inches high; leaves about half an inch long and nearly the same width; pedicels about half an inch long, reflected after inflorescence; involucre minute, campanulate, about six to eight-flowered, the flowers brownish, smooth; the segments of the perianth with whitish, undulated margins; stamens three? caryops roundish at the base, with a minutely scabrous 3-sided attenuated summit. Probably dioicous.

HAB. On the plains of the Oregon and in the Rocky Mountains. (Nuttall.)

E. \*MICROTHECA. Suffruticose and dwarf; stems slender and clustered, at first arachnoid tomentose; leaves linear-oblong, nearly smooth above, whitely tomentose beneath, shortly petiolate, the petiole widened at the base; umbel two or three times di- or trichotomous, each division bracteate; the involucre small and distinct, pubescent, about 6-flowered; the teeth about six, ovate, obtuse; flowers yellow, very small.



A very low shrub, crowded with brown, short, twiggy branches; umbels very compound; the involucre all distinct, not crowded together; every joint of the umbel subtended by short appressed bractes.

HAB. On the sides of hills in Oregon, east of Walla-Walla. (Nuttall.)

E. \*CAMPANULATUM. Leaves all radical, clustered upon a thickish caudex, linear-spathulate or narrowly oblong, narrowed below into longish petioles, whitely tomentose on both surfaces; scapes smooth and naked; umbel about twice trichotomous, few-flowered; bractes acute, a little tomentose on the margins; involucre campanulate, about 6 to 10-flowered, smooth, with obtuse teeth; perianth yellow, smooth.

A small species, with long, narrow, whitely tomentose leaves, clustered at the top of a simple unbranched caudex, one and a half to two inches long, by about two to three lines in width, and obtuse; scapes six to eight inches, and as well as the branches of the umbel, quite smooth and brownish; rays usually three to four, some simple and others subdivided; involucre solitary; pedicellate mostly with bractes a little below them: flowers minute, dioicous? stamens nine.

HAB. On the western declivity of the Rocky Mountains. (Nuttall.)

E. \*EREVICAULIS. Branches very short, arising from a woody caudex, clustered, tomentose; leaves linear-lanceolate, long and rather acute, attenuated into a very long petiole, whitely tomentose beneath, less densely above; upper scapoid stem very smooth; the bractes acuminate, tomentose margined; umbel two or three times compounded, with very long rays; teeth of the campanulate involucre acute; flowers smooth, yellow and very small.

A much larger plant than the preceding, which it much resembles, with an evident short stem; leaves three or four inches long, attenuated, with a very long petiole, dilated at its embracing base two or three lines wide.

HAB. On the upper plains of the Oregon. (Nuttall.)

E. \*CYROPHYLLUM. With a woody caudex; lower leaves clustered towards the base of the stem, oblong-lanceolate, acute, attenuated at the base, beneath tomentose and yellowish-white, above slightly pubescent and green; a verticil of leaves on the stem, about six, sessile, oblong; umbel simple, of many short rays, with a leafy, spreading involucre, tomentose within and without, many-flowered, shallow and simple, with longish, reflected teeth; perianth smooth, exserted.

A remarkable species, bearing some distant resemblance to *E. tomentosum*, but the plant and its leaves are much smaller. It is about a foot high; leaves about two inches long, and half an inch wide, with a little of the brownish hue to the tomentum so remarkable in *E. tomentosum*. Several infertile small branchlets come out from the stem, which is also tomentose; rays of the umbel eight to ten; flowers ochroleucous, numerous, much exserted, oblanceolate; achenium a little hairy on the angles.

HAB. Rocky Mountains of the Platte. (Nuttall.)

- E. \*ANGUSTIFOLIUM. Suffruticose, with infertile branches towards the base; leaves fasciculated and verticillated, linear-acute, narrowed below, whitely tomentose beneath, greenish but pubescent above, a verticel of about six leaves on the short stem; umbel simple, subtended by long, leafy bractes; divisions of the many-flowered involucre reflected, pubescent; perianth reflected, smooth.

A low, somewhat shrubby species, about a foot high; the stem tomentose; leaves an inch or more long, about a line wide; rays of the umbel seven or eight, short.

HAB. Western slope of the Rocky Mountains. (Nuttall.)

- E. \*EFFUSUM. Suffruticose; leaves linear, oblong, obtuse, beneath whitely tomentose, above pubescent, greenish; stem tomentose, two or three times trichotomous, divaricate; bractes ternate, lanceolate-acute; (flowers not seen.)

Stem divided into many simple branches below; flowering stem bearing bractes only, divided compoundly and numerous, each division subtended by conspicuous, trifid bractes.

HAB. In the Rocky Mountains. (Nuttall.)

- E. \*MICRANTHUM. Leaves nearly all radical, arising from a thickish, woody caudex, linear-spathulate, or narrowly oblong-lanceolate, narrowed below into longish petioles, whitely tomentose on both surfaces; scapes, bractes and involucre tomentose; umbel decomposed, pedicels of the second divisions very short, with about three involucre in each; bractes acute or acuminate; involucre campanulate, very small, the teeth obtuse; flowers smooth, small and yellow, dioicous?

In aspect nearly allied to *E. campanulatum*, but with rather longer and narrower leaves, and the involucre most of them sessile.

HAB. In the Rocky Mountains of Oregon. (Nuttall.)

- E. \*ALBUM. Nearly stemless, with a woody caudex; leaves very whitely tomentose, spathulate-obovate, obtuse, usually longer than the petiole; bractes minute, appressed; umbel nearly simple, of few rays; involucre tomentose, angular, with shortish teeth; flowers numerous, smooth.

Very nearly allied to *E. dichotomum*, but a smaller growing plant, with broader, shorter, and whiter leaves; branches of the umbel two or three, short; each branch bearing about two or three involucre, the uppermost pair of involucre sessile, so as to form a larger head than what ever occurs in *E. dichotomum*, and with the involucre not singly disposed in a forked spike as in it. Flowers larger and smooth, the filaments slightly hairy at the base, achenium with acute angles.

HAB. Rocky Mountains of Oregon. (Nuttall.)

- E. \*ROSMARINIFOLIUM. Shrubby and much branched, smooth or somewhat pubescent; leaves clustered, nearly linear, revolute on the margin, slightly tomentose beneath; umbel pedunculate, compound, bractes leafy, numerous; involucre usually smooth, with acute teeth; perianth mostly glabrous.

Nearly allied to *E. fasciculatum*, but never with either oblong or elliptic leaves. A stoutish low bush with brown brittle branches. Leaves smooth, three-fourths of

an inch long, about a line wide, as strongly revolute on the margin as the leaves of Rosemary. Flowers very numerous and showy, whitish, with red central lines; perianth pilose at the base; some of the rays of the umbel nearly sessile.

HAB. Near Santa Barbara, Upper California.

β. FOLIOLOSUM. Leaves more acute, with the petiole, young branches and the perianth, externally near the base, pilosely pubescent.

HAB. With the above.

E. \*VERTICILLATUM. Biennial; stem dichotomously branching, the offsets all subtended by verticels of sessile, lanceolate, very acute leaves, in 3's; radical leaves oblong, as well as the stems and branches whitely tomentose, attenuated below into long petioles; flowers wholly unknown.

*E. elongatum*. (Benth.)?

We have not seen the plant in flower, but the remarkable characters, somewhat resembling those of *E. tomentosum*, and unlike any other species, perhaps justifies our giving it a passing notice.

HAB. Near St. Diego, Upper California.

E. \*NUTTALLII. (Gambel.) Densely cæspitose, with a woody, multifid, short caudex; leaves roundish, ovate or elliptic, on short petioles, not exerted from the cæspitose mass, whitely tomentose on both sides, as well as the scape and involucre; capitulum solitary, rather small; involucre cylindrical, with obscure teeth, cluster of involucres eight or ten, sessile; flowers small, purple; segments of the perianth oblong, not very unequal.

*E. tenellum*. Nutt. (Non. Torrey.) Proceed. Acad. Nat. Sci., Feb. 1848.

Allied to *E. ovalifolium*, which it resembles at first glance, but with shorter leaves and elongated scapes, the flowers deep brown-purple, and scarcely one-third the size of that species. The capitulum in *E. ovalifolium*, like the present, is made up of several sessile involucres, which are sometimes nearly smooth, the perianth also is very unequal, three of the outer segments being nearly round-oval, while the inner are oblong.

HAB. In the Rocky Mountains, on the western slope.

The character of the genus *Eriogonum*, of which there are so many species, perhaps deserves some additional consideration. The genus, as founded on *E. tomentosum* of Michaux, possesses yet some peculiarities not common to the rest of the genus; among the rest of its characters I may remark, that in place of the interior segments of the perianth being smaller, it is the reverse; the perianth increases in size with the perfecting of the fruit, and as in *Rumex*, the three inner segments are larger and erect, the three outer reflected; the next discrepancy in the character, as given by authors, is in the condition of the embryo, which is placed in the centre or axis of the seed, and is not as described excentric.

In *E. longifolium*, besides a remarkable difference in habit, the perianth is wholly herbaceous, very lanuginous, and the segments all so very equal, as to appear, at



length, almost disposed in a simple series; the achenium is also lanuginous, and the seed presents, as in *E. tomentosum*, a concentric embryo. For *E. longifolium* I would therefore propose the name of TRACHYTHECA, excluding every other species. It is the first species of the section ERIANTHA of Bentham, which name, in not being exclusive, and too near *Erianthus*, cannot properly be employed for the present plant. It is very peculiar in its solitary leaves and alternate branches.

In all the rest of this numerous genus, the outer segments of the perianth, which increase a little in size, are either larger and erect, or all nearly equal. In these, some of which have the embryo excentric and others concentric, the subgeneric name of OLYGOGONUM may be applied, but whether any other subdivision may be made by the condition of the embryo is at present uncertain. In *E. flavum* I believe the embryo is excentric, but how far that species connects itself to any others of similar form, remains to be examined.

#### \*EUCYCLA.†

Perianth membranaceous, coloured, petaloid, dimorphous, the three outer divisions orbicular, concave; the three inner linear-oblong, emarginate, connivent into a cylinder. Stamens nine; with short filaments, membranous at base. Styles three, of moderate length, with small, capitate stigmas. Achenium attenuated, triangular. Embryo excentric; radicle superior; cotyledons flat.

E. \*OVALIFOLIA.—Leaves all radical, short and roundish-ovate, whitely tomentose; capitulum made up of several sessile, whitely tomentose involucre; outer segments of the yellow perianth rather narrower at base, the inner emarginate segments exserted.

*Erigonum ovalifolium*. Nutt. Journ. Acad. Nat. Sci., Philad.

HAB. Sources of the Missouri. Flowers bright yellow.

E. \*PURPUREA. Leaves all radical, short and roundish ovate, whitely tomentose; capitulum made up of several sessile, smoothish, tomentosely margined involucre; outer segments of the purple perianth orbicular, sometimes emarginate at base; the inner emarginate, narrow, segments scarcely exserted.

Scape about a span high, arising from a multifid woody caudex; flower larger than in the preceding, and purple; filaments much shorter than the perianth, with a torn membranous margin, at base three stamens seated on each of the inner narrow segments; embryo rather short.

HAB. Rocky Mountains.

#### CHORIZANTHE.

C. \*NUDICAULE. Annual; radical leaves narrow spatulate, pubescent, with long, slender petioles, tomentose beneath; scapiform stem nearly naked, the summit trichotomous, the branchlets once or twice bifid, the flowers cymosely conglomerated; stem and very unequal toothed involucre lanuginous; segments of the sessile exserted, perianth oblong, obtuse.

† In reference to the circular figure of the perianth.

An annual, about ten to twelve or fourteen inches high, with a few narrow spatulate leaves, greenish, but pubescent above, whitish and tomentose beneath. Clusters of flowers crowded; the perianth apparently rose colour, much exerted, with the segments oblong.

HAB. Santa Barbara, Upper California. Flowering in April.

C. \*ANGUSTIFOLIA. Annual and small; leaves all linear-spatulate, softly lanuginous, as well as the branches; stem trichotomous, the heads of flowers somewhat racemose; involucrem pilose, with very unequal, uncinat spreading teeth, subulate to their base; perianth minute, the segments obtuse and without points.

A small, slender annual, three to five inches high, covered with whitish, long, woolly hairs. Leaves not more than a line broad, radical, one to two inches long, with very slender petioles. Stem leafy to the summit, bi- or trichotomous, the heads of flowers disposed in a sort of cymose raceme. Teeth of the involucrem brownish-yellow, very unequal and strongly hooked, wholly subulate, without any membranous expansion, the teeth twice the length of the cup of the involucrem. Perianth sessile, with oblong, obtuse segments, which are not mucronulate.

HAB. Pueblo los Angeles, Upper California. Flowering in April.

C. \*DISCOLOR. Annual or biennial, and rather dwarf; leaves all radical in a rosulate cluster, the primary nearly smooth, rather large, spatulate-oblong, obtuse or emarginate, rather smooth above, whitely tomentose beneath; the petioles, stem and involucrem very hairy; the involucrem with spreading, very unequal teeth subulate to their base; scape low, doubly trichotomous, the flowers in cymose clusters.

A smallish species, three to five inches high. Leaves with their longish petioles two to two and a half inches long, about half an inch wide. The involucrem with the teeth slightly uncinat, two of them very small.

HAB. St. Diego, Upper California.

C. \*PROCUMBENS. Annual or biennial, softly pilose; leaves spatulate, rather small; stem nearly naked, procumbent, the branches extremely divaricate and fragile, cymose; flowers in small clusters; involucrem with the teeth subulate to the base, slightly uncinat, unequal; perianth segments oblong, entire, (yellow,) pubescent.

A very remarkable species by its procumbent habit and extreme fragility; the branchlets and clusters of flowers disjoining into numerous fragments on the slightest touch, like a *Loranthus*.

HAB. With the above. Flowering in April and May. (Nuttall.)

C. \*UNCINATA. Like the preceding, but with the teeth of the involucrem strongly and remarkably uncinat and nearly equal; the tube is almost smooth and strongly ribbed; it is likewise yellowish, as well as the pubescent perianth.

HAB. With the above. (Nuttall.)

§. \*PTILOSEPALA. Perianth exerted ; the segments oblong, deeply fringed towards their base, (red,) styles very long.

C. \*FIMBRIATA. Annual ; leaves all radical, spatulate-oval, pilose beneath ; scape trichotomous ; flowers in compound cymes ; involucrem pubescent, the teeth subulate, unequal ; perianth torn at the sides into long capillary fringe.

Three to five inches high, erect, with a rather large trichotomous cymose panicle, the flowers sessile and mostly distinct. Segments of the perianth exerted, bright rose red below, within the involucrem membranous. The joints of the cyme fragile.

HAB. With the above. (Nuttall.)

#### PTEROSTEGIA.

P. \*DIPHYLLA. ☉. Pubescent ; leaflets binate, each division obcordate or bilobed ; common petiole on the lower leaves very long ; achenium with the angles acute.

♀. \*BILOBA. Leaves nearly all two-lobed, the lobes sometimes emarginated.

A diffuse prostrate annual, with straggling forked branches, the leaflets almost like some *Oxalis*, small, about three to four lines long, and about the same breadth, the lower petioles more than an inch long ; margins of the two-leaved involucrem denticulate, scattered, with small hooked hairs, the crests nearly entire on the margin, and partly folded up at the lower edge.

HAB. Near Santa Barbara. Flowering in May.

P. \*MICROPHYLLA. ☉. Somewhat hirsute ; leaflets binate, the lower ones twice compounded, divisions obcordate or unequally bilobed, the lobes sometimes with a single tooth ; common petiole on the lower leaves elongated, the upper leaves sessile ; achenium with obtuse angles.

HAB. With the above, which it greatly resembles, but always smaller leaved and more pubescent.

#### \*NEMACAULIS.†

Involucrem, none ; the flowers monoicous, disposed in round clusters at the joints of the filiform stem, subtended and mixed with elliptical bractes. Perianth obconic, six-cleft. Stamens three. Styles three, very short, with small subcapitate stigmas. Achenium ovoid, angular only at the summit.—Californian annuals, the leaves wholly, and the bractes on the upper side densely and whitely tomentose ; stems smooth or viscid, filiformly elongated and nearly naked, with the flowers disposed in sessile round heads at the joints of the stem, and subtended and mixed with small, elliptical, marginated bractes. The flowers resemble those of *Eriogonum*, but the habit, absence of involucrem, and paucity of stamens, at once distinguish it.

N. \*DENUDATA. Roots long and slender, filiform. Leaves spatulate-cuneate, attenuated below into a petiole one and a half to two inches long, densely lanuginous, stems three to five from the same root,

† From the singular prostrate, thread-like stem.



smooth and wiry, rigidly horizontal, at the first or second joint, bearing a few leaves below the capitulum, the joints not deciduous; heads of flowers about the size of peas, bearing ten or more flowers each, subtended with, and mixed up with the elliptic bractes, which are margined and smooth beneath, densely woolly like the leaves of some *Gnaphalium* above; perianth exerted a little on a jointed peduncle, brownish, with white margins to the oval obtuse segments; some flowers appear to be hermaphrodite, others with stamens only.

HAB. St. Diego, Upper California, in sandy places, near to the sea shore. Flowering in April and May. (Nuttall.)

N. \*FOLIOSA. With the above, from which it perhaps is not distinct; the leaves are much longer, the stem a little glutinous, and with most of the joints of the latter leafy.

#### \*OXYTHECA.†

Dioicous or monoicous. Involucrum small, four to five-toothed, obconic, few-flowered, (three to five,) the teeth mostly spinulose. Female perianth closed to the summit, about six-toothed; male and hermaphrodite shortly six-cleft. Stamens about six? Achenium compressed, two-sided, elliptic. Style three. Embryo excentric, in a somewhat fleshy perisperm, antitropus. Cotyledones oval, flat; radicle elongated, curved.—Annuals, with the leaves generally hirsute, nearly all radical; panicle or branches trichotomous and very divaricate, the ramifications subtended by verticillated bractes, free or united, into a cup. Involucre very small, solitary and pedicellate, four to five-toothed, the teeth terminating in very long, sharp, rigid bristles, more rarely unarmed; perianth pubescent; the branches clothed with viscid, pedicellate glands. Somewhat allied to *Chorizanthe*, but with the involucrum more than one-flowered, and the achenium compressed.

O. \*DENDROIDEA. Leaves all linear, radical, hirsute; scape divaricately di- and trichotomous; peduncles capillary; involucrum about three-flowered; awns twice the length of the involucrum.

A slender annual, about four to six inches high; the leaves in a rosulate cluster, imbricated round the caudex; about one to one and a half inches long, and less than a line wide; very hirsute, and strongly revolute; the bractes at the divisions of the stem divided at the base; about three flowers in an involucrum; perianth of the female flower pubescent, nearly entire, and closed around the achenium to its summit, which slightly projects, purplish at the point, exerted from the involucrum; achenium compressed, lenticular, strongly adhering to the perianth, with a projecting triangular summit; styles three, very slender, and rather short.

HAB. On the sand hills of the Rocky Mountains, near Lewis' River.

O. \*FOLIOSA. Leaves linear-lanceolate, hirsute; divisions of the trichotomous stem subtended by verticils of leaves; awns of the involucrum about its length.

† In allusion to the peculiar involucrum.

HAB. With the above, which it much resembles; it is, however, a much stouter plant. The leaves about two inches long and two or three lines wide.

§. \*GOMPHOTHECA.—*Dioicous*. Annual; stem naked, verticillately branched and very divaricate. Involucrum small, about five-toothed, five-flowered; without awns.

O. \*GLANDULOSA. Leaves all radical, roundish and pilose; branches verticillate, branchlets very numerous and divaricate, the ultimate ones and pedicels capillary; flowers exserted, pubescent.

Stems and branches about a foot high; leaves thick and fleshy, green, but pubescent, particularly along the under nerves, on longish petioles, about half an inch wide and the same in length; stem simple and naked, dividing verticillately a few inches from the root; every branchlet and pedicel arising from a small three-cleft involucrum; branches and pedicels dark purple; perianth very pubescent; the segments linear-lanceolate, and acute; the achenium, as in some *Polygonums*, is only two-sided, or elliptic, and compressed when ripe; branches and peduncles covered with pedicellate, viscid glands; involucrum small and smooth.

HAB. Rocky Mountains of Upper California.

#### \*STENOgonum.†

Monoicous. Involucrum none. Flowers naked, in axillary clusters. Perianth triangular, six-cleft. Stamens six? Styles minute, with capitate stigmas. Achenium conic, triangular, the angles sharp and salient, with a margin. A small, smooth, rather succulent annual plant of the Rocky Mountains, dichotomously subdivided and branched; leaves entire, opposite or ternate; flowers yellow, in axillary and terminal clusters, subtended by small, similar, leafy bractes. In the want of involucrum, approaching *Nemacaulis*, but the habit, flower and achenium are very distinct.

S. \*SALSUGINOSUM. A small annual, about two to three inches high. Leaves linear, spatulate, about an inch long, one to two lines wide. Flowers in sessile clusters, in the forks, and at the extremities of the branches, subtended by an irregular circle of smaller leaves; perianth greenish, the border segments yellow; no stamens in the female flowers; no germs in the male flowers; embryo inclined to one side of the farinaceous perisperm; the cotyledons oval and flat; the radicle elongated, and curved in a contrary direction to the base of the nub.

HAB. Bare saline hills of the Colorado of the West, in the Rocky Mountains. Flowering in June and July. (Nuttall.)

† In allusion to the sharp and slender angles of the achenium.

## \*HELIOMERIS.†

Capitulum many-flowered, heterogamous; rays ligulate, in a single series, neuter; discal florets tubular, hermaphrodite. Involucrum irregularly imbricated and leafy, in about two series, and rather spreading. Receptacle conic, the palea embracing the florets, lanceolate and acute. Corolla, rays ligulate, (10—12,) those of the disk tubular, the tube short, throat wide and cylindric, border five-toothed. Stigmata with oblong tips. Achenia laterally compressed, somewhat tetragonus, smooth, and without any pappus.

A perennial tall herb, exactly resembling an *Helianthus*, with narrow, entire, somewhat scabrous leaves, the lower ones opposite; flowers yellow, terminal, numerous.

H. \*MULTIFLORUS. A stoutish perennial, three or four feet high, much branched; stems terete and striated; leaves narrow, lanceolate, entire, nearly sessile, above somewhat scabrous, opposite below, on the branchlets alternate; flowers terminal, numerous and showy, bright yellow, with ten to twelve rays, sometimes with deeper discoloured blotches towards the base or lower half, entire and oblong; leaflets of the calyx, oblong-lanceolate, somewhat spreading, in nearly a simple series; achenia black and smooth. Scarcely distinguishable from *Helianthus*, except by a short conic receptacle, and naked seeds.

HAB. Mountains of Upper California, (Dr. Gambel,) and was also collected in the Rocky Mountains by Mr. Gordon.

## CHRYSOTHAMNUS.

C. \*DEPRESSUS. Suffruticose and dwarf, nearly smooth; leaves rigid, lance-linear, very acute, one-nerved; flowers in small corymbs; involucrum closely imbricated, the scales in five rows, lanceolate, acutely acuminate, smooth, the lowest very small, one-nerved and somewhat carinate; pappus fulvous.

Nearly allied to *C. pumilus*, but with a different involucrum. Achenia smooth, five ribbed.

HAB. In the Sierra of Upper California.

*Chrysothamnus*, by Torrey and Gray, has been referred to the genus *Linosyris*, of the old world, with which, as I conceive, they have little if any affinity, as must appear on comparing the characters of the two genera. Taking *L. vulgaris* for the type of the genus, we observe that the hemispherical involucrum is scarcely imbricated, leafy externally, with about one row, or scarcely two of scales, which are nearly flat; the florets very numerous, are very deeply divided; the stigmas are elongated; the summit or appendage *short* and *ovate*, much shorter than the lower or stigmatic portion. Pappus very copious, and scabrous, in several series, scarcely longer than

† In allusion to its close affinity to *Helianthus*.



the achenium. Achenium oblanceolate, and compressed, sericeous villous, with only *two* marginal lines. Receptacle conspicuous, with alveolar margins.

In the present genus the involucre is imbricated distinctly, in three to five series of subcarinated scales, the lowest very small. The florets few in number, have a short, five-cleft border. The processes of the *style* are long and subulate, much exceeding the lower, naked portion. Pappus slender, much less copious, and not so scabrous as in the preceding; more than double the length of the achenium. Achenium somewhat cylindrical, smooth, about *five* lined. Receptacle very small and smooth.

#### \*OXYTENIA.†

Capitulum heterogamous, many-flowered, the marginal ones in a single series, apetalous and feminine. Florets of the disk tubular, masculine. Involucre composed of a single series of imbricated, ovate, rather rigid scales, (about five.) Receptaculum small and flat; its palea narrow, spatulate and membranaceous, tufted with long hairs. MALE FLOWERS.—Corolla obconic, with a narrow tube; border five-toothed. Anthers distinct. FEMALE.—Corolla none. Stigmata terete, filiform, smooth. Achenia bluntly obovate, obcompressed and ridged on the inner side, covered with dense white hairs, situated beneath the scales of the involucre and without pappus.

O. \*ACEROSA. A stout shrub? with soft wood, (a branch of which, one of the specimens, is not less than three feet long;) every part of the plant (in a dried state, at least) covered with a fine close down. Leaves alternate, four to eight inches long, acerose, linear and rigid, like those of a pine tree, nearly sessile, pinnatifid, with about two pair of segments, or simply trifid; both above and below simple; the divisions about the usual width of the leaves of the common Scotch fur, grooved beneath, but so closely revolute as to be terete. Flowers in terminal fascicles or divided branchlets. In some specimens, the capitulum appears to be smaller and the achenia more woolly, with only about ten male florets, while in others the infertile central florets are about twenty; the latter appear, therefore, to be male plants chiefly, but they have also female flowers, which are less woolly; involucre roundish, of five ovate, acute, imbricated scales; male florets obconic, with a slender tube, covered with yellow glands; anthers free; stigmas slender, filiform; radial florets about five, the number of the involucre scales; corolla none; stigmas two, sometimes, short, linear-oblong, smooth; achenia obovate, truncate, rigid internally, covered (particularly towards the summit,) with long conspicuous white hairs.

A large, erect, spreading bush, with the inflorescence of an *Iva*; the leaves alternate, acerose, linear and rigid, pinnately divided into trifid or more compound divisions; capituli sessile, arranged in a compound panicle, as in many *Artemisias*. The whole plant very bitter, but with very little aroma. In habit more allied to *Artemisia* than *Iva*. Appears to be nearly related to *Euphrosyne* of Decandolle, as well as to *Pycnothamnus* and *Cyclachæna*, which last, however, is not sufficiently distinct from *Iva*.

† From οξύτενης *acuminate*. In allusion to the rigid narrow foliage.

HAB. Rocky Mountains, near Upper California. Flowering in October and November.

### GNAPHALIUM.

G. \*RAMOSISSIMUM. Stem tall and stout, very much branched, the branches fastigiate; leaves and stem green but pubescent, the former linear-lanceolate, acuminate, strongly decurrent, viscidly pubescent; heads mostly pedunculate in scattered corymbs; scales of the yellowish-white involucrem, oblong-lanceolate, subacute, longer than the florets; achenia smooth.

A large plant, five or six feet high. Leaves somewhat like those of *G. decurrens*, but green on both surfaces; the upper leaves and branchlets tomentose, but not canescent; the capituli campanulate, distinctly pedicellate, or with two heads approaching each other on shortish stalks. The whole plant exhales the strong peculiar odour of *G. decurrens*.

HAB. Monterey. California. Flowering in September and October.

### HELENIUM.

H. PUBERULUM. (Decand.) Florets of the disk mostly five-toothed, pedicels very long and divaricate. Rays mostly three-cleft. Heads spherical and large.

HAB. St. Simeon, Upper California.

### STEPHANOMERIA.

S. \*ELATA. Stems stout, erect, grooved and attenuated upwards; leaves almost filiformly linear, the lowest somewhat pinnatifid, the upper laciniately toothed at the embracing base; flowers in a small terminal panicle, (blue,) florets about ten; achenia cylindric-oblong, five-grooved, somewhat rugose.

Plant (probably perennial) three to four feet high, the stem perfectly simple, to the commencement of the flower branches, each of these bear three to four flowers, apparently blue. Involucrem and branchlets sprinkled with resinous dots. Involucrem ovoid and caliculate, of six to eight leaflets in a single series. Florets deeply five-toothed, style and stigmas somewhat hispid. Achenia pale brown, oblong-cylindric, obtuse, with five, obtuse, rather rugulose ribs; rays of the pappus about fifteen to twenty, white, plumose hairs, rather naked toward their base.

HAB. Santa Barbara, Upper California.

### PTILOMERIS.

P. \*TENELLA. Pappus of eight to ten, cuneiform, obtuse fringed scales, in the rays minute; involucrem campanulate, about eight-leaved; scales ovate, somewhat obtuse; leaves mostly opposite, pinnatifid, the divisions few, narrow linear.

Very distinct from the *Hymenoxys Californica* of Hooker, (*Ptilomeris Californica*), by its reduced size and smaller number of parts throughout, otherwise its habit and that of the following, are still very similar.

An annual, four to five inches high, the stem and pedicels more or less pilose. The leaves small, except the radical ones, simply pinnatifid, with capillary and nearly simple segments, all usually terminated with a blunt gland. Pedicels elongated. Involucrum campanulate, of about eight ovate, subcarinated scales, (as usual in the genus, arranged in a single series, so that the involucrum is either hemispherical or campanulate, according to the number of its leaves or scales,) rays about eight, oval, and short, scarcely emarginate, nearly entire; the radial achenia subfusiform, curved, and embraced as in the rest of the genus, by a fold in the scales of the involucrum, crowned by a very short and blunt pappus, similar to that of the discal florets, but nearly abortive. Achenia somewhat terete, minutely scabrous, and partly fusiform, in the ray sterile, discal florets with a slender tube. Receptacle small, smooth, and naked, conical.

HAB. In the vicinity of Pueblo de los Angeles, Upper California. Flowering in April.

P. \*AFFINIS. Similar to the preceding, excepting the pappus, which is fimbriate along the margin of the narrow scales, all terminating in awns, excepting the rays, which have the same short awnless pappus as in the preceding.

HAB. With the former. That these are true species, as well as the one which I called *P. coronaria*, I am persuaded by the fact of their retaining the same relative character when cultivated.

One of the species of this very distinct genus, (of which the seeds were sent to London from my growing plants in Philadelphia,) having been hastily referred in the Botanical Magazine to the genus *Hymenoxys* of Cassini, the rest of the species I described in the Philosophical Transactions have by Torrey and Gray been also placed in that very distinct genus, to which they have in fact no affinity, or external resemblance in habit. In *Hymenoxys*, the involucrum is biserial, with rigid appressed scales, of which the interior are longer; the achenia also are turbinate, and, as in *Actinea*, covered with erect, very copious, silky hairs; the rays are also, as in that genus, three-lobed at the extremity; the pappus is always entire, acuminate, awned and consimilar. They are perennials, (at least the section *Oxyppus*,) and one of them was referred, even by H. B. and Kunth to the genus *Actinea*. I have also examined specimens of two or three species of *Hymenoxys*, in the herbarium of — Fielding, Esq. of Lancaster, (England,) and perceive no affinity.

In revising my specimens, I find that the *dissimilar radial florets* are always embraced in a central fold of the scales of the involucrum, somewhat after the



manner of those of the ray in the *MADIEÆ*, and that though provided with a short style they are infertile.

### HEMIZONIA.

H. \**DECUMBENS*. Annual, hirsute, pubescent; heads nearly solitary at the summit of the branches; leaves entire, linear, rather obtuse; rays ten to fifteen, cuneate, three-lobed; achenia rugose, with a short curved beak; pappus of the disk flowers none.

A good deal resembling *H. fasciculata*, but in the two specimens from which I have described, the leaves appear to be all entire. About a foot high and rather decumbent. The flowers yellow, rather scattered, disk flowers enclosed in a cup formed by the union of the inner row of receptacular carinate scales. Stigmas filiform, branchlets and involucrem sprinkled with resinous glands.

HAB. Near Monterey, California.

§. *MADIOMERIS*. Heads hemispherical, many-flowered, corymbose; rays twenty to twenty-five, receptacular chaff, in a single series, not united; pappus none; leaves pinnatifid.

H. \**MACROCEPHALA*. Annual? hirsute; leaves irregularly pinnatifid, acute, upper ones entire and sessile; flowers subcorymbose, head hemispherical, many-flowered; rays twenty to thirty, cuneate, three-lobed; achenia incurved, rugulose, with an oblique apex and stipitate at the base.

About a foot high, more or less clad with long hirsute hairs. Flowers about the size and appearance of those of *Madaria elegans*, bright yellow. Stigmas very long and filiform in the rays, in those of the discal florets hispid and much shorter. Achenia convex externally, and rugulose internally, angular, with a short incurved beak, having a circular cicatrice, and attenuated into a slender stipe at the base. Discal florets densely bearded or fimbriate along the margin of the dentures, their infertile germs oblanceolate and flat. Anthers with broad ovate cups. Leaves of the involucrem linear-lanceolate, leafy and very hairy.

HAB. At St. Simeon, Upper California.

### MONOLOPIA.

M. \**LANCEOLATA*. Young branches and leaves at first somewhat tomentose, at length nearly smooth; leaves oblong-lanceolate, distantly and irregularly toothed, sessile, all alternate, above entire and amplexicaule, acute; peduncles tomentose; leaves of the involucrem usually eight, ovate, divided nearly to the base; rays a little longer than the disk; florets all fertile; receptacle conic, smooth, with projecting papillæ.

A tall stout annual herb, two feet or more in height, and considerably branched, with much the aspect of *Chrysanthemum segetum*. Leaves two to four inches long, the

lower ones irregularly repand toothed, about half an inch wide; on the stem, except at the base, amplexicaule; young shoots and branches softly tomentose as in a *Gnaphalium*; peduncles very long and tomentose, one-flowered. Flowers yellow and showy. The involucre of about eight to ten ovate, acute, greenish leaves, in a single series, divided nearly to the base. Rays eight to ten, cuneate-oval, entire, or two or three toothed, a little longer than the disk, furnished with obtuse, smooth stigmas, and a small, indistinct toothed appendage behind the stigmas. Florets of the disk with a narrow smooth tube, the teeth on the inner margins furnished with numerous threads, which when moistened extend themselves, and appear numerously jointed. All the florets in this plant are fertile. Achenia without pappus, obovoid, compressed, four-angled, a little pilose, the central angles much less salient. Receptacle conic, covered with elevated points, on which the seeds have been seated.

HAB. Pueblo de los Angeles, Upper California. Flowering in April.

#### ACHYRACHÆNA.

A. MOLLIS. A small slender annual, bearing a terminal and sometimes two or three lateral capituli; root leaves smooth, the rest linear-lanceolate, sparingly toothed, attenuated below into a longish peduncle, covered sparingly with a silky pubescence. The involucre of six lanceolate silky leaves, embracing the three-toothed radial yellow florets nearly to their summit; the inner scales of the involucre ten to twelve, lanceolate, and membranaceous nearly to their summits. Radial florets with long exserted styles, and filiform, rather acute stigmas. Achenia of the ray without pappus, those of disk numerous, elongated, narrow and compressed, with ten rather scabrous ribs. Pappus of the discal florets very long, convolute in two series of about eight to ten scales, the outer shorter, all eroded and truncated at the apex. One of the true *MADIEÆ*, and in some respects allied to *Lagophylla*, in the involucre palea and rays, and to *Anisocarpus* in the chaff of the discal florets.

HAB. Pueblo de los Angeles, Upper California. Flowering in April.

#### ERIGERON.

E. \**STENOPHYLLUM*. Nearly smooth, stem even and cylindric, corymbose at the summit; leaves filiform, rather numerous and scattered, minutely scabrous; involucre about three series, scales linear-lanceolate, acute; rays numerous, elongated, (thirty or more,) two to three toothed; pappus fulvous, scabrous, with an outer short white series; achenia nearly smooth and compressed.

Two to three feet high, with a very smooth cylindric stem, and numerous scattered filiform leaves; flowers white and rather large, (about the magnitude of the common Daisy,) branchlets sometimes more than one-flowered, corymb of about seven to ten branchlets.

HAB. In California, (Monterey?)

**E. FOLIOSUM.** Rays narrow and very long. Achenium rather hirsute towards the summit. Corymb with about seven to nine heads. A true species of *Erigeron*.

HAB. Monterey, California.

#### CHÆNACTIS.

**C. \*DENUDATA.** Biennial; glandularly pubescent; peduncles exceedingly long; involucrem viscidly pubescent, rather tomentose; scales linear-lanceolate; ray-flowers irregular, expanded, shorter than the disk.

Very nearly allied to *C. lanosa*, but with a distinct habit. Apparently a very large species, with nearly naked peduncles more than a foot long, occasionally only bearing one or two simple leaves. The leaves are pinnately parted, on slender petioles, with three or four segments on a side. Flowers yellow, rather large, the rays very evidently lobed. Achenia black, narrow fusiform, nearly glabrous, with a pappus of about four lanceolate slightly lacerate scales.

HAB. Pueblo de los Angeles, Upper California.

#### DIETERIA.

§. **SIDERANTHUS.** Involucrem hemispherical, the scales linear and acute; achenia obovoid and compressed, in the young state with numerous striatures, at length covered with a silky villus; pappus of several series of unequal scabrous bristles, the outer series shorter and more slender, (those in the ray, as in the rest of the genus, much shorter and less numerous.) Biennial or perennial, leaves pinnately lobed or incised; the lobes ciliated or pointed with bristles. Receptacle fimbriate or chaffy. Flowers of one colour.

**D. SPINULOSA.** NUTT. in Trans. Amer. Phil. Soc., l. c. p. 301. *Sideranthus spinulosus*. NUTTALL in Fraser's Catalogue, (1813.) *Amellus? spinulosus*. PURSH. Flor., v. ii. p. 564, (from the specimen which I gave to Mr. Lambert.) TORREY, Ann. Lyc. N. York, ii. p. 213. *Starkea? pinnata*. NUTT. Gen. Am. ii. p. 169. *Diplopappus pinnatifidus*. HOOK. Flor. Bor. Amer. ii. p. 22. *Aplopappus spinulosus*. DECAND. v. p. 347. TORREY & GRAY, Flor. Am. ii. 240.

**D. RUBIGINOSA.** *Aplopappus rubiginosus*. TORREY & GRAY, Flor. Am. ii. p. 240.

**D. \*GRACILIS.** Biennial, erect; stem pilose, branched above, the one-flowered slender branchlets forming a fastigate corymb; lower leaves pilose, pinnatifid; the segments oblong, obtuse, upper leaves linear, simple and sessile, entire, or minutely toothed, strongly ciliated with slender white bristles, which terminate all the lobes of the leaves; involucrem not viscid.



A slender biennial, with a fusiform, simple root, about eight to ten inches high. Radical leaves very hairy, pinnatifid, attenuated with slender petioles, little more than an inch long. Branchlets rather long and slender, often forked; each of the slender branchlets one-flowered; stem leaves linear, very elegantly ciliated, by white pellucid bristles about a line long. Heads hemispherical; the scales of the involucre in about three series, acute, rays fifteen or sixteen, with a much shorter and less copious pappus than the discal florets. Discal florets narrow and cylindric, with very small teeth. Stigmas pubescent, lanceolate, with filiform terminations. Pappus bright brown, by transmitted light orange or flame red, in two series, or of two kinds, some of the scabrous bristles being two or three times as thick as the others, which are shorter, and appear to be an outer series. The receptacle is covered with rather long white acuminate palea. Achenium obovate, compressed, at first multistriate; at length the ribs are hidden with a silky villous.

HAB. Near Santa Fé, (New Mexico.) Flowering in August.

#### MICROPUS.

M. \*HETEROPHYLLUS. Annual, erect, simple, slender; densely lanuginous above, tomentose below; leaves below linear acute, above lanceolate, obtuse and sessile; capituli lateral and terminal, more densely lanuginous; discal florets about five, masculine three to five.

Very nearly allied to *M. angustifolius*, but the heads appear larger and more woolly, and the upper leaves are different.

HAB. Santa Barbara, Upper California.

#### POLYPAPPUS.

P. \*SERICEUS. Shrubby; younger branches and leaves sericeous; branches very leafy, ending in small corymbose clusters of flowers; leaves lanceolate-linear, one-nerved, entire, acute, at length nearly smooth; achenia smooth.

A rather large shrub, the branches striate and terete, rather whitely pubescent. Leaves alternate, one to one and a half inches long, one to two lines wide, crowded together so as to hide the stem. Involucre small, tomentose, campanulate, the scales ovate in several series, the inner lacerate on the margin. Flowers (in the only imperfect specimen I have seen,) apparently male. Receptacle flat and naked. Rudimental achenia smooth and subcylindric, with five striæ, and terminated by a pappus of about ten rather unequal thickly clavellated hairs. Bitter and astringent to the taste.

HAB. Rocky Mountains of Upper California.

## BULBOSTYLIS.

§. \*PSATHYROTUS.† Annual, and dichotomously branched; involucre of a nearly single series of loosely imbricated, slightly striated scales; pappus short and scabrous, shorter than the florets; style not bulbous; achenia turbinate, densely villous.

B. \*ANNUA. Very dwarf and dichotomously branched, clothed everywhere with greenish furfuraceous scales, and somewhat viscid; leaves cuneate-obovate, toothed at the apex; flowers nearly sessile, crowded into an irregular corymb.

Flowers ochroleucous, twenty or more florets in the oblong involucre, scales few, linear-lanceolate, the innermost chaffy. Receptacle, small, naked, branches of the style filiform, obtuse, included. Pappus brownish, not very copious, and short. Plant about four or five inches high.

HAB. Rocky Mountains, near Santa Fé.

## QUERCUS.

Q. \*GAMBELII. Leaves obovate, shortly petiolate, narrowed below, sinuately lobed, dilated and somewhat three-lobed at the summit, beneath pubescent, the lobes rather obtuse, the upper ones subdentate; fruit sessile, small, the cup hemispherical, scales ovate-acute; the glande ovate and acute, about half immersed in the cup; the conic summit short.

With the aspect of our northern oaks, but very distinct; in the leaf approaching a little to *L. obtusiloba*, but without any near affinity.

HAB. On the banks of the Rio del Norte, but not abundant.

## OROBANCHE.

O. \*MULTIFLORA. Pubescent; branching from the base; flowers subimbricated, scales lanceolate-acute; peduncles very short; flowers purplish, recurved; calyx deeply five-cleft, bibracteate at base; segments long and linear; anthers tufted with hairs.

Eight or nine inches high, and very robust, branching from the base. The whole plant clothed with short soft hairs. Scales lanceolate and acuminate. Calyx deeply five-cleft, the segments long and linear; two long bractes immediately beneath the calyx. Corolla pubescent, pale below, the border purplish blue, upper lip bifid, the lower trifid, segments short and oblong. Anthers whitish, with tufts of white hairs above, shortly awned at the base. Seeds minute and numerous, light brown, covered with impressed punctures.

HAB. Sandy ground along the borders of the Rio del Norte. Flowering in September.

† In reference to the extreme fragility of the branches.

## GYMNOCAULIS.

*G. FASCICULATA.* *Orobanche (Gymnocaulis) fasciculata.* NUTT. Gen. Am. ii. p. 59. Since this name was proposed, ENDLICHER, in his great work on the Genera of Plants, has founded his genus ANOPLANTHUS on the original congener of *Gymnocaulis uniflora*, which in the Genera I altered to *G. biflora*, as being the true state of the inflorescence; it ought, however, notwithstanding, to prevent greater confusion, to remain *G. uniflora*.

## ASCLEPIAS.

A. \*MACROPHYLLA. Stem erect and smooth; leaves verticillate in threes or fours, very long and smooth, linear-lanceolate, below and on the branches opposite, on very short petioles; peduncles shorter than the leaves; umbels and flowers rather small and smooth; lobes of the corolla oblong-ovate; process of the nectaries strongly curved, acute; style of the nectaries rather short.

About three feet high. Leaves near a span long, very distant. The first pair opposite, as well as the upper, and those on the branches. Flowers small, greenish-white, with some brown, very much like those of *A. verticillata*, to which it is allied, though remotely.

HAB. Near Monterey, Upper California.

## STANLEYA.

S. \*FRUTICOSA. Smooth; leaves lanceolate, entire, or sparingly denticulate, attenuated into a longish petiole; lamina of the petals longer than the claws; stipe more than twice the length of the pedicel.

A shrubby species, with flowers very similar to those of *S. pinnatifida*. Leaves two to two and a half inches long, less than half an inch wide, the uppermost linear, all thick and apparently succulent.

HAB. Rocky Mountains of California.

## BARTONIA.

B. \*MULTIFLORA. Biennial? stem smooth, white and shining, corymbosely branched; leaves narrow-lanceolate, sinuate, pinnatifid, attenuated below and sessile; flowers subtended by one or two linear bractes; petals ten, oblong-oval, obtuse; capsule urceolate, with three to four valves; segments of the calyx long and subulate; seeds in a double series, winged.

About two feet high, dichotomously and numerously branched. Flowers corymbose, terminating the branches, three or four together, but distinct, rather small. Petals about three-fourths of an inch long, apparently straw-white, as in *B. ornata*, the inner smaller. Calyx with very long, subulate points. Capsule urceolate, rather large for the plant; three-fourths of an inch long and two or three lines wide. Style elongated, filiform, placentas succulent, the seeds thickish, and with a winged



margin, pale brown. Leaves rather narrow, and rough, as usual; two to three inches long, narrowed below, about half an inch wide.

HAB. Sandy hills along the borders of the Rio del Norte. Santa Fé, (Mexico.) Flowering in August.

#### NICOTIANA.

N. \*CAUDATA. Annual; leaves lanceolate, sessile, acuminate with very long caudated points; flowers conglomerated in a terminal panicle upon short peduncles; segments of the calyx and corolla much acuminate.

With a very extraordinary character, still closely allied to *N. tabacum*. The lower lanceolate leaves are not less than eighteen inches long, with slender acuminate points in addition, of five or six inches in length. Segments of the calyx pubescent, and viscid, lanceolate, and much acuminate. Corolla pale red, with a long, slender, viscidly pubescent tube, more than an inch in length.

HAB. Near Monterey, Upper California.

#### SAMOLUS.

S. FLORIBUNDUS, (Kunth.) Santa Barbara.

#### SIEVERSIA.

S. PARADOXA. Don. Lin. Trans. v. 14, t. 22. f. 7—10. *Fallugia*, (Endlicher.) Gen. No. 6385.

A common straggling bush, four or five feet high, with very showy racemes of bright yellow flowers. Dr. Gambel states that the branches are collected by the inhabitants and tied together for the purpose of making brooms. Flowers in July and August. Not sufficiently distinguishable from *Sieversia*, and ought to form a mere division in that genus.

HAB. Santa Fé, New Mexico.

#### ERIODYCTION.

E. \*ANGUSTIFOLIUM. Stem and younger leaves glutinous; leaves long, linear, entire, revolute on the margin; beneath canescent and reticulated; flowers small, in paniculate cymes; sepals linear, somewhat hirsute.

Allied to *E. glutinosum*, but with much narrower leaves. Flowers (apparently small,) disposed in a panicle near a foot in length; the branches terminating in bifid or trifid conjugate spikes or cymes. Leaves linear, crowded, three or four inches long, entire, one to two lines wide; when young very glutinous above. Calyx small. Capsules small, ovate, containing very few seeds.

HAB. On the Sierra of Upper California; not seen in flower.

#### HUMULUS.

H. \*AMERICANUS. Leaves three to five-lobed, the upper sometimes entire; inner divisions lanceolate-acuminate, denticulate along the apex; scales of the cone ovate, acute, the lower ones acuminate.

I have ventured, as I think on sufficient grounds, to separate the American from the European hop. Found as it is, in the uncultivated interior of the continent, beyond the reach of inhabitants, our plant must necessarily be indigenous. I have compared the present with the foreign plant with some attention, and I can in all cases readily distinguish them by their foliage. In the American plant, whatever be the other variations of the leaf, the *attenuated* points are denticulated nearly to the extremity. In the European the summit of the leaf is abruptly toothed. In the native plant, the male flowers appear to be smaller; and the scales of the cone are likewise acuminate. In some specimens, as in the European plant, the upper leaves are simply cordate, and entire, but in all cases the denticulations are smaller, and more numerous.

Mr. James Read, who has long ardently studied the botany of his own country, after a distant voyage, has presented to the herbarium of the Academy of Natural Sciences, among many other curious plants of China, a small male specimen of the hop of that country, collected near Canton; and this also appears to be a form sufficiently distinct again from the European hop. From its strong armature it might be called *HUMULUS \*ACULEATUS*. The young stems and petioles are very sharply aculeate; the uppermost leaves are all palmate, five-lobed, and hairy along the ribs; the segments of the pubescent calyx are lanceolate.

HAB. Throughout the United States in alluvial situations. I have also most luxuriant specimens from the borders of streams in the Rocky Mountains, near the line of New Mexico, collected by Dr. Gambel.

#### PECTOCARYA.

*P. PENICILLATA*. Very common round Santa Barbara and other parts of Upper California. Often scarcely distinguishable from *P. chilensis*, except by the smaller fruit, the margin of which, as in *P. chilensis*, is not unfrequently pectinately bristled the whole length; they are all, therefore, little more than varieties of each other. The plant I referred to *Cynoglossum pilosum*, (Gen. Am. i. p. 114,) is a true *Myosotis* wholly distinct from either the present plant or that of Peru. More than seven years back, I had formed a genus for this plant, (*STAUURINA*,) of which I deposited specimens in the Herbarium of the Academy of Natural Sciences in Philadelphia. In our plant, the stigma is capitellate and emarginate, the seed cuneate-oblong, and the radicle inferior or pointing towards the style.

#### MONARDA.

*M. \*PECTINATA*. Biennial? slightly pubescent; leaves oblong-lanceolate, denticulate, shortly petiolate; capituli proliferous, rather small, subtended by herbaceous bracts, some of them purplish, ovate-acute, strongly ciliated, as well as the elongated setaceous teeth of the calyx; corolla widely ringent, the tube scarcely exerted beyond the calyx.

Nearly allied to *M. punctata*, but with very different bractes, leaves of the same form and full of resinous punctures. The flower appears to have been pale purple and spotted.

HAB. Near Santa Fé, New Mexico.

#### HEDEOMA.

H. \*CILIATA. Perennial; minutely pubescent, branching much from the base; leaves linear-obtuse, shortly petiolate, entire; flowers, two or three together in the axils; calyx hirsute, with long, unequal ciliate teeth; corolla about the length of the calyx.

About four inches high, very much branched, with at length a woody root. Allied to *Micromeria glabella*, but with smaller and entire leaves, and with the calyx of *M. hirta*. (*Hedeoma hirta*.)

HAB. Santa Fé. New Mexico.

#### SISYMBRIUM.

S. \*REFLEXUM. Smooth; leaves somewhat lyrate-pinnatifid, the terminal lobe toothed, upper leaves nearly entire and denticulate; flowers small; petals linear-spathulate, a little longer than the coloured calyx; pods subterete, very long, nearly sessile, rigidly reflected and acuminate with the style.

A rather stout species, about two feet high, with the silique an inch and a half long. It bears some affinity to *Hesperis pinnatifida* of Michaux, but the seeds are terete and not margined, and the pods slightly compressed and not torulose.

HAB. Near San Pedro, Upper California.

#### URTICA.

U. \*HOLOSERICA. Perennial and tall; leaves opposite, large, on long petioles, cordate-ovate, acute, above lanceolate, coarsely serrated, smooth, beneath silky villous, as well as the stems and petioles, the latter also pilose; flowers tetrandrous; in axillary, filiform, compound racemes; the upper clusters styliiferous only.

A tall species, resembling *U. procera* but monoicous, and with the large leaves almost whitely villous beneath with a soft down, amidst which, however, on the stem are the usual long hispid hairs, some of the leaves are a span long without the long petiole. Male calyx four-parted, the female four-parted with two of the segments minute. Fruit ovate, pale brown and shining.

HAB. Near Monterey, Upper California.

#### APIUM.

A. GRAVEOLENS. (Celery.) Marshes on the coast of Santa Barbara. (Dr. Gambel.) This useful plant common to all the salt marshes of Europe, is now also found to be indigenous to the west side of this continent.



## PEUCEDANUM.

§. \*PEUCELIMUM. Carpels with two of the lateral ribs undulately winged; vitta indistinct, one or two; commissure ———.

P. \*ABBROTANIFOLIUM. Somewhat pubescent, branching from the base; leaves ternately decomposed, ultimate segments narrowly linear; involucels about seven to nine-leaved, the leaflets palmate, distinct, petiolulate, nearly as long as the umbellet; fruit obovate-elliptical, with a broad, winged margin, and some of the inner ribs with undulated membranaceous margins.

Like many other plants of this family, there is so striking a resemblance betwixt the present species and the *P. caruifolium*, that at first I imagined them to be the same, yet the character of the involucre and the fruit is so wholly different, indeed, from the rest of the genus, as to require a particular section. The present is also a much larger plant than *P. caruifolium*, eighteen inches to two feet high; the leaves multifid, with narrow linear acute segments; petioles very short with an inflated base. The plant branching from the base into two or three divisions, umbel subtended in the two instances out of three with a proper multifid leaf; rays of the umbel ten or fourteen, with several short abortive or masculine umbelets in the centre of the umbel; several abortive flowers in each umbelet. Flowers yellow.

HAB. Pueblo de los Angeles, Upper California. (A single specimen, not far enough advanced to ascertain the ultimate character of the fruit.)

## PTEROCHITON.

P. CANESCENS. In fruit. *P. occidentale*. TORREY in Frem. Journ. p. 318. *Calligonum canescens*. PURSH. Flor. Am. ii. p. 370, excluding the synonym *Atriplex canescens*. NUTT. Gen. Am. i. p. 197.

This plant in several collections to which it was communicated, was marked *Pterocarya canescens*, as far back as 1836. At the same time I marked in the collection of the Academy of Natural Sciences and elsewhere, the "Pulpy leaved Thorn" of Lewis and Clark, by the name of "SARCACANTHUS," the *Sarcobatis* of Nees, and *Fremontia* of Torrey; by the names so marked I intended to have published these plants. Pursh's *Calligonum*, which I mistook for my *Atriplex canescens*, must have been in the collection of Lewis and Clarke, as I did not meet with it on the borders of the Missouri. In the same journey I collected very perfect specimens of the plant since called *Grayia*, which I marked in the collection of the Academy *Psilocarpus*.

HAB. In the Rocky Mountains of California abundant, and also towards the sources of the Platte, where it forms a shrub three or four feet high.

## \*PHORADENDRON.†

*P. CALIFORNICUM.* Leafless; stem and elongated branches terete; sheathing scales bifid, segments ovate acute; berries round and few, opposite, sessile in marginal cup-shaped receptacles.

Branches a foot or more in length, sometimes dichotomous by abortion, but with the branches or branchlets usually opposite. Male spikes very short, as well as those of the female; the scales a little pubescent and acute, nearly two-parted on the stem. The first pair of scales on the male spike, subtends six flowers, or two on a side. Berries white? and small, sessile in cup-shaped depressions of the rachis, the summit of the berry marked with the small three-cleft divisions of the acute calyx. Petals none.

HAB. In the mountains of Upper California. Parasitic on the trunks and branches of a *Strombocarpus*.

This plant agrees exactly in its character with *Viscum flavescens*, and these, with several other American species, ought to constitute a genus distinct from the *V. album* of Europe; distinguished by the ordinary distinct two-celled anthers of the male flowers, which are globular, mostly trifold, rarely bifid or quadrifid, the anther opens by two large terminal pores or foramina, and without filament, is attached to the sides of the three-sided torus at the base of the calyx, the anther only being free. In the female there is no vestige of corolla, a persistent calyx of three, rarely four minute triangular clefts, adhering to the summit of the globular or ovate berry; the style is extremely short, almost sessile in the centre of a triangular fleshy disk, which also as well as the style exists in the male flower. These plants appear to be wholly American, extending from the State of Delaware to the tropics, and to a very considerable distance through the southern hemisphere; branches usually opposite or verticillate, rarely aphyllous.

To this genus I would refer the present plant *P. californicum*, the *Viscum flavescens*, *V. villosum*, *V. trinervium*, *V. buxifolium*, *V. saururoides*, *V. tereticaule*, *V. martinicense*, *V. crassifolium*, *V. leptostachyum*, *V. perottetii*, *V. brachystachyum*, *V. rubrum*, *V. berterianum*, *V. schottii*, *V. macrostachyon*, *V. piperoides*, *V. angustifolium*, *V. affine*, *V. ensifolium*, *V. velutinum*, *V. interruptum*, these and most of the other American species will probably arrange with the preceding in this genus. The *V. stellatum* of Nepal, which I have examined, appears to be a true congener with the *V. album*, as well as *V. orientale*, though in the latter I have found but two adnate anthers, to four petals. A true *Viscum* also appears to exist in China near Canton.

† From φορ a thief, and δειδρον a tree; in allusion to their parasitic habit.

The present genus is well distinguished by the free anthers, which are one-celled, opening by wide pores near the summit; and by the total absence of the annular calyx and petals, the calyx being monophyllous, its base including the berry, and its three or four-toothed connivent border, which never opens, remaining persistent on the summit of the berry.

In all the American species, the flowers are produced with the ripening of the berry on the lower part of the stem, so that their growth continues for the whole year. The flowers, very minute, are usually sessile or partly immersed in the rachis of a cylindric spike, which resembles a catkin, but differs in having the flowers disposed in interrupted clusters; these spikes come out several from the same axil; the inflorescence is never terminal.

#### \*CALYCODON.

Spikelets one-flowered, the flower sessile, bearded at the base. Glumes two, unequal, shorter than the flower, membranaceous, the lower truncate, acutely three-toothed; the lower smaller, one-toothed. Paleæ two, the lower sublanceolate, carinate, terminating in a longish scabrous awn; at length indurated, with a silky pilose margin; the upper palea lanceolate, one-nerved, indurated and involute. Anthers three. Stigmas two, plumose.—A scabrous leaved grass, with a simple inarticulated culm, terminated by a loose, narrow, somewhat spiked panicle. So called in allusion to the remarkable tothing of the calyx.

C. \*MONTANUM. Leaves short and narrow, somewhat-scabrous; ligules membranaceous, elongated; panicles four or five inches long, narrow, with the branches appressed; flowers clustered on the branches, three or four together, some nearly sessile and others pedicellate; glumes variable, membranaceous and eroded at the summit, the lower, three-nerved, with three either short, or rather long and acute teeth, sometimes with a fourth membranous tooth; the upper glume also eroded, and ending in a single tooth from the nerve; the lower palea lanceolate, carinate, scabrous, and indurated, terminated by a long, slender, scabrous awn; the inner margin silky, with soft shining hair, of which there are two tufts at the base of the paleæ; the inner paleæ also indurated and herbaceous in the centre, involving the germ and stamens.

A perennial grass, with a simple, unjointed culm, about eighteen inches high. Somewhat allied to *Muhlenbergia*, (when restrained to its proper limits,) but perfectly distinct by its very remarkable glumes. The ripe seed we have not seen.

HAB. In the Rocky Mountains, near Santa Fé, Mexico. Flowering in August.

#### MUHLENBERGIA.

M. (§. TRICHOCHLOA) \*PURPUREA. Annual, dwarf; much branched from the base and many-jointed; glumes very short and obtuse; palea and awns purple, the latter capillary, many times longer than the palea, the inner one acute and shortly awned.



About a span high. Leaves and sheathes minutely puberulous. Leaves short and narrow. Panicle spreading; flowers very deciduous. Glumes minute, unequal and obtuse, membranaceous, with from one to four nerves. Paleæ dark purple, the lower somewhat carinate; pilose at base, terminating in an arachnoid purple awn, about an inch in length; the upper palea also purple and indurated, its two nerves often ending in two short awns.

HAB. Santa Barbara, Upper California, and the island of Santa Catalina.

#### CALAMAGROSTIS.

§ \*TRICHAGROSTIS.—Spikelets one-flowered, the flower sessile, with long hairs at the base. Glumes two, subequal, membranaceous, acute, longer than the flower, the lower with a short terminal awn. Paleæ two, very acute, the lower carinate, ending in an exserted capillary awn; the upper one-nerved, acuminate. Caryopsis free, cylindric-oblong, much shorter than the glume.

C. \*ANDINA. A simple stemmed small grass, with a compressed culm, about two or three feet high; ligules minute; flowers in a short, paniculate, narrow spike, about three or four inches long, half an inch wide, with a habit very distinct from the general character of the genus; glumes very long and slender, each with about a single nerve; very narrow and membranaceous; one of them distinctly awned, the other acuminate; pappus copious, longer than the small flower; no lateral rudiment of another flower.

HAB. In Upper California, on the Colorado of the West.

#### FESTUCA.

§ \*CHLOROPSIS.—Spikelets unilateral, two-flowered, or with the third abortive; hermaphrodite, distichal. Glumes two, carinate, unequal. Paleæ two, the lower lanceolate, hirsute and concave, ending in a long, slender awn; the upper bicarinate. Stamens, one. Ovary sessile. Styles two, very short, with plumose stigmas. Caryopsis lanceolate, smooth, concave above, nearly free.—A slender Californian annual grass, with a simple filiform culm, ending in a small, nearly simple, spiked panicle; the spikelets sessile on a continuous, angular rachis, at length cernuus. So closely allied to the CHLORIDEÆ, that at first I imagined it would prove a species of *Eutriana*; it is still, however, a *Festuca* in habit.

F. \*MICROSTACHYS. A slender pubescent grass, about a span high, upper part of the rachis simply spiked, the lower part, with two or three similar branches; rachis and paleæ hirsute; glumes, the lower three-nerved, the upper one-nerved; awn of the paleæ about twice its length; caryopsis large, filling up the palea.

HAB. Pueblo de los Angeles, Upper California.

§. \*TRACHYCARPHA.—Spikelets many-flowered, secund, seated on the sides of a branching angular rachis. Glumes two, the upper minute. Paleæ two, the lower with a long awn and strongly ciliated on the margin. Caryopsis adhering to the upper palea.

F. \*MEGALURA. Slender leaves and elongated, simple culm, smooth; panicle spiked, elongated, the branchlets angular and appressed; paleæ and their long awns very scabrous; uppermost floret of the spikelet abortive.

Annual, slender below, more robust above, about eighteen inches high; spikelets so appressed as to appear blended together, erect, seated on a sharply angular rachis; awn about three times the length of the palea, which is very strongly ciliated along the margin.

HAB. Santa Barbara, Upper California.

#### MELICA.

M. \*PANICOIDES. Panicle elongated, many-flowered, the flowers small and numerous; glumes one-flowered, with a small, infertile rudiment; paleæ smooth, scarcely longer than the acute glumes.

A smooth, rather slender grass, two to three feet high. Leaves linear and narrow, with long acuminate points; ligule short, obtuse, membranous; panicle eight to ten inches long, with several subdivided branchlets below, nearly simple above; flowers scarcely larger than those of *Panicum virgatum*, but with shining, yellowish glumes, and purple paleæ. The glumes lanceolate, ovate and acute, the lower a little longer; paleæ ovate, rather acute, the neutral rudiment two-valved, white and small. Stamens three. Styles two. Stigmas white and complicated, plumose. Caryopsis obovate, sessile, free, with a flat basal impression or cicatrice.

HAB. Santa Barbara, Flowering in April.

M. \*POEOIDES. Panicle narrow, many-flowered, the spikelets erect; spikelets with two flowers perfect, and a small rudiment extending beyond the acute glumes; lower palea five nerved.

Two to three feet high, smooth; the leaves narrow and rather short, with longish membranous lacerated stipules, a little hairy below. Panicle narrow and interrupted, several unequal branchlets from a joint. The spikelet parti-coloured and a little shining as usual, but exceeding the glume it appears somewhat like a *Poa*. Lower glume acute, brownish at tip, with a broad yellowish membranous margin. Outer palea oblong-lanceolate, a little obtuse with a brownish tip. Stamens three. Stigmas plumose, short.

HAB. Island of Santa Catalina, California.

## \*STENOCHLOA.

Spikelets about three-flowered; flowers distichal, hermaphrodite. Glumes two, awnless, lanceolate, acute, much exceeding the spikelet in length. Paleæ two, awnless, the lower concave, ovate, nearly nerveless and pubescent; the upper bicarinate. Stamina three. Ovarium stipitate. Styles two. Stigmas plumose. Caryopsis free, oblong-lanceolate.

S. \*CALIFORNICA. A smooth, many-jointed, annual, small grass, without branches, about a foot high; leaves linear and attenuated into long points; ligules membranaceous, small; panicle narrow with the small branches appressed. Glume green, and smooth, very long, extending beyond the included spikelet; the lower valve lanceolate-linear, very acute, membranaceous on the margin, obscurely three-nerved; the upper narrower, one-nerved; paleæ ovate, obtuse, the lower silky pubescent, nearly nerveless, the upper with a nerve on either margin; anthers whitish.

Nearly allied to *Poa*, but with the glume almost of *Danthonia*; the palea also nerveless, not carinate, and without the arachnoid connecting pubescence at the base.

HAB. Island of Santa Catalina. Coast of California.

## \*PLEOPOGON.

Spikelets one-flowered. Glumes two, unequal, nearly as long as the flower; the lower with two awns, the upper entire, with one awn. Paleæ two, the lower oblong, with the apex produced into a short awn, the upper without awn, and two-nerved. Stamens three. Styles two. Stigmas pilose, slender. Culm compressed, somewhat branched; leaves linear, short and rigid; spikes terminal, simple, not jointed.

P. \*SETOSUM. Leaves very narrow and acuminate, rather rigid; ligules membranaceous, acuminate; glumes somewhat membranaceous, the lower terminating with two longish scabrous awns, often rather unequal in length, the upper not cleft, terminating with a single awn; the lower paleæ rather lanceolate, purplish and somewhat oblique, entire, terminating in a shortish twisted awn; a line of pubescence along the sides of the glume; the upper glume membranaceous, two-nerved.

A slender grass, about eighteen inches high, with a flattish jointed culm. Allied apparently to *Lycurus*, but the flowers are all hermaphrodite.

HAB. Mountains of Santa Fé, Mexico.





ART. XIV.—*Monograph of the Fossil Squalidæ of the United States.* By ROBERT W. GIBBES, M. D., of South Carolina; Correspondent of the Academy of Natural Sciences of Philadelphia, &c.

(Continued from page 147.)

Genus *CARCHARIAS*, Cuvier.

This genus differs from *CARCHARODON*, in the dentine presenting a hollow cone internally, while it is solid in *Carcharodon*.

I have seen only a single specimen from the United States of *Carcharias tenuis*, from the Eocene S. C., too imperfect for description. Agassiz expresses some surprise, that while the recent species are numerous, there are so few fossil. He met with only two.

Genus *GALEOCERDO*, Muller and Henle.

This genus, separated from *GALEUS* of Cuvier, comprises many species. In *Galeus* the teeth are smooth on the anterior edge, and have few dentelures on the posterior—in *Galeocerdo* they are crenated on the whole extent, but rather unequally—the base particularly has large notches, while the point has but fine indentations. Agassiz had found specimens so uniform in the indentations of the whole contour, that he constituted a genus based on this character, which he called *CORAX*. I have his authority for the reunion of it with *GALEOCERDO*, since he has seen many other specimens.

In *GALEOCERDO* the teeth are equal in both jaws—nearly as deep as long—the anterior edge is regularly arched, the posterior strongly notched, and below the notch are the largest crenatures. The outer face is flat, the inner more or less elevated; the root is not very thick, generally concave and parallel to the base of the crown. Of the species given by Agassiz four are from *the chalk*, and three from the *tertiary*.

1. *G. ADUNCUS*, Agassiz. Figs. 54, 55, 56, 57, 58.—This species is usually about a half inch in length and the same in height—occasionally longer—the anterior edge is a regular arch finely indented, the posterior angulated, more or less obtuse; below the angle the dentelures are well marked, but are scarcely visible above. The base of the enamel is less sloped on the outer than on the inner face, where it forms almost a right angle. The root is more or less concave and moderately thick, as in all *Galeocerdos*. Agassiz's specimens are from the *Miocene* of Europe—mine from the *Eocene* of South Carolina.

2. *G. LATIDENS*, *Agassiz*. Figs. 59, 60, 61, 62.—Is much less massive and thinner than *G. aduncus*, but is longer in proportion to the height. The anterior edge is less arched than in other species. The cone is short and very pointed on the posterior edge, the angle is very acute in the European species, I think less so in the American. Below the angle the dentelures are well marked, while at the cutting point and on the anterior edge they are very fine. In some specimens they are more distinct near the base on the anterior edge, while in Agassiz's specimens he mentions the reverse, and makes it distinctive of a species. The base of the crown is parallel to the lower edge of the root on the outer face, and differs very slightly on the inner. I have several specimens from the *Eocene* of South Carolina, and one from the *Miocene* of Maryland. For the latter I am indebted to my friend F. Markoe, Jr., of Washington.

3. *G. MINOR*, *Agassiz*. Figs. 63, 64, 65.—Very similar in form to *G. latidens*, but not arched, very small, and the cone more acute. It is almost as high as long—the base of the crown extended—the summit very sharp pointed, edged with fine dentelures on both sides. The root is thick and irregular, the enamel more sloped on the inner or elevated face.

I have specimens from the *Eocene* of South Carolina, and from the *Miocene* of Maryland—the latter sent me by J. G. Bruff, Esq., of Washington.

4. *G. EGERTONI*, *Agassiz*. Figs. 66, 67, 68, 69.—This was described by Agassiz as *Corax*. The cone is acutely pointed, and nearly perpendicular, sloped on both edges, forming almost an angle on the posterior side in some specimens. The edges are more uniformly indented than in other species. The outer surface is elevated above the level of the root and undulated; the inner much more prominent and smooth. The root is very thick and deep, and forms two-thirds of the height of the tooth. The enamel extends lower on the outer than on the inner face.

My specimens are abundant from the *Eocene* of South Carolina. I have a few given me by Professor Wyman, from Richmond, Virginia, and others from Calvert Cliffs, Maryland, (*Miocene*) by F. Markoe, Jr., and from Hollis Cliffs, Virginia, by J. G. Bruff, Esq.

The large specimen (Fig. 66) is of unusual size. It is from Pocotaligo, South Carolina, presented to me by G. C. Mackay, Esq.

5. *G. PRISTODONTUS*, *Agassiz*. Fig. 70.—This species is remarkable for its pyramidal form, and the great size of its crown; from the posterior edge being but slightly sloped, and the anterior forming a sort of elbow, and not a regular arc; the point is nevertheless acute and cutting. The whole height including the root about equals the length, which is sometimes three-fourths of an inch. The dentelures are



very equal, though sometimes more strongly marked on the anterior edge. The root is thick and more than half the depth. The enamel extends much lower on the outer face.

The specimen figured is the only one I have seen. It was given me by Professor Frost, of Charleston, and was sent to him from Alabama, and I am disposed to think from the company with which it came, that it is from the *cretaceous* formation. There is another specimen in the Medical College of South Carolina, and I think there are several in the Cabinet of the Academy from the *Cretaceous* of New Jersey.\*

6. *G. CONTORTUS*, *Gibbes*. Figs. 71, 72, 73, 74.—This is an undescribed species, which is very abundant in the *Eocene* of South Carolina and *Miocene* of Virginia.

The cone is longer and more acute with a twist outwardly in its upper third, which is characteristic. The inner face is rounded, while the outer is undulated; the edges are regularly indented, and on the anterior next the root the dentelures are more developed. The root is very thick and deep.

#### Genus HEMIPRISTIS, *Agassiz*.

The species included in this genus are somewhat intermediate between *GALEOCERDO* and *CARCHARODON*, but the peculiar distinctive character is in the disposition of the marginal serratures. They extend only a certain distance towards the point, leaving it on both sides entirely smooth. The dentelures are very strongly marked, as much so as in any species of *GALEOCERDO*; in other respects these teeth resemble them. They are pyramidal, larger at the base, acute at the summit, and more or less curved backwards. The outer side is almost flat, the inner prominent. The enamel is perfectly smooth, and no folds exist even at the base of the crown.

*Agassiz* described two species, but has rejected *H. paucidens*, and preserved

*H. SERRA*. Figs. 75 to 85.—This has the form of a flat pyramid curved backwards, the edges are cutting, and the notches, which are strongly developed, are continued in some nearly to the point, while in others they are few and low down on the lateral edges. They differ in this respect in the two jaws, as is the case in *Notidanus* and other genera. In the lower jaw they are more conical, higher, more straight at the base, and less curved at the summit. Some are very acutely pointed, so much so as to lead to the belief of there being more than one species. I have, however, a large number, and have traced them in a series of gradual change of size from the broad to the slender forms.

They are flat outwardly and prominent on the inner face, which in some specimens is compressed laterally at the lower third, so as to be very protuberant, giving them

\* I have lately received several specimens from New Jersey, for which I am indebted to Mr. Samuel P. Wetherill, and Mr. L. J. Germain, of Burlington.

the form of a solid triangle. The base of the crown is nearly horizontal, while that of the root is notched in the middle. The root is moderately thick.

My specimens from South Carolina are all from the *Eocene*. I have received several from the *Miocene* of Maryland, from F. Markoe, Jr., and from the *Miocene* of Virginia, from J. G. Bruff, Esq. Agassiz described specimens from the *Miocene* of Europe, but mentions that Count Munster had specimens from *the chalk* which he thought similar.

#### Genus GLYPHIS, *Agassiz*.

The teeth of this genus are peculiarly formed. They are lanciform, with a thick solid and expanded base. The body of the cone is awl-shaped and a little below the point is wider, resembling a graver. The upper portion next the point is flat and finely denticulated, while the lower part is free from serratures, and in some specimens rounded.

Agassiz describes a single species *G. hastalis*, from the London clay.

*G. SUBULATA*, *Gibbes*. Figs. 86, 87.—In this species 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, which is compressed, has a tendency outward. A sharp lateral edge extends from the apex equally on both sides two-thirds the length of the cone, and is finely and uniformly indented. The root is thick; the enamel extends lower on the outer face and to the root on both. In the smallest specimen figured, the root is very broad and not so thick, and the enamelled base has fine denticles.

The specimens figured are all I have met with, and are from the *Eocene* of South Carolina.\*

#### Genus SPHYRNA, *Rafinesque*. ZYGÆNA, *Cuvier*.

The form of the hammer-headed sharks is very remarkable, but there is nothing as peculiar in the character of their teeth by which they can be readily distinguished when isolated, and they differ in the two jaws.

The outer face is flat, and the inner prominent, the marginal indentations are very minute, though often absent, especially in young and lower teeth.

*S. PRISCA*, *Agassiz*. Figs. 88, 89, 90.—These are flat, thin, and triangular, sharp pointed, the apex turned back; the enamelled base extended equally on both sides from the cone; the serratures are very minute, in some specimens not visible to the naked eye, and in others absent, except on the lateral basal extension. The root is thick, flat on the outer, and convex on the inner side.

\* I have recently received several specimens from the *Green Sand* of New Jersey, presented by Mr. S. P. Wetherill.



These teeth are often found precisely similar except in being crenated and smooth, the former most likely belonging to the upper and the latter to the lower jaw.

Agassiz describes specimens from *the chalk* of Malta, and from the *Swiss molasse*; all mine are from the *Eocene* of South Carolina.

*S. LATA*, Agassiz. Figs. 91, 92, 93.—Distinguished by an enlarged and pyramidal form, as well as by the well marked though fine dentelures over the whole contour of the edges; anterior edge somewhat rounded, posterior notched, outer face flat, inner swollen. The enamel extends low down on the root, which is very thick. The locality of Agassiz's specimens was unknown. Mine are from the *Eocene* of South Carolina.

*S. DENTICULATA*, Agassiz. Fig. 94.—Professor Agassiz is in doubt whether this species differs from *S. prisca*. The perpendicular form and acute isosceles-triangular form, and regular distinct and symmetrical denticulations induce me to think it a separate species. I have, however, seen but a single specimen, the one figured.

#### Genus NOTIDANUS, Cuvier.

"In the genus NOTIDANUS, the teeth are not only of different forms in the upper and lower jaws, but also vary considerably in this respect, at the anterior and posterior regions of the same jaw. In the upper jaw, the anterior teeth are large, compressed triangular plates, with the pointed apex arched backwards, and the margins slightly dentated, except in the two anterior ones. The posterior teeth are in the form of simple obtuse furrowed tubercles. In the lower jaw, the large anterior teeth have the apex less produced; the anterior margin is finely serrate, and the posterior divided into three or more denticles. The posterior minute teeth resemble those in the upper jaw. Of the larger teeth there are rarely more than four in each vertical row."—Owen.\*

*N. PRIMIGENIUS*, Agassiz. Fig. 95.—I have given a figure of the only perfect specimen I have met with, and think it belonged to the lower jaw. It was kindly presented to me by Professor J. Wyman, of Boston, who procured it from the *Eocene* of Richmond, Virginia. I have fragments from other localities. The crown consists of a series of sharp oblique cones, of which the first is the largest and least oblique, the others gradually diminishing in size towards the posterior edge. The large cone is strongly indented on its lower outer half. The length of the tooth greatly exceeds its height; the inner and outer faces are both prominent and differ

\* Besides those of Agassiz, good figures are given of various forms of *Notidanus* in the old work of SCILLA, *De corporibus marinis*, Romæ, 1747, and in the recent elaborate work of C. L. Bonaparte, *Iconographia della Fauna Italica*, Romæ, 1832—1841. I find also others in *Oryctographie de Bruxelles*, by F. X. Burtin, Bruxelles, 1784.



very little, though the enamel is lower on the inner surface. The root is thick, and equal in depth to the height of the principal cone. Agassiz has met with no fossil teeth of the upper jaw. He describes several species.

Genus LAMNA, Cuvier.

C. L. Bonaparte, and Muller and Henlé, include under *Lamna* four genera—*Lamna*, Cuvier; *Oxyrhina*, Agassiz; *Carcharodon*, Smith; and *Selache*, Cuvier—all the characters being drawn from the external form, and no regard being had to the skeleton or teeth. These genera have teeth so dissimilar that they are easily distinguished; but *Odontaspis*, which is included in another family, has teeth so like *Lamna*, that when detached they cannot with certainty be distinguished. Agassiz is doubtful about separating them, though there are some fixed differences which will aid in classing species. Teeth of *Lamna* are flat, and approach in form *Otodus*, from which they differ in being of less breadth, and having smaller lateral cones. Those of *Odontaspis*, on the contrary, are more cylindrical, more twisted, and have lateral cones longer and more pointed. The number varies—*Odontaspis taurus* has usually only one on each side, while *O. ferox* has two, sometimes three.

Agassiz includes under LAMNA all straight teeth provided with small lateral denticles, and doubts when the species described seems to approach nearer to *Odontaspis* than to *Lamna cornubica*.

When well preserved, there is no difficulty in distinguishing *Lamna* from *Oxyrhina*, since the latter have no lateral denticles. The distinction is more difficult with *Otodus*, as *Lamna compressa* and *Otodus appendiculatus*.

He also includes under LAMNA another type, which he thinks should form a separate genus, *Sphenodus*.

1. L. ELEGANS, Agassiz. Figs. 96 to 102.—Lanciform, regular and straight; thickness considerable towards the base of the root, but tapering off towards the point. Inner face ornamented with vertical striæ, very fine and numerous, very distinct near the enamel, extending above the middle of the cone. This is a distinctive character, which we usually find better preserved in small teeth.

The lateral denticles are very small points, sometimes absent, the root is thick, with the branches well developed. Outer face plane or a little elevated, inner very convex so that the tooth has almost the appearance of a slender cone cut through the middle, the edges are smooth and cutting. The enamel extends lower on the outer face, the base straight and horizontal, while it is curved on the inner.

This species is very common in the *Eocene*. I have fine specimens from Claiborne, Alabama, kindly sent me by C. S. Hale, Esq., of Mobile, from Richmond, Virginia, by Professor Wyman, and from Maryland by J. G. Bruff, Esq. In South Carolina they are abundant.

Agassiz mentions them from the Crag (*Miocene*) of England. I have not met with them in the *Miocene* of the United States.

2. *L. CUSPIDATA*, *Agassiz*. Figs. 103 to 106.—This species is described by Agassiz as common in the Swiss molasse, (*Miocene*.) I have it from the *Eocene* of Washington, Georgia, from Rev. George White, of Savannah, and from the mouth of Potomac Creek, Virginia, presented me by J. G. Bruff, Esq. It is very like *L. elegans*, is in general very thick, of moderate breadth, equilateral, straight, or a little curved back. The edges are smooth and cutting the whole length; external face perceptibly elevated; inner more so. The base of the enamel, which is smooth, is usually sloped at a right angle on the outer face, which is not as well marked on the inner. The peculiar distinction from *L. elegans* is that it is smooth on both faces, having no striæ. The root is more largely developed than in other species, and cases occur where the branches exceed in length the height of the cone.

Agassiz now refers *L. denticulata* to this species.

3. *L. COMPRESSA*, *Agassiz*. Figs. 107 to 112.—These resemble much in general appearance the small teeth of *Otodus obliquus*. They are more flat and less broad, the root is less prominent, and the passage to the crown less marked. They are more lanciform, and the cone more slender than in *Otodus*. The denticles are irregular, generally larger in the posterior teeth.

All my specimens are from the Santee Canal, (*Eocene*.) South Carolina. Agassiz described this from imperfect specimens, as *Oxyrhina leptodon*, which he now withdraws.

4. *L. ACUMINATA*, *Agassiz*. Figs. 113, 114, 115.—This species is of medium size, very thick at the base, edges cutting, nearly equal, outer surface flat, curved outwardly near the apex; inner face prominent; lateral denticles well developed; root thick.

I have met with only three specimens, all from the *Eocene* of Orangeburg, South Carolina.

5. *L. CRASSIDENS*, *Agassiz*. Figs. 116, 117, 118.—The name of this species indicates its form, which is short and thick. The outer face is flat, the inner prominent and curved backward, the root very thick, and prominent inwardly; edges cutting.

Found in the *Eocene* of South Carolina.

6. *L. (Odontaspis) CONTORTIDENS*, *Agassiz*. Fig. 119.—Agassiz describes this as of a subulate irregular form, much curved inwardly, its internal face having distinct folds from the base to the summit; the root well developed and thick, the branches

of the root of moderate size and approaching, the outer face near the point is plane, lower down, and on the inner rounded, the edges near the point are alone cutting; the base of the cone cylindrical. I have seen but few specimens answering this description, and the latter characters, the cutting edge and the cylindrical form of the base are the only points in which it differs from *Lamna elegans*.

Agassiz describes it as abundant in the *Miocene* of Europe. I do not know the locality of the specimens I have, which are figured.

I am lately indebted to Lieut. J. W. Abert of the Topographical Corps, United States Army, for two specimens of teeth (Fig. 119, Pl. xxvi.) from the *Cretaceous* formation at Poblazon, in New Mexico. They are well marked specimens of *Lamna contortidens*, and are figured by him in his published report to the Secretary of War.

7. *L. (Odontaspis) HOPEI*, Agassiz. Figs. 120, 121, 122, 123.—This is the broadest of the subulate teeth, some are thick others more slender, all are nearly cylindrical at the base, edges prominent and cutting towards the point, in proportion as the tooth is flat, root thick and narrow. The nutritive canal is very perceptible at the most prominent part of the inner face of the root. The lateral cones are small and awl-shaped, often rudimentary, seldom preserved in large teeth. Outer face flat near the point, insensibly rounded towards the base, where it is almost as round as on the inner, compressed laterally, smooth, no trace of striæ.

Found in the *Eocene* of South Carolina.

8. *L. (Odontaspis) VERTICALIS*, Agassiz. Figs. 124, 125, 126, 127.—Not as twisted as *L. Hopei*, nor like *L. compressa*, because thicker: nor like *L. elegans*, because there are no striæ on the inner face. The prominent characters are straightness and thickness at the base of the enamel, and of the root. The edges are cutting even to the root. Lateral denticles are well marked, base of the enamel more sloped on the outer than on the inner face; the nutritive foramen distinct.

My specimens are from the *Eocene* of South Carolina.

9. *L. (Odontaspis) GRACILIS*, Agassiz. Figs. 128, 129, 130.—This is the most slender of known fossil *Lamnæ*, is very slender, has cutting edges the whole length, outer face flat, inner sensibly swollen, no striæ on inner face; branches of root well developed. I think *L. subulata*, Agassiz, identical with this species.

From the *Eocene* of South Carolina.

#### Genus OTODUS, Agassiz.

This is known only fossil. Agassiz has established it as intermediate between *Oxyrhina* and *Lamna* and *Carcharodon*, but easily distinguishable from both. It differs from *Carcharodon* by the entire absence of marginal dentelures, which are of



importance, especially in fossil species. The species are in general less in size than *Carcharodon*, and the largest are seldom as large as the smallest of them.

It is more difficult to distinguish *Otodus* from *Oxyrhina*; it has the same broad flat form, smooth at the edges, but *Otodus* is specially characterized by the presence of a lateral denticle on each side, usually equal; often it is rounded, sometimes compressed and sharp, rarely angular or indented. *Lamna* and *Odontaspis* have it, but always smaller, cylindrical, and more pointed and lanciform. The root is largely developed, very deep and thick, but has no elongated branches as *Lamna*. When the root and lateral denticles are detached, it is hard to distinguish *Lamna* from *Otodus* and *Oxyrhina*. Agassiz describes several species as of doubtful genus on this account.

1. *O. OBLIQUUS*. Figs. 131 to 137.—This species is common in New Jersey, whence there are fine specimens in the Cabinet of the Academy. I have casts also of several from Mr. C. Barclay, of Troy, from the *Eocene* of New Jersey. I have no specimen of *O. obliquus* from South Carolina.

It is massive, with a well developed root, so large that in some the depth equals more than half the height of the crown. The outer face is nearly flat, grooved longitudinally in the middle at the base of the enamel, the inner surface is very prominent, viewed *en profil* the root seems deeper on the inner face, where is a space deprived of enamel; below this the root is thickest. The lateral appendages are thick and irregular, more developed in arched than in upright teeth. Agassiz thinks the presence of the lateral denticles not important for species, but much so for the genus.

The prominent character of *Otodus obliquus* is its massive size and preponderance of root. The enamel is dense and very full at the base of the crown. The species described as *Otodus lanceolatus*, by Agassiz, he thinks most probably belongs to *O. obliquus*.

2. *O. APPENDICULATUS*, Agassiz. Figs. 138, 139, 140.—Distinguished by large lateral denticles, compressed and usually obtuse, but some are very sharp. The root is not large, and thinner, and not so deep as that in *O. obliquus*; base of the crown nearly horizontal. The root is absent in two of my specimens, which are from the Green Sand of New Jersey.

3. *O. LEVIS*, Gibbes. Fig. 141.—The tooth here figured I published\* as new, and upon reference to the figures given by Agassiz, I find he has one resembling it, (Fig. 7, Tab. 32,) which he doubted about separating from *O. appendiculatus*. The following is my description:

\* Proceedings of Academy, September, 1847.

"*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 (Fig. 141) from the *Eocene* of South Carolina." I have since seen one in the cabinet of the Academy from New Jersey.

4. *O. CRASSUS*, *Agassiz*. Fig. 142.—This species is distinguished by a considerable thickness, but not as thick as *O. obliquus*. Contrary to other species, the root has not a marked preponderance. Instead of the outer face being swollen, or strongly prominent, in this it is flat, even at the base of the enamel. The height of the cone does not equal the length of the root. The surface of the enamel is finely striated on both faces. The lateral cones are absent in the only specimen I have seen, but of the identity of the species I have no doubt.

It is from the *Cretaceous* of Alabama.

5. *O. MACROTUS*, *Agassiz*. Figs. 143, 144.—This is flat in proportion to its size, and is characterized by large compressed, rounded, lateral denticles, detached from the principal cone. The outer face is a plane, the inner full, moderately rounded, with faint striæ visible. The base of the enamel is nearly horizontal, and equal on both faces. The larger specimen figured (Fig. 144) is from the *Eocene* of South Carolina, the smaller (Fig. 143) from the mouth of Potomac Creek, Virginia, given me by J. G. Bruff, Esq.

6. *O. TRIGONATUS*, *Agassiz*. Figs. 145, 146.—These are small teeth on an elongated base. The cone is straight, pointed, and narrow, with sharp edges. The thickness is not great, the outer face is flat, the inner convex. The lateral denticles are rounded. From Santee, (*Eocene*) South Carolina.

7. *O. APICULATUS*, *Agassiz*. Fig. 147.—This species is on the confines of *Otodus*, resembles *Oxyrhina hastalis*, but may be distinguished by a very minute lateral denticle on each side of the cone. It is sharp pointed, the apex a little turned back. The anterior edge is straight or slightly arched, the posterior curved. The outer face is plane, the inner swollen, though less so than in other species of *Otodus*, which makes it so flat.

I have figured the only specimen I have seen of this species, from the *Eocene* of South Carolina.



Genus OXYRHINA, *Agassiz*.

This genus is established on the character of the absence of lateral appendages in teeth allied to *Otodus*. It is an important character in fossil genera and species, and the distinction can only be doubtful when the base and root of the specimen are imperfect, as there is then a difficulty in assigning it to *Otodus*, *Lamna*, or *Oxyrhina*.

*Oxyrhina* is generally known by its broad lanciform shape, differing from *Lamna* which is always narrow and straight. The resemblance is greater between *Otodus* and *Oxyrhina*—*Otodus* is generally larger, more triangular, thicker, and not so flat. The root of *Oxyrhina*, particularly is less thick, and the branches less developed. In other respects *Oxyrhina* approaches *Lamna*.

1. *O. HASTALIS*, *Agassiz*. Figs. 148 to 152.—The variety of form and dimensions of these teeth, according to their position in the jaw, render their distinction difficult. They are large, elongated and lanciform, the larger teeth mostly equilateral, probably occupying the front; others are more or less arched, very thin, not half as thick as the breadth of the base of the enamel. The root is never as prominent as in *Otodus*, and the terminal portions less developed. The inner face is regularly convex from the base to the summit, and serves to distinguish this species from *Ox. xiphodon*, which is more flat on this side. The base of the enamel is slightly sloped on the outer face, and descends lower on the inner, and is more hollowed on that face. The outer face is flat; on each side parallel to the edge is a vertical furrow, which extends two-thirds or three-fourths of the height; the middle is slightly prominent, with a small depression near the base of the enamel.

I have specimens from the *Miocene* of South Carolina, from T. W. Porcher, Esq., from the *Miocene* of Virginia and Maryland, from J. G. Bruff, Esq., and F. Markoe, Jr., and from the *Eocene* of South Carolina.

2. *O. XIPHODON*, *Agassiz*. Figs. 153, 154.—There is a single prominent character which distinguishes this species from *Ox. hastalis*, viz., on the inner face, which is ordinarily regularly rounded, at the base of the enamel, is a remarkable flattening, as if ground; unless this face be well preserved you cannot distinguish it; usually *Ox. xiphodon* is larger. All are curved outwardly at the summit. The base of the enamel is almost the same on both sides, a little lower on the outer face. The root, though a little thicker than the base of the crown, is still less developed than in other species. On the outer face are parallel furrows next the edges, which give it an undulated appearance.

The specimens I have seen are all from the *Eocene* of South Carolina.

*Agassiz* now considers *Ox. quadrans* and *Ox. retroflexa* as forms of this species.



3. *O. PLICATILIS*, *Agassiz*. Figs. 155, 156, 157.—This is broad, flat and of moderate thickness, resembling somewhat *Ox. xiphodon*. It is distinguished from all others of this genus, by having folds on the outer face at the base of the enamel, numerous and well marked in the middle of the tooth. There is a broad furrow near the edges, and two others exist next the middle. The root is thick, without lateral branches, the base of the enamel is parallel on both faces to the base of the root.

*Agassiz* described this species as always straight, and *Ox. retroflexa* as distinct from its oblique form. He now considers the latter as belonging to *Ox. xiphodon*. *Ox. trigonodon* he thinks should be referred to this species.

My specimens are mostly from the *Miocene* of South Carolina, though I have several from the *Eocene*.

4. *O. MANTELLII*, *Agassiz*. Fig. 158.—This resembles *Ox. hastalis* and *Ox. xiphodon*, but is much thicker and has the root better developed. The outer face is flat, with furrows next the edges on the lower half, and a depression in the middle at the base of the enamel, the surface is thus undulated. The inner face is regularly arched, the anterior edge is arched and the posterior curved in the specimen figured. The enamel is horizontal at the base, the root thick and distinctly separated into branches.

The only specimen I have seen is from the *Cretaceous* of Alabama.

5. *O. CRASSA*, *Agassiz*. Figs. 159, 160.—Is very massive, thicker than any species except that which I will describe as *Ox. Desorrii*. It is curved inwardly, the outer face is elevated and presents faint traces of furrows, which are so developed in *Ox. hastalis*. It is nearly equilateral, the edges cutting, though thick, the point tends outwardly; the root is very thick, the base of the enamel angular on the outer, arched on the inner face.

My specimens are from the *Eocene* of South Carolina.

6. *O. MINUTA*, *Agassiz*. Figs. 161 to 164.—This species is quite small. They are sub-cylindrical, with point and edges rather obtuse. They are mostly straight; the root very thick in proportion to the size of the teeth.

Numerous in the *Eocene* of South Carolina.

7. *O. SILLIMANI*, *Gibbes*. Figs. 165 to 168.—Among twelve specimens from the *Eocene* of South Carolina, there is much uniformity. The cone is straight or very slightly bowed on the inner edge, equilateral, acutely pointed, both surfaces convex, the inner 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 Professor B. Silliman, the veteran co-labourer in American science.\*

\* *Ox. Desorrii* and *Ox. Sillimani* were described in the Proceedings of September, 1847.

8. *O. DESORII*, *Gibbes*. Figs. 169 to 171.—Professor 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-labourer of 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 *Ox. 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 several specimens from the *Miocene*, and others from the *Eocene* of South Carolina.

9. *O. WILSONII*, *Gibbes*.—Figs. 171, 172, 173.—This resembles somewhat *Ox. hastalis*, but is convex on the outer face, the root also is thicker and more largely developed. The cone is straight, equilateral, and very acute, slightly curved near the base. The root is very convex on the inner and concave on the outer face, the branches irregular. The enamel is arched on the inner face, and waved on the outer.

I believe this species distinct from other American varieties, and propose for it the name of Dr. Thomas B. Wilson, the patron of the Academy.

When I commenced my investigation of the *Fossil Squalidæ*, it was my purpose to attempt a microscopic arrangement. Professor Agassiz having informed me of his intention to undertake such researches, both of the recent and fossil genera, I prefer to yield to his experience and opportunities what I could but partially and imperfectly effect. In the present state of our knowledge, it is convenient to make a *pro tempore* division of the *Squalidæ*, into those having crenated teeth, and those which are smooth, as follows :

## FAMILY SQUALIDÆ.

## TEETH WITH CRENATED EDGES.

## GENERA.

GLYPHIS, *Agassiz*.  
 CARCHARODON, *Smith*.  
 CARCHARIAS, *Cuvier*.  
 CARCHAROPSIS, *Agassiz*.  
 SPHYRNA, *Rafinesque*. ZYGÆNA, *Cuvier*.  
 GALEOCERDO, *Muller and Henle*.  
 HEMIPRISTIS, *Agassiz*.  
 NOTIDANUS, *Cuvier*.  
 AELLOPOS, *Agassiz*.

## TEETH WITH SMOOTH EDGES.

## GENERA.

LAMNA, *Cuvier*.  
 OTODUS, *Agassiz*.  
 OXYRHINA, *Agassiz*.  
 SCYLLIODUS, *Agassiz*.  
 THYELLINA, *Munster*.  
 ARTHROPTERUS, *Agassiz*.

## GENERA AND SPECIES DESCRIBED.

## CRENATE TEETH.

Genus CARCHARODON, *Smith*.

- Sp. 1. C. MEGALODON, *Agass*. Pl. xviii. figs. 1 to 9.  
*Var.* RECTIDENS, *Agass*. Pl. xviii. fig. 4.  
 " SUBAURICULATUS, *Agass*. Pl. xviii. figs. 5 and 6.  
 2. C. ANGUSTIDENS, *Agass*. Pl. xix. and xx. fig. 10 to 38.  
*Var.* LANCEOLATUS, *Agass*. Pl. xx. figs. 19 to 23.  
 " HETERODON, *Agass*. Pl. xx. figs. 30, 31, 32.  
 " MEGALOTIS, *Agass*. Pl. xx. figs. 24 to 29.  
 " AURICULATUS, *Agass*. Pl. xix. fig. 12.  
 " TURGIDUS, *Agass*. Pl. xix. figs. 13 to 16.  
 " SEMISERRATUS, *Agass*. Pl. xx. figs. 33 to 36.  
 " TOLIAPICUS, *Agass*. Pl. xix. figs. 17, 18.



3. *C. ACUTIDENS*, *Gibbes*. Pl. xxi. figs. 39 to 44.
4. *C. MORTONI*, *Gibbes*. Pl. xxi. fig. 45.
5. *C. LANCIFORMIS*, *Gibbes*. Pl. xxi. figs. 46 to 51.
6. *C. SULCIDENS*, *Agass*. Pl. xxi. figs. 52, 53.

Genus *GALEOCERDO*, *Muller and Henle*.

- Sp. 1. *G. ADUNCUS*, *Agass*. Pl. xxv. figs. 54 to 58.
2. *G. LATIDENS*, *Agass*. Pl. xxv. figs. 59 to 62.
  3. *G. MINOR*, *Agass*. Pl. xxv. figs. 63 to 65.
  4. *G. EGERTONI*, *Agass*. Pl. xxv. figs. 66 to 69.
  5. *G. PRISTODONTUS*, *Agass*. Pl. xxv. fig. 70.
  6. *G. CONTORTUS*, *Gibbes*. Pl. xxv. figs. 71 to 74.

Genus *HEMIPRISTIS*, *Agassiz*.

- Sp. 1. *H. SERRA*, *Agass*. Pl. xxv. figs. 75 to 85.

Genus *GLYPHIS*, *Agassiz*.

- Sp. 1. *G. SUBULATA*, *Gibbes*. Pl. xxv. figs. 86, 87.

Genus *SPHYRNA*, *Raf.* *ZYGÆNA*, *Cuv.*

- Sp. 1. *S. PRISCA*, *Agassiz*. Pl. xxv. figs. 88, 89, 90.
2. *S. LATA*, *Agassiz*. Pl. xxv. figs. 91, 92, 93.
  3. *S. DENTICULATA*, *Agass*. Pl. xxv. fig. 94.

Genus *NOTIDANUS*, *Cuv.*

- Sp. 1. *N. PRIMIGENIUS*, *Agassiz*. Pl. xxv. fig. 95.

SMOOTH TEETH.

Genus *LAMNA*, *Cuv.*

- Sp. 1. *L. ELEGANS*, *Agass*. Pl. xxv. figs. 96 to 102.
2. *L. CUSPIDATA*, *Agass*. Pl. xxv. figs. 103 to 106.
  3. *L. COMPRESSA*, *Agass*. Pl. xxv. figs. 107 to 112.
  4. *L. ACUMINATA*, *Agass*. Pl. xxv. figs. 113 to 115.
  5. *L. CRASSIDENS*, *Agass*. Pl. xxvi. figs. 116 to 118.
  6. *L. CONTORTIDENS*, *Agass*. Pl. xxvi. fig. 119, and 119<sup>a</sup>.
  7. *L. HOPEI*, *Agass*. Pl. xxvi. fig. 120 to 123.
  8. *L. VERTICALIS*, *Agassiz*. Pl. xxvi. figs. 124 to 127.
  9. *L. GRACILIS*, *Agass*. Pl. xxvi. figs. 128 to 130.

Genus OTODUS, *Agassiz*.

- Sp. 1. O. OBLIQUUS, *Agass.* Pl. xxvi. figs. 131 to 137.  
2. O. APPENDICULATUS, *Agass.* Pl. xxvi. figs. 138 to 140.  
3. O. LEVIS, *Gibbes.* Pl. xxvi. figs. 141.  
4. O. CRASSUS, *Agass.* Pl. xxvi. fig. 142.  
5. O. MACROTUS, *Agass.* Pl. xxvi. figs. 143, 144.  
6. O. TRIGONATUS, *Agass.* Pl. xxvi. figs. 145, 146.  
7. O. APICULATUS, *Agass.* Pl. xxvi. fig. 147.

Genus OXYRHINA, *Agassiz*.

- Sp. 1. O. HASTALIS, *Agass.* Pl. xxvi. figs. 148 to 152.  
2. O. XIPHODON, *Agass.* Pl. xxvi. figs. 153, 154.  
3. O. PLICATILIS, *Agass.* Pl. xxvi. figs. 155 to 157.  
4. O. MANTELLI, *Agass.* Pl. xxvi. figs. 158.  
5. O. CRASSA, *Agass.* Pl. xxvi. figs. 159, 160.  
6. O. MINUTA, *Agass.* Pl. xxvi. figs. 160 to 164.  
7. O. SILLIMANI, *Gibbes.* Pl. xxvi. figs. 165 to 168.  
8. O. DESORII, *Gibbes.* Pl. xxvi. figs. 169 to 171.  
9. O. WILSONII, *Gibbes.* Pl. xxvi. figs. 171 to 173.

This monograph will be continued from time to time as specimens are procured.

ART. XV.—*Descriptions of new Fossil and Recent Shells of the United States.* By  
T. A. CONRAD.

UPPER EOCENE FOSSILS.

CLAVELLA, *Swainson.* *Fusus*, Lam.

C. VICKSBURGENSIS.—Fusiform, smooth, moderately thick; volutions eight, with straight sides; spire conical, with obtuse longitudinal remote varices, first and second volutions entire; suture impressed; body whorl regularly rounded towards the beak; aperture and canal about one-tenth longer than the shell; beak straight and pointed.  $2\frac{1}{4}$ .  $\frac{7}{8}$ .

*Locality.* Vicksburg, Mississippi. Abundant.

FULGUR, *Mont.*

F. NODULATUM.—Pyriform, thick, with strong rugose revolving lines, with a very fine intermediate line between most of the large striæ; on the inferior part of the body whorl is a space without lines, below which the whorl has a slightly concave slope towards the beak; angle tuberculated, the series continued on the spire near the suture: in some specimens the tubercles margin both sides of the suture; spire short, the sides of the volutions concave; labrum with rather distant prominent acute lines within; beak straight.  $1\frac{3}{4}$ .  $\frac{7}{8}$ .

*Locality.* Occurs with the preceding.

This species is easily distinguished from *F. spiniger*, (*Fusus spiniger*), of the same locality, by its much less prominent spire, and by having tubercles in place of spines.

TRITON, *Mont.*

T. SUBALVEATUM.—Subfusiform; varices obsolete, except one near the margin of the labrum, which is broad; revolving sulci in pairs with a broad flattened interval; longitudinal wrinkles distinct and the longitudinal ribs or varices numerous, narrow and obscure, except on the spire where they are more prominent; sutural area subcanaliculate; aperture wide; labrum with remote prominent lines within; columella with a prominent plait near the middle and another near the angle of the aperture.  $\frac{3}{4}$ .  $\frac{5}{8}$ .

*Locality.* Occurs with the preceding.

The three fossils above described occur near the base of the cliff at Vicksburg, in company with *Natica Mississippiensis* and *Corbula alta*, all abundant, and none have been found in the group above, except one valve which I supposed to be of the last named species, when I saw it at Vicksburg. As I have not access to the specimen,



I cannot say certainly that it is the same with the *C. alta*. These shells are situated below the indurated marly beds which contain the remains of crabs, as I am informed by J. D. Anderson, Esq., of Vicksburg, who collected the specimens. The stratum near Dr. George Smith's plantation, about six miles N. E. of Vicksburg, in which I found the *Natica Mississippiensis* and *Corbula alta*, is identical with that of Vicksburg to which I have alluded.

## RECENT SHELLS.

SILIQUA, *Megerle*. *Leguminaria*, Schum.

S. FLORIDANA.—Equilateral convex; posterior side narrower and more acutely rounded than the anterior; basal margin slightly contracted or arched; colour purple, umbo whitish; epidermis olive with two narrow whitish rays on the posterior side; rib marked by a broad purplish brown ray.

SOLECURTIS FRAGILIS.—Var. *nob.* Proceedings, Vol. iii. p. 24, fig. 10.

*Locality.* Inhabits Egmont Key, Tampa Bay, Florida.

LYONSIA, *Turton*.

L. FLORIDANA.—Very inequilateral, ovate-oblong, thin, fragile, inflated; posterior side produced, slightly recurved, narrow and direct at the extremity, a slight furrow on the submargin of the hinge; epidermis extremely thin, white, with fine radiating lines.

OSTEODESMA HYALINA?—*nob.* Proceedings, Vol. iii. p. 24, fig. 7.

This species is larger than *L. hyalina*, much longer in proportion, narrower posteriorly, and has more distinct radiating lines.

CRYPTOMYA, *Con*.

An equivalved, equilateral, bivalve, closed or very slightly gaping, the hinge similar to that of *Mya*; pallial impression without a sinus, but forming a right angle posteriorly.

SPHÆNIA CALIFORNICA.—*nob.* Journ. Acad. Nat. Sci, vol. vii. p. 234, Pl. 17, fig. 11.

This shell was incorrectly referred to SPHÆNIA, and cannot with propriety enter the genus *Mya*. "The form of the pallial impression, and the valves being nearly or quite closed, prove that the animal inhabiting this shell differs from that of *Mya*."

## DONAX.

D. PROTRACTA.—Elongated; anterior side produced, acutely rounded at the extremity; hinge and basal margins parallel; hinge margin straight, scarcely oblique; posterior side cuneiform, distinctly striated, acutely rounded at the extremity; disk widely contracted between umbo and base, arching the basal margin; surface with crowded minute radiating lines; colour variable, light red or purple, more or less rayed; interior red or purple with a white margin; margin crenulated. 11-16. 4.

*Locality.* Coast of Florida, near St. Joseph's Bay.

This shell is about the size of *D. scalpellum*, and quite as much elongated. I found a number of odd valves, generally water worn.

#### VENUS, *Lan.*

V. INTAPURPUREA.—Ovate-triangular, thick, ventricose, with about thirty concentric somewhat reflected ribs, becoming laminated and waved towards the anterior and posterior margins; the laminæ alternately elevated; radiating striæ distant; lunule cordate; basal margin rounded and somewhat tumid in the middle, subtruncated posteriorly; colour white with irregular angular fulvous spots; interior white with a very large triangular purple stain; margin crenulated. 1½. 1.

*Locality.* Egmont Key, Tampa Bay.

Resembles the Miocene fossil *Venus cribraria*, nob., but is very distinct.

#### PECTEN.

P. FUSCOPURPUREUS.—Ovate; ears subequal, broad and long; ribs about eighteen, about as wide as the interstices, with a crenulated line or two on the side of each; ribs finely squamose; interstices with crenulated longitudinal lines; colour brownish purple. 1½. 1¼.

*Locality.* Mullet Key, Tampa Bay.

I found several odd valves of this *Pecten* in company with *P. dislocatus*; and I have elsewhere remarked that although *P. irradians* (*concentricus*, Say,) is common on the Bay shore, it is never met with on the sea beach of Mullet Key.

ART. XVI.—*Notes on Shells, with Descriptions of new Genera and Species.* By  
T. A. CONRAD.

CASSIS.

*C. CORNUTA*, *Lin.* Two species of *Cassis* have been confounded by authors since the time of Linné, under the name of *C. cornuta*, one of which inhabits the East, the other the West Indies. Linné gives the latter habitat, but his reference is solely to figures of the eastern shell, and it is therefore probable that his description was taken from that species, though the name better applies to the other, which is really horned when old, whilst the eastern shell has much shorter and more numerous tubercles: these never become so greatly unequal in size as in the former species, which shell is well represented in Chemnitz's figures, 1790 and 1791.

*Reference to Cassis cornuta, as figured in the works of various authors.*

Lister. t. 1006 f. 70, and t. 1009, fig. 71, c.

Bonani. Recr. 3, f. 155.

Rumph. Mus. t. 23, fig. 1.

Petiv. Gaz. t. 151, fig. 9, *Buccinum brevirostrum*, and 7, fig. 14, *Cassis Amboinensis*. 1713.

Gualt. Test. t. 40, fig. D.

Seba. Mus. 3, t. 73, figs. 7, 8, 17, 18.

Knorr. Pl. 3, 2\*\*, fig. 1.

Favanne. Conch. Pl. 26, fig. A, 1.

Martini. Conch. 2, t. 33, figs. 348, 349, and t. 35, fig. 362.

Kiener. Spec. des Coq. p. 9, No. 4, Pl. 2, fig. 3.

Wood. Index Test. pl. 22, fig. 14.?

Reeve. Conch. Icon. part 65, Pl. 1, fig. 2.

Chenu. Illus. Conch. Pl. 2.

*C. LABIATA*, *Chemnitz*. The only certain figures of this species I have seen, are those in Chemnitz's and Lister's works. Reeve has pointed out the difference between this shell and the eastern *cornuta* of Lin., but regards it as only a variety of that species. Surely when characteristic differences are so prominent and persistent, in shells so remote in their habitats, it is fair to conclude that they cannot be identical species.

The figures usually referred to the one in question by authors, in the works of Rumphius and Petiver, appear to me to represent *Cassis tuberosa*, Lam.



*Reference to Cassis labiata.*

- Lister. t. 1008, fig. 71, C.  
 Rumph. Mus. t. 23, fig. A.  
 Petiver. Gaz. t. 2, fig. 10, and t. 7, fig. 10.  
 Chem. Conch. 2, t. 184, fig. 1790, and t. 185, fig. 1791.

*C. TUBEROSA*, *Lin.* In the twelfth edition of the *Systema Natura*, Linné quotes Gualteri, t. 41, fig. A A A, which is the *tuberosa* of authors, but his original description, and which he retains in the twelfth edition, applies to a different shell, probably, as he remarks, to a variety of *Cassidaria echinophora*.

*Reference to Cassis tuberosa.*

- Gualt. Test. t. 41, fig. A A A. *Cochlea cassidiformis*.  
 Favanne. Pl. 25, fig. B, 2.  
 Encyc. Method., 406, fig. 1, and 407, fig. 2.  
 Lam. An. sans Vert.  
 Sowerby's Manual, fig. 410.  
 Reeve. Conch. Icon. Pl. 3, fig. 7.

*Reference to Cassis flummea.*

- Seba. Mus. 3. t. 73, fig. 2, 5, 6, 10, 11, 14, 15, 16, 19, 20.  
 Knorr. 3, Pl. 10, fig. 1, 2, (old Pl. 4, fig. 1\*, (young.)  
 Martini, 2, fig. 353, 354, and 381, 382.  
 Reeve. Conch. Icon. Pl. 5, fig. 12.

TRITON, *Mont.*

*T. TUBEROSUS*. Two distinct shells are usually referred to this species. The so-called variety I designate by the name of *T. pyriformis*.

*Reference to Triton tuberosus.*

- Lister. Conch. t. 935, fig. 29a.  
 Rumph. t. 24, fig. H.  
 Voyage of Astrolabe, Pl. 40, fig. 19.

Animal olive-green with large dots. Shell with a crooked oblique beak.

*Reference to Triton pyriformis.*

- Martini. 3, fig. 1050, 1051.  
 Dillwyn. *Murex pyrum*, var. *C*.  
 Kiener. Pl. 14, fig. 2.  
 Reeve. Conch. Icon. Pl. 41, fig. 1b.  
 Voyage of Astrolabe, Pl. 40, fig. 18.

Animal ash-coloured with small dots. Shell with the beak less oblique, and straighter than in the preceding species.

\* Quoted by Lam. for *Cassis tuberosa*.

*T. VARIEGATUS*, Lam. Three species have been confounded by authors under the name of *T. variegatus*. Reeve in his figures and observations clearly represents the difference between the East Indian and one of the West Indian species, which last I name *nobilis*. The former I regard as the type of *Murex tritonis*, Lin. The third species is common in the West Indies, and is smaller and more ponderous in proportion. The following characters may serve to designate the species :

1. *T. TRITONIS*.—Spire with coarsely granulated striæ; labrum expanded, widely reflected\*, margin deeply scalloped; columella with broad slightly raised plaits, with narrow brown grooves between. (East Indies.

*Reference to Triton tritonis.*

- Bonani. Rec. fig. 188.  
 Rumph. Mus. t. 28, fig. B and 1.  
 Petiver. t. 12, fig. 15. *Buccinum tritonis*.  
 Gault. Test. t. 48, fig. A.  
 Seba. Mus. t. 73, three large figures.  
 Favanne. Conch. Pl. 32, fig. G 1, G 2.  
*Murex tritonis*, LIN. Syst. Nat.  
 Martini. Conch. 4, t. 134, fig. 1277, 1281.  
 Reeve. Conch. Icon. Pl. 2, fig. 3b.

2. *T. NOBILIS*, Con.—Dilated, ventricose, humped on the upper part of the body whorl, about which three ribs are prominent, rounded, lower one broadest. (West Indies.) 11. 5 $\frac{2}{4}$ .

*Reference to Triton nobilis.*

- Favanne. 32, fig. G, 1, 2.  
 Blainville. Malacol. Pl. 18, fig. 3.  
*Triton variegatus*, Reeve. Conch. Icon. Pl. 1, fig. 3a.

3. *T. VARIEGATUS*.—Thick and heavy, slender; upper whorls with minutely granulated revolving lines; columella brown with white plaits, mostly narrow. (West Indies.)

*Reference to Triton variegatus.*

- Lister. Conch. t. 959, fig. 12.  
 Seba. Mus. 3, t. 73, two upper figures.  
 Martini. Conch. 4, t. 134, fig. 1277, 1281, and t. 135, fig. 1282, 1283.  
 Wood. Index Test. Pl. 27, fig. 95.  
 Keiner. Pl. 2.

\* The character of the reflected patulous labrum becomes most decided in the largest specimens. Young shells do not possess it.

I am indebted to Dr. Thomas B. Wilson for the opportunity of examining the three foregoing species in different periods of growth, which removed all doubts about the specific differences of each. The young *nobilis* has the same dilated form as the old shell. The young of the other two species are on the contrary very slender. In the *variegatus* and *nobilis* there is a much larger proportion of the dark waved bands to the white or light coloured shell, and in every stage of growth the former is thicker and heavier than in corresponding ages of the others.

### NAUTILUS.

*N. PERFORATUS*.—Suborbicular, umbilicated; margin deeply sinuous; colour white with brown irregular transverse rays, becoming distant, and inclining to flesh colour on the margin of the wider portion of the shell; margin of aperture blackish-brown within. Length  $6\frac{1}{2}$ .

This shell has been referred to *N. umbilicatus*, Chemnitz, (*N. scrobiculatus* of Solander and Dillwyn,) but it has not the flattened sides nor wide umbilicus of that species, and the rays are much darker. It more resembles the *pompilius*, but the umbilicus and narrower aperture readily distinguish it. It is about the size of that species.

### PETRICOLA.

*P. CALIFORNICA*.—*Saxicava californica*. Journ. Acad. Nat. Sc. Vol. 7, pl. 20, fig. 9, 1837.

*Petricola arcuata*, Desh. Rev. Zool. par la Soc. Cuv. 1839, p. 358, Mag. de Zool. 1840, Pl. 19.

*P. CARDITOIDES*, Con. *Saxicava carditoides*, Con. Journ. Acad. Nat. Sc., Vol. 7, pl. 20, fig. 8. 1837.

*Petricola cylindracea?* Desh. Mag. de Zool. 1840, Pl. 20.

### SILIQUA, Megerle. LEGUMINARIA, Schum.

*S. NUTTALLII*, Con.

*SOLECURTUS NUTTALLII*, Con.

*S. MAXIMUS*, Gould, not Wood.

*SOLENS SPLENDENS*, Chenu. Illus. Conch. Pl. 8, fig. 3.

*S. LUCIDA*, Con.

*SOLECURTUS LUCIDUS*, Con.

*S. RADIATUS*, Gould not Lin.

### TRIGONELLA, Con.

An equivalved subtriangular bivalve, thick, smooth; cardinal teeth three in each valve; a rather distant straight anterior lateral tooth in one valve, fitting into a double tooth on the opposite valve; ligament pit deeply excavated; pallial impression with a considerable sinus.

*T. CRASSATELLOIDES*, nob. Journ. Acad. Nat. Sc. Vol. 7, p. 253, Pl. 19, fig. 17.



SANGUINOLARIA, *Lam.*

S. NUTTALLII, *Cor.* Jour. Acad. Nat. Sc. Vol. 7, p. 230, Pl. 17, fig. 6.

PSAMMOBIA DECORA, *Hinds.* Zool. of the Sulphur, Pl. 19, fig. 6, 7.

## PHOLADOMYA.

This shell which Deshayes referred to *Panopea*, has a highly perlaceous substance, and is destitute of cardinal teeth. The nacre, and different form of the muscular impressions, appear to me sufficient to exclude it from *Glycimeris*, *Lam.*, to which it approaches nearer than to *Panopea*, *Aldrov.*

If this Miocene fossil is inadmissible in the genus *Pholadomya*, I propose a new generic name, *Margaritaria*.

PARAPHOLAS, *Con.*

Shell pholas-like; dorsal margins widely folded over the valves; accessory valves two, nearly similar in form, elongated, one extending from the umbo to the posterior extremity; the other united to the base; hinge plate thick; adductor muscular impressions greatly elongated.

The peculiar character of the accessory valves which appear as though soldered to the shell; the elongated muscular impressions so different from those in other genera of *Pholadidæ*; the form of the pallial impression, and the valve on the base, prove a very distinct organization in the animal, and marked distinctive generic characters. The accessory valves are only two, with a medial suture, and are much alike in form, the dorsal valve being shortest and truncated at the beak. On the back there is a strong resemblance of four other valves caused by a wide folding over the valves. The pallial impression descends in a nearly direct line from the adductor muscle to an elongated cicatrix, of an oblong square shape, which joins the basal margin.

P. CALIFORNICA, *Con.* Journ. Acad. Nat. Sc., Vol. 7, p. 236, Pl. 18, fig. 35. *Revue Zool. par la Soc. Cuv.* 1839, p. 357.

P. JANELLI, *Desh.* Mag. de Zool. 1840, Pl. 14, 15. *Chenu. Illus. Conch.* Pl. 3, fig. 4.

## PECTEN.

P. FRAGOSUS.—Ovate; inferior valve nearly flat; ribs eight, six of which are very large, rounded, profoundly elevated, nodose, longitudinally sulcated; intercostal spaces very narrow, crossed by transverse elevated laminae, and destitute of longitudinal lines; posterior ear produced, margin dentate; colour deep orange. Length 2 inches: height the same.

Inhabits the West Indies.

Differs from *P. nodosus* in having fewer, sulcated and much larger ribs, narrower interstices with transverse laminae; and in the flatness of the inferior valve. The anterior and posterior submargins have longitudinal lines, but the intercostal spaces are without any.

ART. XVII.—*Remarks on the Birds observed in Upper California, with descriptions of new species.* By WILLIAM GAMBEL, M. D.

(Continued from page 56.)

PIAYA, *Less.*

111. P. CAYANENSIS, Gamb. Cayenne Cuckoo.

*Cuculus cayanensis*, Briss. Vol. iv. p. 122, (1760.) *C. cayanus*, Linn. Syst. Nat. ed. 12th, (1766.)

We found this beautiful bird common about the Gulf of California, particularly at Mazatlan.

There is a good deal of variation both in size and colour in this species, probably dependant on age. The colour above on young birds is pale cinnamon, but in old specimens it becomes of a much deeper reddish, with beautiful purple reflections. The tail beneath also changes from the colour of the upper parts to nearly a pure black. There is much variation also in the size of the bill, and length of wings and tail; but one specimen which we have in the collection of the Academy, from Surinam, exceeds all the others so much, that we purpose to make it different under the name.

P. MACROURA. Its total length is 22 inches, of which the tail is 15 inches: wings  $6\frac{3}{4}$  inches: tarsus  $1\frac{3}{4}$  inches.

The plumage is almost exactly the same, though less tinged with red above, and the front and top of head more inclined to dusky grey. Its broad expansive tail presents beautiful purple reflections; beneath it is almost black, each feather with a white tip.

GEOCOCCYX, *Wagler.*

112. G. MEXICANUS, Strick. Paisano.

*Phasianus mexicanus*, Gmel. Lath.

*Hoillalotl*, Hernandez. Willoughby's Orn. p. 403. Ray. Syst. Av. p. 158.

*Cuculus viaticus*, Licht.

*G. variegatus*, Wagler. Isis, 1831.

*Saurothera marginata*, Kaup. Isis, 1832.

*S. bottæ*, Blainville. Less. Traité d'Orn. i. p. 144. *S. Californiana*, Less

*Leptostoma longicauda*, Swains. Class. Bds. vol. ii. p. 325 and 140, fig. 172.

Gamb. Proceed. Acad. Nat. Sci. Phila. vol. ii. p. 263.

*G. mexicanus*, Strick. Annals and Mag. Nat. Hist. 1841, p. 544. Hartlaub,

Revue Zool. 1844, p. 215.

The Hoitlalotl, or Long Bird of Hernandez, was said to inhabit the hottest parts of Mexico; to fly near the ground, making but short flights, but ran so swiftly that it far exceeded the speed of the swiftest horses; and that its flesh was not much esteemed for food. The length of the body was nine inches, and the tail in addition about a span, or a total of about eighteen inches, and the tail green with purplish reflections like the peacock.

All of which is true of the Paisano only, and together with the rest of the description given by Willoughby and Ray, leaves but little doubt that this is the bird which was intended to be described. As we know, therefore, that the name *mexicanus* was first given to it as the bird of Hernandez, it should be retained, although the description be so imperfect.

It is distributed throughout the greater part of Mexico, where it is well known by the name of *paisano*, or countryman, and in California as the *correcamino*, or road-runner. We also found it occasionally on the route from New Mexico to California, and I have seen several specimens from Texas.

Its swiftness of foot is proverbial, and the astonishment of all who see it; indeed it is said in many places to be chased on horseback by the Mexicans for amusement. I have heard of its being tamed at Chihuahua and other places, and kept about the houses to rid them of vermin, such as scorpions, lizards, centipedes, &c., which are there so common; and judging from the contents of the stomach of one which I opened in California, they would be useful enough for this purpose, for it contained to my astonishment, beside other small matters, nine very large grasshoppers and a good sized lizard whole!

I have been told by the Californians, that they have a method of killing snakes which, if true, is sufficiently remarkable: that is, when they find a snake coiled up and asleep, to encompass him with the joints of a round-stemmed cactus, with long very piercing barbed spines, which is common in many places, and then to drop a joint upon his coil; the snake by his twisting is pierced in all directions and soon killed.

I have observed them to frequent principally the barren bushy plains, and especially those which are covered with several kinds of cacti; probably because in such places lizards are also abundant. I have found their bills and feet covered with dirt as if they had been both scratching and digging. They will fly for a short distance when first surprized, but if chased do not rise, running with the wings a little open and the head erect.



This genus contains at least two well marked species differing in size and colour. The *G. affinis* is much smaller, with the bill quite moderate, and the plumage above with reddish bronzed reflections; beneath it is pale ochraceous, with the anal region dusky rufous: the breast and sides of neck are sparsely marked with longitudinal black streaks occupying the centres of the feathers. The *G. mexicanus* has the upper plumage bronzed with steel blue and brownish green reflections. On the breast and sides of neck the webs of the feathers are more loose and setaceous, black in the centre, on either side, with broad reddish ochraceous margins; all the rest of the woolly feathers beneath of a dirty grey colour.

Nothing is more remarkable in these birds than the variation in size to which the bill is subject. This led me to suspect that among the specimens in the collection of the Academy, there were four species, but finding scarcely any difference in the other proportions or colour, I conclude that the bill is subject to very great modification in size and form according to age; which, in fact, is the case in most of the American cuculidæ.

In two specimens of the *G. affinis* the measurements of the bill are as follows:

		1st specimen.	2d specimen.
Length of from nostril to tip,	- - -	8-10ths of an inch,	1 inch and 1-10th.
“ “ lower mandible from the junction of rami to tip,		5-10ths “	7½-10ths of an inch.
“ from angle of mouth,	- - -	1 inch and 6½-10ths.	2 inches.

The smaller one appears to be in perfect plumage, and its colours more brilliant than in the one with the largest bill. The tail, wings and tarsi are nearly equal in both.

A specimen of *G. mexicanus* brought from Buena Vista by one of the army officers, is smaller in every way than the other specimens, but is a young bird. The wing is half an inch shorter, the tarsus shorter, and the bill from angle of mouth five-tenths of an inch shorter, and from nostril to tip one inch and two-tenths, instead of one and a half inches.

From *Saurothera* it only differs in the character of the plumage: the margins of the mandibles are ragged, not serrated, in both; indeed the lacerated appearance is most probably only the result of wear and tear, either in the living bird or in dried specimens.

It at first seemed strange to me that Boie should have placed this bird in his genus *Diplopteris*, but if the very short-billed specimen of the *G. affinis* is compared with *Diplopteris nævius* it will be difficult to find a generic distinction

#### COLUMBA, Linn.

113 C. FASCIATA, Say. Band-tailed Pidgeon.

*C. monilis*, Vigors' Zool. Beechy's Voyage, pl. 26.

Small flocks of this noble pidgeon frequent the woods of California during winter, but are extremely shy.

114. *C. CAROLINENSIS*, Linn. Common Turtle Dove.

We found this species breeding on the prairies near the rivers Arkansaw and Cimaron, in June, forming their nests on the ground at the foot of large tufts of grass. It is common about Santa Fé, and was occasionally seen by us on the road to California, where it is a constant denizen of the vineyards and orchards.

CALLIPEPLA, *Wagler*.

115. *C. CALIFORNICA*, Gould. Californian Crested Quail.

*Perdix californica*, Lath.

This beautiful bird is extremely abundant throughout California; in the winter season congregating in large flocks, sometimes of as many as a thousand or more, in those places where there are woods enough to afford covert for so many. They also resort to the bushy plains and ravines of the hills. Displaying all the watchfulness of our Virginian Quail, they are even more swift of foot, eluding pursuit by running and hiding with surprising speed; but upon sudden alarm, are more apt to fly into the trees, where they lie close upon the horizontal branches like so many squirrels, which added to their colour, resembling somewhat the bark, renders them difficult to be seen. They are exceedingly graceful in their deportment, and when running have the crest elevated and thrown backwards, but when at rest, walking on the ground or over piles of brush, carry it curved forward overhanging the front.

The nest is formed upon the ground at the foot of a tree, or under cover of a bush. The number of eggs is sometimes very great, as in the instance of one which I found at Monterey, July 20th. It was a shallow hole scratched in the ground at the foot of an oak tree, with a few blades of dried grass around the sides but bare at the bottom, and contained twenty-four eggs! I judged from the appearance of them, that two birds had laid in the same nest, as fifteen of them were of a different shade from the others.

116. *C. DOUGLASSII*, Gamb. Douglas' Crested Quail.

*Ortyx Douglassii*, Vigors. Trans. of the Linn. Soc. of London, vol. xvi. p.

145. Zool. Jour. vol. iv. p. 344. Jard. and Selby's Ill. Orn. pl. 107.

Zool. Beechy's Voyage, p. 27, pl. 11. Audubon's Bds. Amer. pl. 418.

*O. spilogaster*, Vigors. Proceed. Zool. Soc. 1832, p. 4.

*O. elegans*, Less. Cent. Zool. pl. 61, p. 189.

*Callipepla elegans*, Gould. Monog. Odont. pl.

This elegant Quail, the female of which was first described as *Ortyx Douglassii*, and which has been so long considered a distinct species, does not, as far as I have observed, extend into Upper California, but is common about the Gulf, particularly at Mazatlan, where no doubt the specimen figured in Beechy's Voyage was obtained, and not, as stated, at Monterey.

117. C. GAMBELII, Gould. Gambel's Crested Quail.

*Lophortyx Gambelii*, Nuttall. Proceed. Acad. Nat. Sci. Phila. vol. i. p. 260,  
*C. venusta*, Gould.

This beautiful species I discovered on the eastern side of the Californian range of mountains in 1841. They were numerous in flocks of fifteen or twenty, running about in company with another species which I thought new also, but the specimens I had procured, whilst engaged in skinning this, were devoured almost at my elbow by a couple of hungry Ravens. Several spiral podded species of *Prosopis*, with low spreading branches, afforded them excellent covert, and the seeds of bushy malvas, chenopodiums and artemisias, probably served them as food in that dreary region.

118. C. PICTA, Gould. Plumed Quail.

*Ortyx picta*, Douglass.

*O. plumifera*, Gould.

Common in the northern parts of Upper California, in the mountain valleys.

119. C. SQUAMMATA, Gray. Scaly Quail.

*Ortyx squammata*, Vigors. Zool. Jour. vol. v. p. 275.

*Callipepla strenua*, Wagler. Isis, 1832, p. 277.

This singular species is common along the banks of streams in New Mexico, and the adjoining parts of California.

#### TETRAO, Linn.

120. T. UMBELLUS, Linn. Ruffed Grouse.

I met with flocks of this familiar species, much to my surprise, in the high mountain ravines along the solitary and desolate Rio Severo, (Nicolet's river of Fremont,) but did not find it anywhere near the coast.

121. T. OBSCURUS, Say. Dusky Grouse.

We also met with this fine species frequently in our journey across the interior.

122. T. UROPHASIANUS, Bonap. Cock of the plains.

Common in the interior.



CHARADRIUS, *Antiq.*

## 123. C. VOCIFERUS, Linn. Kildeer Plover.

This watchful noisy bird is common in California, and as annoying to the sportsman there as with us, ever ready to give the alarm to ducks and other game.

I found them breeding at Santa Barbara in April.

## 124. C. MONTANUS, Towns. Rocky Mountain Plover.

We found this species only in the interior. It has also been found plentiful in Texas.

PLUVIALIS, *Gesner. Briss.*

## 125. P. VIRGINIACA, Gamb. American Golden Plover.

*Charadrius virginiacus*, Borkh.

Common along the coast.

SQUATAROLA, *Cuv.*

## 126. S. HELVETICA, Cuv. Black-bellied Plover.

Small flocks are frequently seen along the coast.

STREPSILAS, *Illiger.*

## 127. S. MELANOCEPHALUS, Vigors. Californian Turnstone.

Zool. Jour. iv. p. 356. Zool. Beechy's Voyage, p. 29.

Head, neck, upper part of breast and back, wings and rump dusky, with golden green reflections; beneath, a band on the wing formed by the tips of the greater coverts, shafts of the quills, tip and base of tail pure white: the scapulars and some of the coverts also edged with white.

Length 9 inches: bill about 1 inch, dark brown: irids hazel: legs umber-brown: tarsus 1 inch.

This remarkable species, so distinct from the common Turnstone, is abundant throughout the coast of Upper California.

I first met with it in the Bay of St. Pedro, in February, flitting over the rocks with great activity, and uttering as it flew a creaking twittering note.

The plumage of the living bird is of a beautiful dark golden green, which contrasted with the pure white of the upper tail coverts, and the double white bands of the wings when expanded, renders its appearance when flying extremely beautiful.

I afterwards found it common along the rocky coast, particularly at Monterey, in November; and observed that it preferred the roughest rocky points and broken stony banks, lashed continually by the foaming surf. Here it delights to run over the rocks covered with sea weed and small shells, rising for a minute on the wing to avoid the dashing breaker, and alighting the moment its fury is spent, to glean its well earned fare amid the rustling foam, in which they are often enveloped.

When flying, they utter a rapidly repeated trilling *twit twit twit*.

Gray in his Genera of Birds has abandoned the name *Strepsilas*, and given *Cinclus* of Moehring for this genus. In my opinion, we might as well go back to Gesner and Aldrovandus for names, as to Moehring, and it is but right that we should, for the names they gave to well known birds, are as much matters of history as names given by authors at the present day. The "inflexible law of priority" must, as a matter of necessity always hold good, to prevent an otherwise ever-varying and endless confusion; and if we adopt it, how can we with justice reject the names given by the very earliest writers on the subject, if they characterize the species in such a way that we can recognize them? It has been assumed that the binomial system of nomenclature was first established by Linnæus, and that we owe the compliment to that great man, not to take any of the names of the older authors; but will the world think so a century hence, when the system of Linnæus will appear as imperfect, as the systems of the older authors do to us now?

Neither can I agree with those who think that we owe the first distinct idea of genus and species to Linnæus. But in regard to this genus the name *Strepsilas* can with propriety be retained, because that *Cinclus* was used before Moehring's time for the Tringas; *Arenaria* of Brisson was previously used for a well known genus of plants; *Morinella* of Meyer, 1810, which is the same as *Morinellus*, was first used for the *Eudromias morinella* of Boie, which should be called *Morinellus anglorum*. The European Turnstone should be *Strepsilas marinus*, the latter being the specific name given to it by Willoughby, Ray, and Catesby.

#### HÆMATOPUS, *Antiq.*

129. H. ATER, Vieill. Black Oyster Catcher.

Gal. des Ois. ii. p. 88.

*H. niger*, Voyage de l'Uranie Zool. p. 129, pl. 34. non Temminck.

*H. Bachmanii*, Aud. Bds. Amer. pl. 427, fig. 1.

I found this species not uncommon at San Pedro, and on the rocky islands along the coast. Their food most probably consists of the Patellæ and Chitons which so abound, and for obtaining which their bills are particularly adapted. When approached they utter a quick whistling *kwit kwit*, and when flying it is so rapidly repeated that it ends in a low trill.

The plumage of the head, neck and breast is glossy blue-black, and of the back and wings glossy brownish-black. The bill and fleshy ring round the eye bright vermillion: irids golden yellow: tarsus and toes fleshy, and almost white.

#### GRUS. *Antiq.*

129. G. CANADENSIS, Temm Great Brown Crane.

Extremely abundant throughout the west, but nowhere perhaps do they congregate in such vast numbers as in California; where, during the winter season, the grassy plains are in many places covered with them, in company with myriads of Geese.

ARDEA, *Linn.*

130. A. OCCIDENTALIS, Aud. Great White Heron.

Common throughout California, frequenting the fresh water ponds and small streams.

131. A. HERODIAS, Linn.

Frequent about the shallow ponds and bays of the coast.

ARDEOLA, *Bonap.*

132. A. EXILIS, Bonap. Least Bittern.

Common about the marshes of California.

BOTAURUS, *Steph.*

133. B. MINOR, Bonap. American Bittern.

*A. minor*, Wils. Vol. viii. p. 35, pl. 65, fig. 3.

I found this species near the Pueblo de los Angeles.

NYCTICORAX, *Steph.*

134. N. VIOLACEUS, Gray. White-crowned Heron.

Extremely abundant about the Gulf of California.

PLATEA, *Antiq.*

135. P. MEXICANA, Willoughby. Roseate Spoonbill.

Will. Orn. p. 213. *Platea Brasiliensis*, Idem.

*P. incarnata*, Sloane. Jam. Ray. Syn. Av. p. 189.

*P. mexicana*, Ray. p. 102.

*P. rosea et P. coccinea*, Briss. Vol. v. pp. 356 et 539.

*Platalea ajaja*, Linn.

Small flocks of this beautiful bird have several times extended up the coast even as far as San Francisco.



FALCINELLUS, *Gesner. Ald. Ray.*

136. F. CAYANENSIS, Gamb. Glossy Ibis.

*Tantalus cayanensis*, Gmel. Lath. Gen. Hist. Bds. vol. ix. p. 145.*Ibis ordi*, Bonap.

Very common in Mexico and plentiful in California. They are quite familiar in many places, frequenting the shallow muddy ponds in the neighbourhood of the towns. At Mazatlan this is particularly the case, and in California at the Pueblo de los Angeles, I found one near the centre of the town along a small ditch. Their flesh is considered very palatable by the Mexicans. When approached too closely and made to fly, they utter in a harsh voice *eh eh ek, eh eh ek, eh eh ek*, and sometimes only a rapidly repeated *ek ek ek ek*, continued for some time.

NUMENIUS, *Antiq.*

137. N. LONGIROSTRIS, Wils. Long-billed Curlew.

We found this excellent game bird abundant on the prairies, and from New Mexico to California, where it is also common.

ACTITURUS, *Bonap.*

138. A. BARTRAMIUS,
- Bonap.*
- Bartram's Tatler.

Common on the prairies of the interior.

TOTANUS, *Becht.*

139. T. FLAVIPES, Vieill. Yellow-shanks Tatler.

Common along the western coast.

140. T. CHLOROPYGIUS, Vieill. Green Rump Tatler.

Common along solitary streams.

141. T. MELANOLEUCUS, Vieill. Tell Tale.

Common along the coast.

SYMPHEMIA, *Rafn.*

142. S. SEMIPALMATA, Gamb. Willet.

*Scolopax semipalmata*, (Lath.) Gmel.*Catoptrophorus semipalmatus*, Bonap.*Symphemia atlantica*, Rafinesque.

Very common in the maritime marshes of Mexico and California.

LIMOSA, *Briss.*

43. L. FEDOA, Vieill. Marbled Goodwit.

Frequent in the winter season along the coast.

MACRORAMPHUS, *Leach.*

144. M. GRISEUS, Leach. Red-breasted Snipe.  
Abundant along the coast.

FULICA, *Antiq.*

145. F. AMERICANA, Gmel. Common Coot.  
Abundant about fresh water ponds, going in large flocks. They breed in California.

PHALAROPUS, *Briss.*

146. P. FULICARIUS, Bonap.  
In the month of November large flocks of this active little sea-bird appeared in the Bay of Monterey. They were in immature plumage, and never came very close to the shore, but seemed to prefer the deep water, riding upon the waves like so many Petrels.

HOLOPODIUS, *Bonap.*

147. H. WILSONII, Bonap.  
*Phalaropus frenatus*, Vieill.  
Frequent in the interior where it breeds.

HIMANTOPUS, *Antiq.*

148. H. NIGRICOLLIS, Vieill. Black-necked Stilt.  
This species is abundant on the Mexican coast, and extends into Upper California, where I found them at Santa Barbara in April. They frequented the wet marshy ponds near the coast, and were probably breeding, as they seemed to be very pugnacious among themselves, balancing in the air, and striking at each other with their wings, the long legs hanging down, and at the same time uttering a noisy loud peculiar note.

RECURVIROSTRA, *Gesner. Will. Ray.*

149. R. OCCIDENTALIS, Vigors. Californian Avocet.  
Zool. Beechy's Voyage, p. pl.  
This is an abundant bird throughout California, and, according to Nuttall, has been shot also at the great northern bend of the Missouri, (see Man. Orn. vol. ii. p. 77.)  
It frequents the muddy margins of ponds and marshes, into which it walks up to its breast in water, and wriggles its bill about in the soft mud like a duck, its head often being entirely immersed.

150. *R. AMERICANA*, Linn. Red-necked Avocet.

We found this species common in crossing the interior.

CYGNUS, *Antiq.*

151. *C. AMERICANUS*, Sharpless. American Swan.

Not uncommon during the winter season in the retired lakes and ponds of California.

CHEN, *Boie.*

152. *C. HYPERBOREUS*, Boie. Snow Goose.

Extremely abundant in California during winter, the plains often being white with them for miles in extent.

ANSER, *Antiq.*

153. *A. ERYTHROPUS*, Linn. White-fronted Goose.

Abundant. The large irregular black patches or bands on the lower part of the breast of this species, is a curious character, and, from their being so irregular in shape, would seem to be in immature condition; but among the myriads of Geese which arrive in California in the fall and retire again early in the spring, perfectly adult ones are abundant, yet I never saw these patches but of the same irregular outline, although many flocks which seemed to be young birds had no trace of such marks.

154. *A. CANADENSIS*, Vieill. Common Goose.

Very abundant.

155. *A. HUTCHINSII*, Richard. Hutchin's Goose.

Abundant in California in company with the former. There is a specimen of this species in the Academy, which was procured by the late Dr. Burrough at Vera Cruz.

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BERNICLA, *Antiq.*

156. *B. BRENTA*, Steph. Brant Goose.

Abundant.

ANAS, *Linn.*

157. *A. BOSCHAS*, Linn. Common Mallard.

Abundant in California.

MARECA, *Steph.*

158. *M. AMERICANA*, Steph. American Widgeon.

Extremely abundant along the coast.



DAFILA, *Leach.*159. *D. CAUDACUTA*, Leach. Pintail Duck.*A. caudacuta*, Ges. Ald. Will. Ray.*A. acuta*, Linn.

Common both in Mexico and California.

SPATULA, *Boie.*160. *S. CLYPEATA*, Boie. Shoveler Duck.

Abundant.

PTEROCYANEA, *Bonap.*161. *P. DISCORS*, Bonap. Blue-winged Teal.

Very abundant in Mexico and California.

QUERQUEDULA, *Briss.*162. *Q. CAROLINENSIS*, Briss. Green-winged Teal.

Abundant.

FULIGULA, *Ray.*163. *F. MARILOIDES*, Vigors. Lesser Scaup Duck.

Zool. Beechy's Voyage, p. 31.

*F. affinis*, Eyton.*F. minor*, Aud.

Abundant in California.

CLANGULA, *Flem.*164. *C. ALBEOLA*, Bonap. Butter-box Duck.

Common.

CEDEMIA, *Flem.*165. *CE. PERSPICILLATA*, Flem.

Abundant.

166. *CE. FUSCA*, Flem.

Abundant.

167. *CE. AMERICANA*, Swains.

Abundant.

ERISMATURA, *Bonap.*168. *E. RUBIDA*, Bonap. Ruddy Duck.

Common.

## CARBO.

168. *C. DILOPHUS*, Swains. Common double-crested Cormorant.

*Phalacrocorax Townsendii*, Aud. Bds. Amer. pl. 412, fig. 2. Young.

This species is common both to the Atlantic and Pacific coasts of North America, specimens from Oregon and California are identical with those of Florida.

Although the double-crested Cormorant of North America was first figured by Vieillot in the Gal. des Ois., pl. 275, yet, strangely enough, the text of the book does not correspond to the plate, and the bird described by Vieillot under that name, is the beautiful *C. punctatus* of New Zealand. It is copied from the Nouv. Dic. d'hist. Nat. vol. viii. p. 5, where he unnecessarily changes the old name *punctatus*.

Swainson, apparently unaware that the name *dilophus* had been given by Vieillot to the spotted shag, or that the North American one was figured, by mistake I suppose, in the Gal. des Ois., first described our bird\* under the name *dilophus*, and is therefore entitled to the name.

170. *C. PENICILLATUS*, Brandt.

This species is readily distinguished during the breeding season by the delicate white linear feathers which are developed upon the sides of the neck and scapulars. It is common at Monterey and other places in California.

PELECANUS, *Linn.*

171. *P. TRACHYRHYNCHUS*, Lath. Rough-billed Pelican.

*P. Americanus*, Aud. Bds. Amer. pl. 311.

Common.

172. *P. FUSCUS*, Linn. Brown Pelican.

Abundant.

SULA, *Briss.*

173. *S. FUSCA*, Briss. Booby.

Common off the coast.

ZACHYPETUS, *Vieill.*

174. *T. AQUILUS*, Vieill. Frigate Pelican.

These birds are extremely abundant at Mazatlan, and about the Gulf of California, and so daring were they, while we were hauling the seine, as to pounce down and seize the fish from within a few feet of us. On a clear day they may be seen in great numbers, soaring at a great height in the air, sometimes almost out of sight.

THALLASEUS, *Boie*.

## 175. T. REGIUS, Gamb.

*Sterna regia*, Gamb. Proceed. Acad. Nat. Sci., vol. iv. p. 128.

*S. cayana*, Aud. Pl. 273, Orn. Biog. vol. iii. pl. 505; Bonap.; Giraud, Bds. Long Island, p. 355; *S. cayana*, Lath.?

*S. erythrorhynchos*, De Weid. Bey. Zur. Natur. Brazil?

Adult male.—Length, 19 inches: extent of wings, 3 ft. 9 in.: length of wing, 15 in.: outer tail feathers,  $7\frac{1}{2}$  in.: tarsus, 1 inch and 2-10ths, black: bill bright red, along the ridge  $2\frac{1}{2}$  in.: from corner of the mouth,  $3\frac{1}{2}$  in.: from symphysis to point, beneath, 1 inch: depth at commencement of feathers, 7-10ths inch.

This noble species, so abundant on our southern coast, has for a long time been considered the *S. cayana* of Latham, notwithstanding its disparity with his description both in size and colouration. It seems to me that the Cayenne Tern must have been founded upon the immature plumage of one of the yellow-billed species of the Brazilian coast, since described by Lichenstein, probably the *S. magnirostris*.

Young birds of our species would agree pretty well with the *erythrorhyncha* of Brazil, described by the Prince de Wied, as they are somewhat smaller and less proportioned, yet we hesitate to give it that name, until its identity can positively be proved, particularly as the Terns of that coast are peculiar.

The representative of the *regia* in the old world, is the *S. velox* of Rüppel, though quite distinct.

## 176. T. ELEGANS, Gamb.

*Sterna elegans*, Gamb. Proceed. Acad. Nat. Sci. vol. iv. p. 129.

Adult male.—With the general plumage of *S. regia*; length, 17 in.: of wing,  $12\frac{1}{2}$  in.: of outer tail feathers, 6 and 8-10ths in.: tarsus, 1 and 1-10th in.: middle toe and nail, 1 and  $2\frac{1}{2}$ -10ths in.: bill bright red, along the ridge 2 and 6-10ths in.: from corner of mouth, 3 and 3-10ths in.: from symphysis to point beneath,  $1\frac{1}{2}$  in.: depth at commencement of feathers, 5-10ths in.

This elegant species differs from the former not only in proportions, but in the delicate hue of the under parts, which are of a satiny cream colour when living, but faded very much in the dried specimen.

The bill is of the same colour as in the *regia*, and as long, but much more slender; the prominent angle beneath half an inch farther from the point, and the depth at base two-tenths of an inch less. Wings two and a half inches shorter, but of the same colour in every respect. Legs pure black, the tarsus nearly as long as in the former, but the toes much shorter. Tail long, pure white and deeply forked, whole



top of head from the bill, pure black, extending into an ample flowing crest as in the former species.

The representative of this species in the old world is the *S. affinis*, Rüppell, but it differs from that species in nearly the same respects as *S. regia* does from *S. velox*.

I procured this species on the Pacific coast of Mexico, particularly at Mazatlan at the mouth of the Gulf of California. It is exceedingly delicate in its plumage, and graceful in its mode of flight. I found them congregated in numbers on the sandy shoals of the Bay in the month of April, uttering as they flew a grating Kingfisher-like note.



ART. XVIII.—*Additional Observations on a new living species of Hippopotamus.*

By SAMUEL GEORGE MORTON, M. D. Penn. &amp; Edinb.

In the year 1840 I met with a man who had travelled extensively through the colony of Liberia, and beyond the limits of that province into the Dey and Bassa countries on the western coast of Africa. Among a variety of statements made by this person, was one to the effect that he had repeatedly seen, in the rivers of this interior region, a small Hippopotamus, not longer in the body than a middle-sized heifer, though possessing the relative proportions of the common Hippopotamus, to which it bore in all respects an epitomized resemblance. He further stated that the natives hunted this animal for food, and that he had himself seen it killed and eaten. This person's account, and his replies to my questions, were clear and consistent throughout; but some subsequent circumstances tended to cast a doubt upon his veracity, and satisfied me that his statements required confirmation from other sources.

In the summer of 1843, however, I received from my friend Dr. Goheen an extensive series of skulls of the mammiferous animals of Western Africa. They had been obtained by him during a residence of several years at Monrovia, in Liberia, where he had officiated as Colonial Physician; a situation that gave him great facilities for procuring the natural productions of that region. Among these crania were two of a small Hippopotamus from the river St. Pauls; a stream that rises in the mountains of Guinea, and passing through the Dey country and Liberia, empties into the Atlantic to the north of Cape Messurado.

Although nothing could be more manifest than the difference, both in size and conformation, between the head of this animal and that of the common Hippopotamus, I for some time hesitated to publish it, under the impression that so remarkable a species could not have wholly escaped the attention of zoologists. Having, however, carefully examined the latest European works on Zoology without finding any notice of it, I at length published a description, accompanied with two wood engravings, in the Academy's Proceedings for the month of February, 1844; and inasmuch as all subsequent investigation, both in Europe and this country, has confirmed the entire novelty of this species, I now republish it with some corrections, and much larger and more accurate illustrations.

I first announced this animal by the name of *Hippopotamus minor*; not knowing



at the time that Cuvier had already given this specific designation to a fossil species. It therefore becomes necessary to change it, which I do by placing this species in the zoological system by the name of

### HIPPOPOTAMUS (TETRAPROTODON) LIBERIENSIS.

#### The Little or LIBERIAN HIPPOPOTAMUS.

*Dental Formula.*

$$\begin{array}{l} \text{Incisors, } \frac{4}{2} \quad \text{or, } \frac{2-2}{1-1} \\ \text{Canines, } \frac{1-1}{1-1} \\ \text{False molars, } \frac{4-4}{4-4} \\ \text{Molars, } \frac{3-3}{3-3} \end{array}$$

Of the two skulls in my possession, one is that of a very old individual, in which the teeth are much worn down, and the incisors, canines, and two first false molars on each have been lost. This head is entire, excepting a small part of the nasal and maxillary bones of one side. The lower jaw is wanting. Pl. 34, fig. 5.

The other head is of the same size and proportions, but has pertained to a younger animal. It retains all the teeth, and for this reason I have used it exclusively in the following dental observations. It also retains the lower jaw; but the occiput, orbit and zygomæ have been fractured, and parts of the bones lost. There are also three slug or bullet wounds through the nasal region. Pl. 32.

UPPER JAW.—The *central incisors* are slightly flattened, and about a quarter of an inch in diameter at the alveolar margin. The lateral incisors are less flattened and more conical. All these teeth are slightly curved and nearly vertical. Pl. 34, fig. 3, and plate 33, fig. 3.

The *canines* are about an inch in the longest diameter, and remarkable for a deep posterior groove or furrow, extending about half the depth of the tooth, and giving its cross section (and consequently the corresponding alveolus) a reniform outline. Pl. 34, fig. 2. These teeth are much worn by attrition.

*False molars.*—The first of this set is little more than an inch in length, slightly curved, and has but a single fang and point. Pl. 33, fig. 5. The second and third false molars are very much larger than the first, with two fangs. They run to an irregular conical point, with a second rudimentary point on the posterior margin. The fourth false molar is less in size than the second and third, and is only partially

protruded above the jaw. It is capped on each side by the mere shell of the corresponding deciduous molar. The latter has been removed in Pl. 33, fig. 2, in order to show the protruding permanent tooth.

*The molars.*—Of the three molar teeth the middle appears to be the largest; but the posterior one is so partially protruded as to render comparison imperfect. The crown of each, before it becomes worn by attrition, presents a double cone, divided into four points by a longitudinal fissure. The roots of the first two molar teeth are four in number, but the last has five.

**LOWER JAW.**—In the lower maxilla dentition is complete, there being no remains of the deciduous teeth, and all the teeth are perfect, excepting only in the molar fangs.

*The incisors.*—These two teeth are much longer and more robust than those of the upper jaw. They protrude nearly on a line with the alveolar margin, and are much worn away by attrition. Pl. 33, fig. 4.

The *canines* differ from those of the upper jaw in being much longer, and in wanting the grooved or fluted character on their posterior surface. Pl. 34, fig. 1.

*False molars.*—The first of these is smaller than the upper one. Pl. 33, fig. 6. The second and third are more compressed than their fellows, and run up with smooth sides to a flattened cone. Pl. 33, fig. 7. The fourth false molar is a little smaller than those that precede it, and, like the corresponding teeth of the upper jaw, shows some resemblance to a true molar in its irregular crown and rudimentary points. Pl. 33, fig. 8.

*The molars.*—The three true molars increase in size from first to last, and differ in no material respect from the upper set. The last of them, however, which has just attained its adult position, has four complete points on its crown, and a rudimentary one posteriorly. It has also five corresponding fangs, but these have not yet attained their full length. Pl. 33, fig. 9.

#### Measurements.

	Inches.
Basal length of the skull, measured from the margin of the notch between the occipital condyles	
to the anterior end of the maxillary bones,	12.3
From the last named point to posterior surface of the condyles,	12.8
Basal distance between the anterior margin of the upper maxilla to the end of the os palati,	8.4
Distance between the posterior molars,	1.2
Distance between the posterior false molars,	1.4
Distance between the canines,	2.7
Distance between the external incisors,	1.7
Distance between the internal or central incisors,	1.
Inter-zygomatic diameter,	12.3
Inter-parietal diameter,	3.5
Distance between the orbits over the surface of the cranium,	3.9

	Inches.
Vertical diameter of the orbit, - - - - -	2.
Horizontal diameter of the orbit, - - - - -	1.8
Vertical diameter of the occiput, measured from the lower margin of the foramen magnum -	3.6
Lateral diameter of the foramen magnum, - - - - -	1.3
Vertical diameter of foramen magnum, - - - - -	1.1
From the centre of the orbit to the lateral margin of the occiput on the same plane, - -	5.1
From the centre of the orbit to the anterior end of the upper maxilla, - - -	7.3
Length of the lower jaw, - - - - -	10.2
From the angle of the lower jaw to the top of the coronoid process, - - - - -	5.6
Depth of the lower jaw from the alveolar margin of the fourth false molar to the base, -	2.2
Length of the symphysis, measured externally, - - - - -	3.3
Distance between the outer margins of the angles of the lower jaw, - - - - -	8.9
Distance between the outer alveolar margins of the canines of the lower jaw, - - - - -	4.5

The preceding remarks and measurements, and the annexed drawings, almost preclude the necessity of further specifications on the cranial structure of this animal. It may be observed, however, that in the *H. Liberiensis* there is a slight but uniform convexity of the upper surface of the skull from orbit to orbit, and between the occipital and nasal bones; while, on the contrary, in the *H. amphibius* the orbits are remarkably elevated, and the intermediate surface is concave.

In my first description I committed an error in describing the orbit as nearly intermediate between the two extremes of the head. This mistake is corrected in the table of measurements. At the same time it is to be remarked, that the orbit is placed much nearer a central point than in the *H. amphibius*, as will be more particularly evident in the reduced vertical view, Pl. 34, fig. 5.

The lachrymal bone in this species is remarkable for its extreme tenuity as well as for its form. It rises with prominent convexity from the floor of the orbit for nearly an inch in length, and is marked by a slight, sub-central, vertical constriction, that gives it a bilobed shape.

Dr. Goheen, (who from the first of his seeing these bones, considered them indicative of a new species,) has obligingly favoured me with the following memorandum. "These animals abound in the river St. Pauls, and vary in weight from four hundred to seven hundred pounds.\* They are slow and heavy in their motions, yet will sometimes stray two or three miles from the river, in which situation they are killed by the natives. They are extremely tenacious of life, and almost invulnerable excepting when shot or otherwise wounded in the heart. When injured they become irritable and dangerous, but are said by the natives never to attack them when in their canoes. The negroes are very fond of the flesh, which seems to be intermediate in flavor between beef and veal."

\* Judging from the osteology of the animal, it can rarely attain this maximum weight.



In preparing to republish this animal, I had contemplated a review of the allied species both living and extinct; but before commencing the arrangement of my materials, I had the pleasure to receive a communication from Dr. Hugh Falconer, of London, the distinguished author of the *Fauna Sivalensis*. In this letter Dr. Falconer gives a clear and concise view of the present state of our knowledge of the several species, recent and fossil, of the genus *Hippopotamus*, and I trust I commit no infraction of the kindness and confidence of that gentlemen by inserting so much of his communication as refers to this subject.

LONDON, BRITISH MUSEUM, OCTOBER 2d, 1847.

\* \* \* \* \*

“I regard your species as one of the most interesting and remarkable discoveries that has been made in recent zoology during the present century. Cuvier, in the “Discours Preliminaire,” has entered into an elaborate argument against the probability of any remarkable existing large species of land animal remaining to be discovered, after the search which has been made through the continents and great islands of the globe; but your discovery proves that the inference was premature.

The species as you have established it, is perfectly distinct from the *H. amphibius*. It differs more from the latter than *H. amphibius* does from *H. major* and *H. palæindicus*; the only two fossil species of the same subgenus of which the crania are known. The distinctive characters as you have given them, are very strongly marked, viz.: the length of cranium proper as compound with that of the face: the advanced position of the orbits: the convexity of the forehead, both from back to front, and across between the orbits: and the details of the dental character. The canine teeth of the upper jaw alone, without reference to the dimensions and other peculiarities, would establish the distinctness of the species. In *H. amphibius* and *H. major*, the internal vertical channel is shallow, while in your species it is so deeply grooved, as to yield a strongly marked reniform outline in the section. This character was of especial interest to me, as it is constant, and nearly to the same amount in an Indian fossil species, of the subgenus *Hexaprotodon*, var. *Hipp. (Hex.) Sivalensis*.

Unluckily, Cuvier had preoccupied the specific name of *H. minor* for this small European fossil species, which he called both *H. minor* and *H. minutus*. The latter name is now generally applied to it; but to prevent confusion, the name which you mention in your letter to me would be the most suitable to your species, and in the notice which I intend taking of it, I shall mention it as *Hipp. Liberiensis*, (Morton.)

Enclosed I send you a synopsis of the results of my examination of the Hippopotamidæ, fossil and recent.

Hippopotamus comprises two subgenera, HEXAPROTODON, with six incisors above and below; and TETRAPROTODON, the species with reduced incisors, viz., four above and below. Your species, although it has but two in the lower jaw, belongs to the latter subgenus. The excessive reduction is probably only an individual case of variety, but if proved to be constant, the position of species in the genus will not be altered. The succession of the species in the table indicates the order of their affinities. No. 1, *H. major*, is the most divergent form, with short cranium, posterior orbits, great elevation of the sagittal and occipital crests, and excessive elevation of the upper margin of the orbits above the plane of the brow. Next follows *H. palæindicus*, (No. 2,) a true fossil Hippopotamus from India. Then comes *H. amphibius*, No. 3 in the series, of which the French naturalists make two species, *Capensis* and *Senegalensis*.

Duvernay, in a late memoir, (Comptes Rendus, October 1846,) maintains their distinctness, but I regard them as merely varieties. *H. annecteus*, No. 4, is an undescribed fossil species from the Nile above the Cataracts, which I lately observed in the Frankfort collections, (the Senckenberg Museum,) and brought to Europe by Dr. Rüppel in 1827. I have named it *H. annecteus* from its forming a link in size between *H. amphibius* and your species. The cranium is not known. Cuvier's *H. medius* has proved to be a species of Dugong, (*Halitherium* of authors.) Next follows Cuvier's *H. minor*, No. 5, which is a doubtful *Tetraprotodon*. I range your species last, from its close resemblance to the Indian *Hexaprotodons* in the form of the upper canines, No. 6.

Of HEXAPROTODON, we have three well-marked Indian fossil species. *H. Iravaticus*, No. 7, is a size larger than your *H. Liberiensis*. *H. sivalensis*, No. 8, is less than *H. amphibius*; and *H. namadicus*, No. 9, with other strongly marked characters, is larger than *H. amphibius*, or the *H. sivalensis*. We possess portions of every part of the skeleton, showing the closest resemblance to *Hippopotamus amphibius* throughout, but more slender in the proportions. *Merycopotamus* is a most interesting and well marked genus, connecting *Hippopotamus* with *Anthracotherium*. The molar teeth, as in the latter, are constructed on the ruminant plan; while the cranium, incisors and canines, together with the leafy expansion of the angle of the lower jaw, connect it with the former. It was nearly of the size of your *H. Liberiensis*.

#### SYNOPSIS OF THE HIPPOPOTAMIDÆ, FOSSIL AND RECENT.

##### GENUS 1. HIPPOPOTAMUS.

###### Subgenus 1. TETRAPROTODON.

1. *H. (Tet.) MAJOR.* Europe. Fossil.
2. *H. (Tet.) PALÆINDICUS.* India. Fossil.

3. H. (Tet.) AMPHIBIUS, *Linn.* Africa. Existing.  
     H. SENEGALENSIS,           "           "  
     H. CAPENSIS, *Auct.*       "       "
4. H. (Tet.) ANNECTEUS. Africa. Fossil.  
 5. H. (Tet.?) MINOR, *Cuv.* Europe. Fossil.  
 6. H. (Tet.) LIBERIENSIS, *Morton.* Western Africa. Existing.

## Subgenus 2. HEXAPROTODON.

7. H. (Hex.) IRAVATICUS. India. Fossil.  
 8. H. (Hex.) SIVALENSIS. India. Fossil.  
 9. H. (Hex.) NAMADICUS. India. Fossil.

## GENUS 2. MERYCOPOTAMUS.

M. DISSIMILIS. Fossil. India.

H. F."

In addition to the preceding remarks of Dr. Falconer, I submit the following in further explanation :

The first attempt to divide the *Hippopotamus amphibius* of Linneus, was made by M. Desmoulins in Magendie's *Journal de Physiologie* for 1825. This able naturalist, after comparing the head and parts of the skeleton of the *Hippopotamus* of Senegal with that of the Cape, came to the conclusion that the two animals were specifically distinct. On this subject I shall only remark, that I possess two adult heads from the Cape, and the Academy's collections contain two others from Senegal; and that on comparing them, I find the Cape specimens to differ as much from each other as either of them does from those of the rivers of Senegal. If, however, they should prove distinct, the courtesies of science require that the specific name *amphibius* be retained for one of them, and to that of Senegal in preference, because it has been best known to naturalists, and has consequently served as the basis of most descriptions.

In D'Orbigny's *Dictionnaire d'Histoire Naturelle*, M. Boitard has elaborately investigated this question. He details the two species proposed by M. Desmoulins, and adds that M. Lesson had proposed the name of *H. Abyssinius* for the animal inhabiting the upper Nile; but M. Boitard does not adopt these specific designations.

This department of science has yet more recently been investigated by M. Duvernoy, whose facts and conclusions are published in the *Compte Rendu des Séances de l'Académie des Sciences*, for October, 1846. It may suffice on the present occasion to observe, that M. Duvernoy's observations are favourable to the specific distinctions proposed by M. Desmoulins; he regards the Abyssinian animal as of the same species with that of Senegal, but maintains the specific distinctness



of the Hippopotamus of the Cape. He further admits the *H. Liberiensis*, (minor,) to be perfectly distinct from either, and concludes his memoir by adopting three species of living Hippopotami. All this is very well; but we confess our surprise that M. Duvernay, after confirming the two species proposed twenty years before by M. Desmoulins, should, without note or explanation, give new names to them both. Thus, he calls the Senegal and Abyssinian animal *H. typus*, because it has been longest known to naturalists and others. The Cape species he designates *H. australis*.

Now we must be allowed to repeat, that this unnecessary change of names is contrary to the conventional usages of naturalists, and hostile to the utility and integrity of zoological nomenclature. For if M. Duvernay can be sustained in this innovation, the very next writer on the subject has an equal right to indulge his fancy or ambition in the same way, and may discard M. Duvernay's names for others of his own. Such practices tend to interminable confusion in science, which is already over-burthened with synonyma.

In the present state of our knowledge, and awaiting the results of further observation and comparison, we can only admit of two living species of Hippopotamus as positively determined; viz. *H. amphibius* and *H. Liberiensis*.

By the cruel munificence of the Roman Emperors, the solitudes of Europe, Asia and Africa were annually taxed to furnish wild animals for the bloody sports of the amphitheatre. Of all the large quadrupeds, the Hippopotamus was the only one that escaped the sacrifice; not on account of his size, which would have been no obstacle, but from his amphibious habits, which prevented his being taken to Rome or exhibited in Europe. But the smaller species I now introduce to notice, is of so moderate a bulk, even in adult age, as to render his capture and transportation of comparatively easy accomplishment; and I feel confident that nothing more will be necessary to success, than an adequate reward to such of the inhabitants of Liberia as may be disposed to attempt so novel an enterprise. A half grown animal, if not really docile might at least prove tractable; and by a studious adaptation of his food, and attention to his aquatic habits, we can see no great difficulty in introducing the Liberian Hippopotamus into the menageries of Europe and America. The skin and entire skeleton can no doubt be readily obtained, and would constitute most instructive additions to any collection of zoology or comparative anatomy. I shall close this paper by stating the remarkable fact, that although this Hippopotamus is abundant within one hundred and fifty miles of the sea coast of Liberia, the only parts of him that are known to have ever been sent from Africa, are the two skulls in my possession. I cannot find that any portion of the animal is yet contained in the museums of Europe.\*

\* I sent my specimens to London by the hands of Mr. (now Sir Charles) Lyell, that they might be examined by those distinguished comparative anatomists, Professor Owen, of the Royal College of Surgeons, and Dr. Hugh Falconer, author of the *Fauna Sivalensis*.

## EXPLANATION OF THE PLATES.

## PLATE XXXII.

Cranium of the younger of the two animals. The nasal region is pierced by two slugs, and the orbit, zygomatic process and terminal portion of the occiput, are fractured and the fragments lost.

## PLATE XXXIII.

Parts of the same cranium.

Fig. 1. Right half of the lower jaw with its nine teeth.

Fig. 2. Right half of the upper jaw with its ten teeth; the first præmolar, (fig. 5,) having been removed for a separate drawing, was inadvertently omitted in the present instance. The fourth and last premolar is of the permanent series, but not fully elevated above the bone. I removed the shell of the corresponding deciduous tooth in order to bring the permanent one into view. All the rest of the teeth in both jaws belong to the permanent set.

Fig. 3. Internal incisor of the upper jaw, natural size.

Fig. 4. Incisor of the lower jaw, natural size.

Fig. 5. First præmolar of the upper jaw, natural size.

Fig. 6. First præmolar of the lower jaw, natural size.

Fig. 7. Third præmolar of the lower jaw, natural size.

Fig. 8. Fourth præmolar of the lower jaw, natural size.

Fig. 9. Third or posterior molar of the lower jaw, natural size: the roots imperfectly developed.

## PLATE XXXIV.

Fig. 1. Canine tooth of the lower jaw, natural size, with a transverse section.

Fig. 2. Canine tooth of the upper jaw, natural size, with a transverse section.

Fig. 3. Face and front view of the head and lower jaw.

The three preceding figures were taken from the younger of the two animals; the following figures are derived from the older skull.

Fig. 4. View of the occiput in its vertical position.

Fig. 5. Cranium, viewed from above, the sutures being obsolete from age, as stated in the text.





ART. XIX.—*Descriptions of new species of Birds of the genera VIDUA, Cuvier, EUPLECTES, Swainson, and PYRENESTES, Swainson, specimens of which are in the collection of the Academy of Natural Sciences of Philadelphia.\** By JOHN CASSIN.

VIDUA, Cuvier.

V. ALBONOTATA, nobis.—Alarum tectricibus superioribus, minimis flavis, minoribus brunneo terminatis, et majoribus albo terminatis, remigibus ad basin albis; reliquis partibus læte nigris. Rostro cærulescente, margine utriusque mandibulæ albo margaritacea.

Long. tot. (exuvix) ab apice rostri usque ad finem caudæ, 6½ pol. alæ 3, caudæ 3 3-10 pollices.

Hab. Natal, in Africa orientali.

Space at the flexure of the wing, including the least wing coverts, yellow. Primaries white at their bases to the extent of about one-third of their length; greater wing coverts also tipped with white, which, with that portion of the primaries of the same colour, forms a conspicuous white spot on the wing. Lesser wing coverts tipped with brown.

All other parts of the plumage glossy black.

Bill light blue, at the edges of the mandibles pearly white.

Total length (of skin) from tip of bill to end of tail about 6½ inches, wing 3, tail 3 3-10 inches.

HAB. Port Natal; Eastern Africa.

This bird belongs to that group of species which forms the genus *Coliuspasser*, Rüppel. From either of those species (*V. flavoptera*, Vieill., *V. macrocerca*, Licht., *V. axillaris*, A. Smith, and other species,) it may readily be distinguished by the white spot on the wing, which is peculiar.

Three specimens of this interesting species, all of which are labelled as coming from Port Natal, by Mr. J. Verreaux, are included in the many valuable acquisitions of this Academy, made through the judicious exertions of Mr. Edward Wilson.

V. CONCOLOR, nobis.—Unicolor niger, rostro valido, conico, cauda longissima. Habitu *Vidua payanensis*, (Gm.) sed rostro majore plumisque alarum et caudæ latioribus, sine vestigio collaris rubri, quod ad hanc speciem proprium est.

Long. tot. (exuvix) ab apice rostri usque ad finem caudæ 12 pol. alæ 2 8-10, caudæ 8½ pollices.

Hab. Africa.

Plumage entirely black, bill strong, conical, tail very long.

General form and appearance of *Vidua payanensis*, (Gm.) but with no vestige of

\* From the Proceedings of the Academy of Natural Sciences of Philadelphia, vol. iv. p. 65, (June, 1848.)

the red collar which distinguishes that species; the bill is larger, and the tail and quills also are broader.

Total length (of skin) from tip of bill to end of tail about 12 inches, wing 2 8-10, tail 8½ inches.

HAB. Africa.

Of this species one specimen only is in the Rivoli collection, without label.

It is nearly related to the *Vidua payanensis*, (Gm.) which appears to be the *V. rubritorques*, Swainson, but has the bill larger than either of ten specimens of the latter which I have examined. The entire absence of the red collar is, however, the most striking distinguishing character.

#### EUPLECTES, *Swainson*.

*E. NIGROVENTRIS*, nobis.—Partibus superioribus coccineis, exceptis alis et cauda, fusciscentibus marginibus pallidioribus. Genis, partibusque inferioribus, a basi rostri, intense nigris, exceptis tibiis et crissa, albo rufescentibus.

Long. tot. (exuvix) ab apice rostri usque ad finem caudæ, 4½ pol., alæ 2 3-10, caudæ 1½ pol.

Hab. Zanzibar.

Entire upper parts of the plumage, scarlet, except the wings and tail, which are hair brown with paler margins.

Cheeks and entire under parts of the body, from the base of the bill, deep black, except the thighs and inferior tail coverts, which are pale reddish white.

Total length (of skin) from tip of bill to end of tail about 4½ inches, wing 2 3-10, tail 1½ inches.

HAB. Zanzibar.

This species, one specimen of which from the Rivoli collection is now described, resembles *Euplectes flammiceps*, Swainson, more than any other species known to me. From that, and the other species of this genus in which the scarlet plumage predominates, it may easily be distinguished by the uniform deep black of the entire under surface of the body.

#### PYRENESTES, *Swainson*.

*P. COCCINEUS*, nobis.—Capite, collo, uropygio, caudæ tectricibus superioribus et hypochondriis coccineis nitente; cauda supra coccinea pallidiore. Alis, dorso et corporis reliquis partibus brunneis.

Long. tot. (exuvix) a rostri apice usque ad finem caudæ 4 4-10 poll., alæ 2 3-10, caudæ 1 9-10 pollices.

Hab. Africa occidentali.

Head, neck, rump, upper tail coverts, and flanks glossy crimson.

Tail above of the same colour, but not so glossy.

Wings, back, and all other parts of the body brown, a few of the feathers of the back and wing coverts margined with red.

Total length (of skin) from tip of bill to end of tail about 4 4-10 inches, wing 2 3-10, tail 1 9-10 inches.

HAB. Western Africa.

Very similar in colour and general appearance to *Pyrenestes coccineus*, (Vieill.) but is much smaller and less robustly organized.

The two species measure as follows:—

	<i>P. ostrinus</i> , (Vieill.)	<i>P. coccineus</i> , Cassin.
Total length of skin from tip of bill to end of tail,	5 6-10 inches,	4 4-10 inches.
Length of wing from flexure to tip of longest primary,	2 8-10 “	2 3-10 “
Length of tail,	2 4-10 “	1 9-10 “
Length of bill from gape,	7-10 “	5-10 “
Breadth of under mandible,	7-10 “	5-10 “

The dimensions of *P. ostrinus* here given, are nearly the same as those given by Mr. Swainson, in *Birds of Western Africa*, vol. i. p. 158, (Nat. Lib.) and agree with Vieillot's plate Ois. Chant. pl. 48.

Several specimens of each species are in the collection of the Academy.





ART. XX.—*Cryptocephalarum Boreali-americanae diagnoses cum speciebus novis  
musei lecontiani.* Auctore S. S. HALDEMAN.

An examination of the North American species of *Cryptocephalus* and *Pachybrachis* seems to indicate that the characters which are usually regarded as of generic value, are subject to considerable variation, and to some difficulty in the application. Several additional sections are here proposed, chiefly because the species cannot be placed in the former genera; but as it will be necessary to examine a much larger number of species, including both sexes, before this sub-family can be placed upon a permanent generic basis, several of the sections are allowed to remain in the old genus *Cryptocephalus*, instead of being provided with distinct names. The genus *Chlamys* would have been included in this paper, had it not been already monographed by Lacordaire in the second volume of his large work on the *Phytophaga*.

Caput deflexum, fronte plana, antennis distantibus: abdomen basi utrinque prolongatum, epimeris metathoracis amplectens, articulo ultimo majore: tarsi unguiculis simplicibus, vel appendiculatis: coxae anticae distantes.

- |  |           |                                |
|--|-----------|--------------------------------|
| §1. Prosterno lato, bisulcato, postice angulato, rotundato-acuminato,  | - -       | GRIBURIUS <sub>†</sub> Lec.    |
| 2. Prosterno sulcato,  | - - - - - | PACHYBRACHYS.                  |
| 3. Prosterno postice dentibus 2 longis armato, (Crypt. G—b.)   | - - -     | CANTHOSTETHUS.                 |
| 4. Prosterno plano, lato,  | - - - - - | CRYPTOCEPHALUS.                |
| 5. Thorace pone oculos acute lobato ♂ ♀; prosterno maris cornu compresso<br>inter coxas, coxis posticis ♂ perlongis, apice spiniferis, | - - - -   | BASSAREUS.                     |
| 6. Thorace maris non lobato, prosterno ♂ cornu compresso ante coxas,<br>coxisque ♂ posticis spiniferis, (C. formosus.)                 |           |                                |
| 7. Prosterno spina acuta inter coxas ♂ ♀ (C. amatus, recurvus.)  |           |                                |
| 8. Thorace pone oculos late lobato, lobo brevissimo, truncato, (C. sulphuripennis.)  |           | ODONTODERUS <sub>†</sub> Chv.? |

In the European genus *STYLOSOMUS Suffrian*, 1847, Lin. ent. 2,8; the scutellum is not apparent.

GRIBURIUS<sup>i</sup> Hald.

1. C. SCUTELLARIS F. 2,54 :72. Niger, antennarum basi, capitis maculis, thoracis margine maculis 2 basalibus, lineaque antica, scutello, elytrorum macula transversa marginali ad medium apice, pygidio macula magna laterali, abdominis margine pedibusque *flavis*: pronoto sparsim subtilius punctato, basi utrinque oblique impresso: elytris punctato striatis, apice fere laevibus. Long. 2½ lin.

a. Pygidio toto flavo ; pectore utrinque flavo-guttato. *Pachybrachis decoratus* †Dej., 445.

c. Pronoto sparsim punctato, maculis discoidalibus nullis, pectore immaculato.

Variety  $\beta$  is allied to the type, and differs chiefly in the coarser punctures upon the pronotum and apex of the elytra.

*Griburius* is a latinized form of the French name for *Cryptocephalus*, (gribouri) and although it was perhaps not intended as a permanent name by Dr. LeConte, I have no hesitation in adopting it, as it will give two forms under one vernacular name.

### BÀSSAREÛS *Hald.*

2. C. CLATHRATUS *Mels.* Pr. Acad. 3,173. Saturate rufus, capite flavo-variegato, thorace subtiliter punctato, flavo-marginato, maculis 2 basalibus flavis; elytris profunde striato-punctatis, nigro-brunneis, guttis pluribus in fasciis 3 ordinatis, apiceque flavis: antennis apice tibiis tarsisque fuscis: pygidio grosse equaliter punctato. Long. 2 lin.

a. Capite thorace pedibusque laete rufis.

b. Prosternum with an erect compressed spine between the coxae: a large lunate yellow plate between the posterior coxae, with the extremities projecting and forming an acute spine; abdomen with a large shallow smooth impression; sides bounded laterally and posteriorly by an acute margin, posterior to which projects a small tooth; ♀ without these appendages, but provided with a deep fovea upon the last ventral segment. Pennsylvania and Carolina.

3. C. CONGESTUS *F.* 2,47 :34. Dejean regarded the preceding insect as this species, but I have no means of ascertaining the accuracy of his determination. = *C. brunnipes* †Oliv.?

### CRYPTOCEPHALUS *Geoff.*

÷ 1, punctato-striati, pronoto laevissimo vel punctulato.

A. Elytris flavo-guttatis.

B. Elytris nigro-guttatis.

a. Thorace nigro, flavo-lineato.

b. Thorace vel maculato vel immaculato, non lineato, prosterno postice emarginato, lobis acutis.

C. Elytris vittatis.

a. Elytro singulo vittis 2 plus minusve distinctis.

b. Elytro singulo margine vittisque duabus flavis apice coeuntibus, his nonnunquam evanescentibus.

D. Prosterno postice vix emarginato, thorace nigro, vel maculato vel immaculato, elytris flavis.

E. Elytris rufo-maculatis.

F. Metallici.

÷ 2, disperse punctati, thorace punctatissimo.

G—a. Elytris disperse punctatis.

G—b. Elytris striato-punctatis



## 4.

4. *C. GUTTATUS* *Hald.* Laete rufus: capite flavo-maculato; antennis fuscis, basi rufis: pronoto subtiliter sparse punctulato, canaliculato; margine angusto, maculisque 2 basalibus flavis: elytris nigris, profunde punctato-striatis, singulo maculis flavis 4-2-2-1 positis, ultima apicali: pygidio punctato, leviter carinato, apice utrinque macula parva flava. Long. 2 lin.

♂..? ♀ with a transverse impression between the anterior coxae, and a deep fovea on the last segment of the venter. Pennsylvania.

5. *C. FORMOSUS* *Mels.* Pr. Acad. 3,173 :14. Niger, capite fulvo-variegato, antennarum basi flavis: pronoto laevissimo, margine fulvo-interrupto, maculis 2 basalibus fulvis: elytris profunde punctato-striatis singulo guttis 3?-2-2-1 positis fulvis, ultima apicali: pygidio punctato, carinato, supra leviter impresso. Long. 2 lin.

Black, head punctulate, frontal line impressed; front below the antennae, and extending to the inferior portion of the eyes, and a spot at the inner superior angle of the eye *fulvous*; antennae flavous, except the four apical articulations, which are obscure fuscous: pronotum with the four angles, two basal spots, and anterior margin *fulvous*: elytra profoundly punctate striate, with four series of transverse fulvous spots, the basal row occupying the first third and fifth interstices, but as the second and fourth have some colour, the basal spots may be considered confluent; the interior basal spot is in contact with the scutel, which gives it an oblique direction; the two medial spots (on each elytron) are sometimes confluent; posterior to these are two more, and an apical one.

♂ with an acute yellow spine near the anterior margin of the prosternum, and a yellow plate on the first segment of the abdomen, bearing two sharp teeth posteriorly: venter with a large shallow impression defined laterally and posteriorly by an acute line.

♀ with a slight fovea between the anterior coxae, and a deep fovea on the final segment of the abdomen.

6. *C. LAUTUS* *Newman.* Mag. n. h<sup>v</sup>. 1840, 4,250. — *guttatus* † *Dej. Cat.* ,447'. — *pulcher* † *Mels. Cat.* :497. Laete rufus, pernitus, capite flavo: pronoto laevissimo, elytris nigris punctato-striatis, maculis flavis 3-2-2-1 positis, ultima apicali, superiori externa humerali: abdomine flavo-marginato.

a. Elytris brunneis, flavo-maculatis. ♀.

b. Elytris nigris, maculis posticis obsoletis: puncto solum apicali flavo. ♂

In both sexes the anterior margin of the prosternum is prominent, covering the mouth, and emarginate posteriorly: the male is destitute of the ventral fovea.

*B—a.*

7. *C. BIVIUS Newm.* 1840. Mag. n. h". 4,249. "Antennæ fuscæ, basi ferruginæ: caput ferrugineum, maculâ suborbiculari albidâ: prothorax albidus, lineis 4 longitudinalibus, puncto laterali, marginibusque nigerrimis: elytra dorso ferruginæ, lateribus albida, maculis 10 margineque postico nigris: abdomen pedesque pallidè ferruginea. (Corp. long. .2 unc. lat. .125 unc.)" Mas latet. Pensylvania, Florida.

*B—b.*

8. *C. MUTABILIS Mels.* Pr. Acad. 3,172 :11. Rufus; clypeo, labro, orbitisque albidis; fronte impresso: thorace polito, sparse punctulato, apice marginisque albidis: elytra punctato-striata, lateribus maculis 3 nigricantibus; basi, apice marginisque late albidis: pygidio valde punctato, apice acuto: abdominis apice pedibusque rufis.

a. Pronoto lineis 2 obliquis abbreviatis albis: elytris rufo-maculatis.

e. Minor, niger, maculis solitis.

Prosternum ♂ ♀ deeply emarginate posteriorly, angles of the emargination acute: ♂ with a shallow depression and ♀ with a deep fovea upon the ultimate segment of the venter.

9. *C. DISPERSUS Hald.* Saturate rufus, capite pallido; maculis 3 rufis triangulariter positis: pronoto margine antico laterali lato, maculisque 2 basalibus magnis pallidis: elytra pallida, sutura guttisque paucis obscure rufis: antennarum apice tarsisque fuscis. Long 3¼ lin.

Head flavous, sparsely punctulate, punctures more dense superiorly, several of them confluent and indistinctly rufous, each side of the frontal impression; a rufous spot at the base of the antennae, forming a triangle with a rufous line in the frontal impression; labrum and extreme superior margin of the head rufous: pronotum polished, minutely and sparsely punctulate; the flavous margin encroaches so far upon the disc as to leave a transverse rufous triangular spot with its apex near the scutel; extreme anterior and lateral margin rufous: scutel rufous, with a flavous spot: elytra flavous, punctate in series, somewhat scabrous towards the apex, maculate with rufous, three transverse sub-basal and two sub-apical spots (on each,) a medial sutural spot extending and contracting backwards to near the apex, with a short one exterior to it, and two or three minute ones towards the exterior margin, which is rufous posteriorly from the apex to near the middle, where the color dilates into a spot: beneath and feet pale fuscous, mesosternum blackish, a flavous plate between the posterior femora; ultimate segment of the venter with a profound fovea in the female. St. Louis, Missouri.

10. *C. AULICUS* Hald. †Dej. Cat. ,447'. Rufus, pronoto valde convexo, punctulato; margine flavo, tenuissimo nigro; maculis 2 basalibus confuse flavis: elytra flava, punctato-striata, striis indistinctis; vittarum 2 nigrarum vestigiis. Long. 3 lin.

Head and base of antennae rufo-flavous, six terminal articulations of the latter fuscous; front distinctly punctulate, medial line impressed: extreme margins of the pronotum and elytra black; pronotum polished, rufous, very convex, descending suddenly towards the head, anterior and lateral margins, and two oblique basal spots, yellow: scutel black: elytra yellow, punctate in series, punctures in impressed lines posteriorly, fourth exterior series of punctures irregular; portions of a humeral and sub-sutural black band are represented by one or two spots: apex of the abdomen foveolate: prosternum deeply emarginate, sides forming spines as in *Canthostethus*.

Varies in having the margin and spots of the thorax so much expanded that the rufous color is confined to a transverse spot in the middle of the disc, and a small longitudinal one on each side of the base. Southern.

*C—a.*

11. *C. SIMPLEX* Hald. Rufo-brunneus; pronoto subtiliter dense punctato, apice tenuiter, lateribus maculisque 2 parvis basalibus flavis; elytris flavis, profunde punctato-striatis; sutura, epipleuris, punctoque humerali nigerrimus; labro antennis palpibusque laete rufis. Long. 2½ lin.

Head punctate, flavous varied with rufous: pronotum rufous, two oblique basal lines, a narrow anterior and wide lateral margins *flavous*; extreme margins rufous or blackish, that of the base black: scutel polished black, impunctate, sometimes with a flavous spot: elytra punctate-striate, *flavous*, extreme margins and a humeral spot *black*: beneath and feet rufous; pectus varied with blackish; venter (except the sides and final segment) blackish, apex foveolate. Southern.

12. *C. PUMILUS* Hald. †Dej. Cat. ,449'. Minutus, supra flavescens, pronoto sparse minus subtiliter punctato, macula transversa discoidali saturate rufa: scutello nigro: elytris profunde punctato-striatis: subtus saturate rufus, pedibus pallidioribus. Long. 1 lin.

Front sparsely punctulate, flavous varied with rufous, labrum black; antennae fuscous, base flavous: extreme margin of pronotum and elytra (including the suture) blackish, particularly the base of the former: pectus blackish. Southern.

13. *C. LINEOLATUS* Hald. †Dej. Cat. ,448"? Saturate rufus, pronoto punctato, apice tenuiter, lateribus, maculis 2 basalibus obliquis flavis; elytris valde pro-



funde punctato-striatis, vittis 2 flavis apice conjunctis, exteriori irregulari. Long.  $1\frac{1}{2}$  lin.

Head coarsely punctate, rufous; labrum and a narrow superior orbital line *flavous*; antennae fuscous, five basal articulations rufous: pronotum polished, finely punctulate, extreme lateral margin blackish: elytra with two wide irregular vittae connected posteriorly, *flavous*; the striae, external and sutural margin, and a medial irregular vitta *rufous*; the vitta is formed by the fourth exterior interstice upon the posterior half, and fifth upon the basal half of the elytra; extreme base black; interstices convex: beneath punctate, deep rufous, feet paler. Southern and Middle States.

14. *C. INCERTUS* Oliv. Dej. Cat. ,447'. Flavescente rufus, vix nitidus; pronoto valde dense punctato, disco et utrinque versus latera obsolete infuscata, basi tenuiter nigro: elytris profunde punctato-striatis, vittis 2 obliquis obscure rufis, sutura margineque tenuissimo nigris. Long.  $2\frac{1}{2}$  lin.

Head punctate, flavous; torulus and margins of the clypeus rufous; antennae rufo-fuscous, five basal articulations rufo-flavous: pronotum densely covered with piliferous punctures, basal angles flavous, extreme base black and serrulate: scutel black, disc flavous: elytra with the extreme base and suture (and sometimes the exterior margin) *black*; punctate-striate, punctures rufous; of the two rufous vittae, the interior one is situated upon the third and fourth intervals, becoming narrower and confined to the third posteriorly, where it approaches the suture, terminating with the second stria about one-fourth the distance from the apex; the second vitta occupies the eighth and ninth interstices: pygidium and venter punctate, and with the feet, having numerous silvery hairs: ♂ ? ♀ with the apex of the venter foveolate. Southern.

15. *C. VITATUS* Hald. †Lec. Rufus, supra flavus, pronoto dense punctato, macula rotunda medio, vittaque utrinque submarginali brunneis: elytris profunde punctato-striatis; sutura vitta lata versus marginem, alteraque inter media abbreviata atro-brunneis, margineque tenuissimo. Long. 2 lin.

Head flavous varied with rufous; front with numerous dilated impressed punctures, medial line impressed; antennae fuscous base (5 artic.) rufous: pronotum with the extreme margin brown, disk with a large oval reddish-brown spot, bounded laterally and anteriorly by the flavous ground colour, and a submarginal reddish-brown vitta narrowing anteriorly, and continuous with the principal elytral vitta: scutel blackish brown: elytra with the striae discoloured; the sutural vitta is widest anteriorly, but suddenly contracted near the scutel; a short basal vitta or spot in the fourth interstice from the suture; lateral vitta occupying the sixth interstice posteriorly, and

the seventh and eighth ; extreme base and margins colored like the vittae : pygidium punctate, pale rufous or flavous : beneath dull testaceous, pectus (and in some, the base of the abdomen) varied with flavous : ♂ with the venter simple, ♀ last segment with a deep fovea ; in both the prosternum is deeply emarginate and toothed behind. Middle States.

16. *C. CINCTIPENNIS* *Randall*. 1838. Bost. j. n. h. 2,45 :19. *C. hamatus* *Mels.* 1847. Pr. Acad. 3,174 :15. Laete rufus, nitidus, pronoto punctato, apice anguste lateribus late maculisque 2 obliquis basalibus flavis : elytra punctato-striata, flava ; sutura, margine tenuissimo, vittisque 2 latis nigerrimis. Long. 2 lin.

Head punctate, and with the trophi, flavous varied with rufous ; antennae obscure fuscous, five basal articulations rufous : pronotum finely and densely punctate, extreme margins blackish : scutel black, generally with a flavous disc : elytra punctate-striate, some of the rows scarcely striate ; suture, base and margin with a narrow line of black ; the interior of the two black vittae follows the second line of punctures, which brings it to the suture posteriorly, it extends to the fifth line of punctures at base, where it is most dilated ; the exterior vitta lies between the sixth and eighth striae : pygidium and apex (sometimes the margins) of the venter flavous or rufous, with numerous dilated punctures : beneath punctate, clothed with numerous flavous hairs, black, middle of the sternum varied with flavous : feet rufous, with numerous hairs, tarsi fuscous, ♂ with the last segment of the abdomen deeply foveolate, (wanting in the ♀) prosternum slightly emarginate behind, with rounded lobes. Eastern and Southern. *Randall* found it on *Aster puniceus*.

α. Internal vitta becoming confluent with the suture immediately behind the base: body beneath dark brown ; feet pale. ♂

β. 2 vittae confluent, so that the elytra present a black disk with a narrow flavous margin recurved at the apex : body beneath very dark brown. ♂

17. *C. VENUSTUS* *F.* 2,42 :7. *Oliv. Encyc.* 6,609. — *ornatus* *F.* 2,47 :32. *Oliv. Encyc.* 6,621. *Say. am. ent. pl.* 28. Saturate rufus, nitidissimus ; pronoto subtiliter punctulato, apice lateribus maculisque 2 basalibus obliquis pallidis, elytra leviter seriatim punctata, punctis postice fere obsoletis, sutura margine tenuissimo vittisque 2 nigerrimis ; antennarum apice, tibiis tarsisque fuscis : pygidio punctato, apice flavo. Long. 2¼ lin.

α. Vitta exteriori valde interrupta. β. Pronoto pallido, immaculato.

Head punctate, rufous, orbits flavous, base of the antennae pale rufous : scutel and extreme margins of the pronotum black : elytral vittae disposed as in the preceding species. Prosternum ♀ deeply emarginate behind, with the lobes subacute, the last ventral segment deeply foveolate. ♂ with the prosternum less distinctly emarginate, and the venter without the fovea. Eastern, Middle, and Southern States.



18. *C. GIBBICOLLIS* Hald. †Lec. Habitu omnino *C. venusti*, at major: pronotum gibbosum, vix punctulatum, limbo semicirculari. Long. 3, lat. 2 lin.

Closely allied to the preceding, but differs in the gibbous prothorax and greater size. If, however, the former character is abnormal in the single individual observed, it may be only a variety. Southern.

19. *C. INSERTUS* Hald. Pallide rufus, pronoto polito, punctulato, apice lateribusque margine angusto flavo, basi vix maculato: elytris valde profunde seriatim punctatis, margine angusto, vittisque 2 latis confluentibus confusis nigerrimis, tarsis nigris, antennis apice fuscis. Long. 2 lin.

α. Vittis distinctis.

β. Vitta exteriori evanescente.

Head punctate, rufous, varied with flavous, apex (5 artic.) of antennae fuscous: pronotum highly polished, minutely punctulate; lateral and anterior margins, and two indistinct oblique maculae, *flavous*; extreme margins black: scutel black, disk indistinct flavous: elytra flavous, punctate in series, extreme margins and disc black with two confluent vittae, leaving the exterior margin, apex, and a few streaks of flavous (when the two vittae are normal, they correspond with those of the two preceding species:) abdomen rufous, with silvery hairs, (three basal articulations sometimes blackish;) sternum flavous, pronotum slightly concave: tarsi black, exterior side of the tibiae fuscous towards the apex.

♂ with a plate extending over the posterior portion of the last ventral segment: prosternum with a posterior incisure, the lobes of which are acute.

20. *C. ALBICANS* Hald. †Dej. Cat., 447. Laete rufus, pronoto vel obsolete punctulato vel laevissimo; apice, lateribus, maculisque 2 basalibus obliquis obsolete flavis: elytris seriatim punctatis, sutura, margineque tenuissimo, vittisque 2 obscure brunneis vel etiam nigris: tarsis fuscis. Long. 2¼ lin.

α. Vitta unica subsuturali.

β. Pallidus, vittis obsoletis, pronoto laevissimo.

Front punctate, flavous or pale rufous; antennae black, five basal articulations flavous: pronotum polished, smooth or obsoletely punctulate, pale rufous or flavous; apex, lateral margins and two oblique basal maculae indistinctly flavous; extreme margins black, portion of the base covered by the elytra, serrulate: elytra flavous or rufo-flavous, punctate in series, extreme margins black, interior vitta occupying the space between the second and fourth striae, to which they are confined, the interstices being scarcely discolored, the base of the fifth stria is slightly discolored; second vitta between the third and fourth exterior stria. Prosternum ♂ excised and toothed behind: ♀ with a deep fovea on the last ventral segment. Southern.



## C—b.

21. *C. AMATUS* *Hald.* Supra flavus, pronoto lateribus obsolete punctulato, vittis 4 laete rufis: elytris profunde seriatim punctatis seriebus preparia approximatis, interstitiis alternatim nigricantibus, subtus niger, prosterno nigro: pedibus rufis, genibus flavis. Long.  $1\frac{3}{4}$  lin.

Head punctulate, flavous, with an A-formed rufous mark from the vertex to the antennae: clypeus punctate, margined with rufous; antennae fuscous, five basal articulations pale rufous: pronotum polished, scarcely punctulate, flavous, with four wide rufous vittae sub-abbreviated anteriorly, the exterior one with a short medial transverse line; extreme margin black posteriorly and rufous anteriorly: scutellum black, disc flavous: elytra with impressed discolored punctures, in series, which are arranged in pairs; suture margin and base with a narrow line of black; a black widely interrupted vitta between the third and fourth rows of punctures; a second abbreviated anteriorly, between the fifth and sixth, and fifth and seventh posteriorly; the exterior vitta is between the seventh and ninth rows anteriorly, and eighth and ninth posteriorly, and from the irregularity of the rows of punctures, it presents a tendency to unite with the intermediate vitta; beneath black, punctate, pygidium and apex of the abdomen flavous with impressed discolored punctures; prosternum flavous, with an anterior spine tipped with black; feet rufous, apex of the femora flavous. Missouri Territory.

♂ with an acute spine near the anterior margin of prosternum; prosternum deeply emarginate, angles subacute. ♀?

22. *CONFLUENS* *Say.* Am. ent. 2, pl. 28. Laete rufus, fronte punctata, linea impressa; antennis corpore vix longioribus: pronoto polito, subtiliter punctulato, flavo-marginato, prosterno flavo, scutello nigro: elytris flavis, seriatim punctatis, sutura margine tenuissimo, lineis 3 nigerrimis: pygidio punctato: prosterno postice valde emarginato. Long. 2 lin.

Say describes the head and thorax as impunctured. The punctulations of the pronotum are indistinct, and might not be observed. The antennae are dark fuscous, five basal articulations rufous. In the ♂ the last ventral segment is not foveolate, and the base between the coxae is flavous; ♀ not observed. Missouri Territory.

23. *C. GEMINATUS* *Newm.* 1840. Charlesw. mag. n. h. 4,250. Niger, capite pronotoque laete rufis; antennis nigris: elytris flavis profunde seriatim punctato-striatis; sutura late, margine tenuissimo, vittisque 2 nigerrimis; interstitiis convexis. Long. 2 lin.

a. Vittis 2 nigris dilatatis confluentibus.

β. Ano, pectore, femoribusque rufis.

Head rufous, orbits obsolete flavous; front sparsely punctulate: pronotum rufous, somewhat polished, impunctate: lateral margins and extreme apex sometimes flavous; extreme base black, this color sometimes extending along the sides: scutel black, disc sometimes flavous: elytra with the first, second, (sutural) fourth, and sixth interstices, and extreme margin *black*; third, fifth, seventh, and eighth *flavous*: pygidium punctate: beneath entirely black, or varied with rufous: feet black, femora sometimes rufous. Southern and Western.

The punctures of the submarginal stria are discolored, which probably led Mr. Newman to state the pale vittae to be four. ♂ with an acute spine between the anterior coxae, and a transverse impression on the ultimate segment of the venter. ♀ with the prosternum truncate behind, ultimate ventral segment foveolate.

24. *C. LITURATUS* F. 2,50. — *recurvus* Say. J. Acad. 3,439 :6. — *castus* Mels. Pr. Acad. 3,171 :4. — *lativittus* Germ. Sp. nov. 538? — *4-lineatus* † Dej. Cat., 448'. Niger; pronoto laevi, aurantiaco, macula magna discoidali apicem non attingente, alteraque parva utrinque submarginali nigerrimis: elytris punctato-striatis, nigris, (margine tenuissimo;) vittis 2 aurantiacis postice connexis: pygidio punctato. Long. 1½ lin.

α. Thorace medio nigricante; elytris nigris, flavo-marginatis.

β. Elytris nigris, macula aurantiaca arcuata apicali: *C. castus* Mels.

γ. Vitta unica submarginali, apice recurvo: *typus Sajanus*.

The entire or partial absence of the elytral vittae cause this species to vary considerably. The male has an acute spine between the anterior coxae, and a transverse impression on the last segment of the venter. ♀? Middle, Southern, and Western States.

#### D.

25. *C. SULFURIPENNIS* Mels. Pr. Acad. 3,173 :13. Atro-brunneus; capite punctato, flavo, fronte in medio nigro: thorace sparse punctato, margine laterali, maculisque 2 basalibus flavis: elytris profunde punctato-striatis; guttis nonnullis oblongis brunneis, fasciis 3-bus ordinatis: antennis, abdominis margine, pedibusque laete rufis: pygidio punctis impressis confluentibus. Long. 2 lin.

♀ Prosternum sub-emarginate, lobes very obtuse, impressed between the coxae, with a slight elevation in the centre; ultimate ventral segment with a deep round fovea. Pennsylvania.

26. *C. LUTEIPENNIS* Mels. Pr. Acad. 3,172 :10. Niger, nitidus, capite albomaculato; pronoto punctis paucis sparsis; lateribus, maculisque 2 obliquis basalibus albis: scutello nigro, laevigato; elytris profunde seriatim punctatis, aurantiacis, sutura margine tenuissimo punctoque humerali nigris: pygidio punctato, maculis 2 albidis. Long. 2 lin.



♀ with the ultimate ventral segment deeply foveolate. Abdominal plate, a spot on the prosternum, anterior coxae, and interior margin of the anterior femora *white*. Antennae black, five basal articulations rufous. Pennsylvania and upper Mississippi river.

27. *C. FULVIPENNIS* *Hald.* †Lec. Niger; antennis breviusculis, palpisque rufis: pronoto polito subtiliter punctato: elytris profunde seriatim punctatis, aurantiacis: pygidio punctato, subcarinato. Long. 2 lin.

Black with a ceruleus tinge: front punctate, with an impressed medial line; palpi, labrum and antennae pale rufous, the latter short, and darker towards the apex: pronotum with a row of punctures in the recurved lateral margin: scutel and extreme base of the elytra black: beneath and feet shining blue-black; venter punctate, with silvery hairs. Southern.

### E.

28. *C. MAMMIFER* *Nm.* 1840. Mag. n. h<sup>v</sup>. 4,250. — *pretiosus* *Mels.* Pr. Acad. 3,174 :16. Niger, nitidus: capite flavo, fronte nigro, punctato, in medio impresso; labro, antennarum basi, palpisque rufis: pronoto sparse punctulato; apice tenuissimo, angulis, maculisque 2 obliquis basalibus albidis: elytris punctato-striatis; apice, fascia praemediali (ad suturam late interrupta) lineolisque 3 basalibus aurantiacis. Long. 2 lin.

α. Pronoto immaculato.

The anterior spots in the angles of the pronotum are the largest, and it is possible that the entire lateral margin may be found white. The anterior margin of the mesosternum has a whitish spot, there is another on the anterior coxae, a small one on each side of the pygidium, and the ventral plate is of the same color. Beneath punctulate, venter of the ♀ with a deep fovea. Pennsylvania, Carolina, Florida.

29. *C. NOTATUS* *F.* 2,55 :76. Oliv. enc. 6,618. Niger, antennis filiformibus: pronoto dense punctato, apice contracto; elytris grosse punctato-striatis, interstitiis convexis; puncto apicali, fasciaque praemediali (sutura vix attingente) aurantiacis: pygidio partibusque inferioribus grosse punctatis. Long. 2 lin.

Robust, head with a few coarse punctures; antennae remarkably slender, black, second, third, fourth, and fifth articulations with a rufous tinge: prothorax much contracted anteriorly. Southern.

30. *C. DISTINCTUS* *Hald.* †Dej. ,447". Niger, nitidus, capite punctato, antennarum basi fusco, labro flavo vel fusco-marginato: pronoto convexo, obsolete sparsim



punctulato : elytris seriatim punctatis, fascia subbasali humeros attingente, maculoque apicali flavis ; pygidio carinato, punctato : abdomen et pectus punctis piliferis. Long. 2 lin.

a. Elytrarum fascia maculisque rufis.

The elytral fascia is sometimes interrupted at the suture ; its posterior margin is anterior to the middle of the elytra. Southern.

31. *C. BINOMINIS* *Nm.* Ent. Mag. "Niger, maculis utriusque elytri 2 magnis coccineis, quarum 1<sup>a</sup> humerali ramulam ad suturam emittente, altera rotunda, apicali; thorax glaber, nitidus; elytra striato-puncta, striis 9, quarum 7<sup>ma</sup> et 8<sup>va</sup> valde indistinctis. Long. .2 unc."

Not observed. The last character given distinguishes this species from *C. distinctus*.

32. *C. QUADRIFORIS* *Nm.* Ent. mag. "Niger, nitidus; utriusque elytri maculis 2 rufis, quarum 1<sup>a</sup> humerali, altera apicali; thorax nitidus, lateribus subtiliter punctis; elytra subtiliter puncta, punctis haud linea dispositis. Long. .175."

Not observed.

33. *C. 4-MACULATUS* *Say.* J. acad. 3,441. — *notatus* †*Dej.* Cat. ,448'. — *semicinctus* *Germ.* Ins. sp. nov. ,554. Caeruleo-niger, nitidus, subtus punctis piliferis; capite punctato, labro rufo; antennis fuscis, basi rufis: pronoto convexo, polito, obsolete punctulato : elytris seriatim punctatis; macula magna, quadrata, humerali, punctoque rotundato apicali, aurantiacis: pygidio punctato. Long. 2 lin.

a. Elytrarum basi, punctoque terminali aurantiacis.

β. Elytrarum margine exteriori aurantiaco.

γ. Elytra aurantiaca, macula magna, communi, ovali vel cordata, nigra.

♀ with the apex of the abdomen foveolate, ♂ without the fovea. Middle, Southern, and Western States, and Lake Superior.

34. *C. QUADRUPLIX* *Newm.* Ent. mag. *4-verrucatus* †*Dej.* ,448'. Niger, nitidus; capite concavo, punctulato; labro flavo; antennis pallide fuscis, basi flavis: pronoto convexo, polito, vix punctulato; elytris seriatim grosse punctatis; macula humerali (basin vix attingente) punctoque apicali rufis; lineola humerali nigra: pygidio carinato, punctis impressis dilatatis; abdomine indistincte punctulato, ♀ apice foveolato. Long. 1½ lin. Southern and Middle States.

#### F.

35. *C. VIRIDIS* *Mels.* Pr. acad. 3,174 (Monachus). *C. aeneus* †*Dej.* ,449'. Supra viridi aeneus, elongatulus; capite sparse punctulato; oculis nigris, antennis pallide rufis, apice fuscis; clypeo, labro, prosterno, pedibusque pallide rufis: pronoto convexo,

minutissime scabro, basi utrinque emarginato, lateribus rufis; scutello triangulari, laevi: elytris seriatim punctatis, punctis minutis: pygidio confertim punctato. Long. 1 lin.

Capite thoraceque obscure rufis.

Head rufous, above brassy; mandibles black, prothorax laterally and beneath, with the feet, pale rufous; pectus and venter shining black; pygidium with numerous dilated, but not deeply impressed punctures. Apex of the venter with a deep fovea. Middle and Southern States.

36. *C. LEVIS* *Hald.* Violaceo-niger, nitidus: ore antennisque pallide rufis: pronoto laevigato, basi utrinque emarginato, scutello triangulari: elytris seriatim punctatis, punctis minutis. Long.  $\frac{3}{4}$  lin.

Characterized from a single example of which the feet are wanting. Southern.

G—a.

37. *C. HEPATICUS* *Mels.* Pr. acad. 3,171. Ferrugineus, confertim irregulariter punctatus: oculis nigris; antennis brevibus, flavis, apice incrassato, fusco: scutello rufo-piceo: elytris grosse punctatis marginibus flavis, impunctatis: pectore abdomineque rufis, punctis piliferis, ano pedibusque flavis: pygidio flavo, supra rufo, punctis piliferis. Long. 1 lin.

Characterized from a single individual from fort Laramie near the Rocky Mountains. It does not quite agree with Dr. Melsheimer's description of an example from Pennsylvania, but some variation of character must be allowed in this genus.

38. *C. TRIDENS* *Mels.* 3,172 :8. Niger, supra flavus, obscure rufo variegatus, punctis impressis decoloratis: capite flavo; vertice, macula frontali, et punctis impressis nigro-rufis; labro, palpis antennisque rufis: pronoto apice, lateribus, lineola dorsali apicali, et 2 basalibus flavis: elytris irregulariter seriatim punctatis: pygidio, abdominis marginibusque flavo-variegatis: pedibus flavis. Long.  $1\frac{1}{3}$  lin.

The feet vary to testaceous, and the femora are sometimes maculate with brownish rufous. Pennsylvania and Lake Superior.

39. *C. PUNCTATUS* *Hald.* †Dej. ,445" (Pachybrachis). Nigricans, supra (capite incluso) flavus, brunneo variegatus, punctis impressis brunneis: antennis fuscis, articularum basi flavescens: pronoto basi tenuiter nigro: scutello nigro: pygidio punctulato, apice flavo: subtus punctulis piliferis; femoribus flavo-annulatis. Long. 1 lin.

The elytra vary in the depth of shading; the lighter varieties have a dark humeral spot, and a common sutural one posteriorly; the scutellar region is flavous, and the feet vary to flavous, with very feint traces of brown. Pennsylvania in June. Southern.

## G—b. (Canthostethus.)

40. *C. RUGICOLLIS* Hald. †Dej. ,447'. Rufus, elongatulus: fronte scabro-punctata, orbitis flavis; oculis nigris angustis: pronoto longitudinaliter ruguloso, lateribus grosse punctatis, flavescentibus: scutelli disco flavo: elytris flavis, indistincte rufo-nebulosis, punctato-striatis, punctis rufis, approximatis; basi tenuiter nigro; apice punctato. Long. 2, lat. 1 lin.

Antennae pale rufous, scarcely darker towards the apex: punctures of the elytra regular, coarse, and approximate: mesosternum polished, medial line impressed: apex of the venter with a fovea. A single individual observed. Southern.

41. *C. FASCIATUS* Say. J. acad. 3,437. — *lateritius* Newm. Ent. mag. Rufus; capite scabro-punctato; labro, orbitisque flavis; antennis fuscis, basi rufis: pronoto flavo, basi tenuiter nigro; confertim punctato, punctis impressis rufis: scutelli basi emarginato, nigro: elytris flavis; basi tenuiter nigris; fasciis 3 rufis undatis; irregulariter punctato-striatis, punctis rufis: pygidio flavo, punctis impressis rufis: subtus punctulis piliferis: sterno in medio et abdomine inter coxas flavis: sterno linea longitudinali impressa. Long.  $1\frac{1}{2}$  lin. ♂

a. (*tesselatus* †Dej. ,447') pronoto rufo, punctis majoribus, elytrarum fasciis confluentibus. ♂

The punctures of the pronotum being rufous and dense, the surfaee has a rufous tinge although the ground color is flavous. In the variety the rufous becomes confluent, the punctures are somewhat larger, and the elytral fasciae have become confluent, leaving two distinct flavous spots towards the apex, and the scutellar region flavous. Two specimens examined. Southern.

*Not having observed or recognized the following species of CRYPTOCEPHALUS, they cannot be satisfactorily placed in their proper section.*

42. *C. LARVATUS* Nm. 1840. Mag. n. h<sup>o</sup>. 4,250. "Antennae fuscae, basi testaceae: caput nigrum, fasciâ sinuatâ medio interruptâ verticali, alterâ sub oculis, labroque flavidis: prothorax flavidus, maculis 2 punctiformibus nigris: elytra flavida uterque maculis 3, quarum 2 basalibus, 1 discoidali, nigris signatus; suturâ margineque laterali ferè ad basin quoque nigris: abdomen nigrum, lateribus, maculâ mesosterni utrinquè, podiceque flavidis: pedes flavidi. (Corp. long. .25 unc. lat. .15 unc.)" Florida.

43. *C. LIMBATUS* Nm. id. "Antennæ piceæ: caput profundè punctum, nigrum, maculâ anticâ oculorumque marginibus albidis: prothorax profundè punctus, niger, margine laterali albido: elytra rugosè et irregulariter puncta, miniata, maculâ dorsali communi nigrâ: abdomen et pedes nigra. (Corp. long. .17 unc. lat. .09 unc.)" This species is evidently a *Pachybrachys*. Florida.



44. *C. LIXUS* *Nm.* id. "Antennæ testaceæ, apice fuscescentes: cætera testacea, vittis vix distinctis, prothoracis elytrorumque communibus 4 luteolis: elytra striata, striis profundè punctis. (Corp. long. .14 unc. lat. .08 unc.) Florida.

45. *C. LUTEOLUS* *Nm.* id. "Antennæ luteolæ, apice fuscescentes; oculi nigri: elytrorum maculâ minutâ humerali, alterâ subapicali, strigâque anticâ, discoidali, brevi, nigris; cætera luteola: elytra glaberrima, 8-striata, striis profundè punctis. (Corp. long. .14 unc. lat. .08 unc.)" Florida.

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| 46. <i>C. PUNCTIPES</i> <i>Say.</i> 1824. <i>J. acad.</i> 3,438. | 51. <i>C. PARVULUS</i> <i>F.</i> 2,57.   |
| 47. <i>C. NIGRICORNIS</i> <i>Say.</i> id. 3,436.                 | 52. <i>C. DETRITUS</i> † <i>Olivier.</i> |
| 48. <i>C. OBSOLETUS</i> <i>German.</i> Sp. nov. ,559.            | 53. <i>C. EQUESTRIS</i> † <i>Oliv.</i>   |
| 49. <i>C. PICTURATUS</i> <i>Germ.</i>                            | 54. <i>C. PUBESCENS</i> <i>F.</i> 2,43.  |
| 50. <i>C. NANUS</i> <i>F.</i> 2,56.                              |  |

#### PACHYBRACHIS † *Chev.*

##### ÷ 1. Disperse punctati.

- A. Elytris flavis, nigro-vittatis.
- B. Elytris nigris.
- C. Elytris nigris, rufo-maculatis.
- D. Elytris nigris, flavo-maculatis.
- E. Elytris nigris, lineolis vel punctis flavis.

##### — ÷ 2. Punctato striati, vel striate-punctati.

- F. Elytris flavis: a nigro-vittatis: b nigro-lineolatis.
- G. Elytris nigris, flavo-maculatis.

#### A.

55. *P. BIVITTATUS* *Say.* (Crypt.) *J. acad.* 3,440 :8. *Am. ent. pl.* 28. Flavofuscus, subtus pilosus: capite dense punctato; fronte impressa; antennis palpisque apice nigris; orbitis subflavis: pronoto dense punctato, lateribus flavis: scutello nigro vel flavo: elytris irregulariter punctatis, apice impunctato; vittis 2 latis (exteriore interrupta) marginisque tenuissimo nigris: dorso nigro; pygidio flavo, dense punctulato, punctis piliferis: pedibus flavo-variegatis, tarsis nigricantibus. Long. 2 lin.

The flavous color of the head and pronotum is sometimes indistinct, and the external vitta is limited to two or three maculae. There is a marginal and two submarginal punctate-striate series. Both sexes seem to have the apex of the venter foveolate. Missouri Territory. Arkansa.

## B.

56. *P. MOROSUS* *Hald.* Niger, confertim scabro-punctatus; subtus punctatus, albido sericeus: fronte plana: scutello polito: humeris prominulis, politis: pygidio confertim punctulato. Long. 2 lin.

♀ with a shallow ventral fovea, which is absent in the male. The puncturing is dense and uniform, and no portion is arranged in series upon the elytra: the humeri are prominent and scarcely punctate. Southern.

57. *P. CARBONARIUS* *Hald.* †*Dej.* ,445". Niger, subtus piliferus; disperse punctulatus; labro et antennarum basi brunneis: pronoto dense et distincte punctato, punctis parvis, profundis: scutello vix punctulato: elytris grosse punctatis, externe irregulariter punctato-striatis; humeris prominulis, laevibus: pectore punctato; ventre pygidioque punctulatis. Long. 1½ lin.

The punctures on the head are smaller, and on the elytra larger than those of the pronotum. Of two specimens described, both have the venter sub-foveolate. Southern.

58. *P. TRINOTATUS* *Mels.* *Pr. acad.* 3,170 :3. *ornaticollis* †*D.* ,445". Niger, subtus punctulatus, subsericeus: capite dense punctulato, maculis 2 frontali, et 1 inter antennis, aurantiacis vel sanguineis; antennis elongatis, nigris, basi subtus pallidioribus: pronoto confertim punctato; apice tenuiter, lateribus, lineola apicali, maculisque 2 basalibus, aurantiacis vel sanguineis, marginibus tenuiter nigris: scutello impunctato; elytris grosse et dense punctatis, lineis elevatis perpaucis externis irregularibus; humeris prominulis, laevibus: pygidio dense punctulato. Long. 1¾ lin.

♀ with the apex of the venter foveolate; ♂ without the fovea. The spot between the antennae is sometimes absent; and another is sometimes present at the exterior base of the antennae.

## C.

59. *P. SUBFASCIATUS* *Lec.* (*Crypt.*) *Ann. Lyc. N. Y.* 1,173. 11'20. :494 *Mels. Cat. Dej. Cat.* ,445". Niger, capite dense punctato; antennis brevioribus, tenuibus, articulis 2-6 dilute rufis: pronoto dense punctato, lateribus anguste sanguineis: elytris punctatis, apice tenuiter, maculisque 2 in medio rufis: ventre pygidioque indistincte punctulatis, albido-sericeis. Long. 1½ lin.

Venter with a fovea, apparently in both sexes. The medial spot upon each elytrum may unite and form a fascia. The punctures are dilated, and somewhat regularly arranged posteriorly, and there are several elevated interstices. Pennsylvania.

## D.

60. *P. M-NIGRUM* Mels. Pr. acad. 3,170. †Dej. ,445'. Niger; capite dense punctato, flavo-variegato; antennis fuscis, basi flavis: pronoto punctato, apice tenuiter, lateribus, macula apicali, et 2 basalibus, flavis: elytris irregulariter punctatis, flavo-maculatis: pygidio minute punctulato, macula laterali, alteraque externali, flavis: subtus punctulatus, pilosus, femoribus apice tibiisque flavis. Long. 2 lin.

Apex of the venter sub foveolate ♀. Dr. Melsheimer's specimens seem to have the flavous portions testaceous.

61. *P. SPARSUS* Nm. (Crypt.) Ent. mag. "Niger, albo prave irroratus, caput et thorax punctata, elytra profunde punctata, punctis nullo modo ordinatis. Long. .075."

Not having observed this species it is placed here provisionally.

62. *P. FLAVICORNIS* Mels. Pr. ac. 3,172. Niger, punctatus: ore, orbitis, antennis, pedibusque flavis: pronoto inequaliter profunde punctato; angulis, lateribus, maculisque 2 basalibus flavis: elytris punctatis, ad marginem striato-punctatis; apice, maculaque mediali flavis: pygidio impunctato, macula laterali flavo, ventre minutissime punctulato: femoribus posterioribus in medio fuscis. Long. 1½ lin.

## E.

63. *P. LURIDUS* F. 2,45:24. — *femoratus* Say. 1824. J. acad. 3,439. Niger; capite dense punctato; labro flavo, clypeo flavo-variegato; antennis tenuibus rufis, articularum apice fusco: pronoto confertim punctato; linea dorsali lateribusque sanguineis: elytris confertim punctatis, interstitiis elevatis, subrectis: lineolis flavis variegatis: pectore punctato. Long. 2 lin.

α. Labro flavo, linea dorsali abbreviata vel obsoleta: femoribus anterioribus macula flava. *C. aesculi* Mels. Pr. ac. 3,171.

β. Pronoto omnino rufo. *Say.*

γ. Elytrarum interstitiis flavis.

The venter is foveolate ♀. Inhabits Massachusetts, Pennsylvania, Carolina, and Georgia, on *Baptisia tinctoria*. The first variety may be a distinct species, as it seems to live upon a different plant. The third variety is from Missouri Territory, and has the yellow color predominating on the elytra, and the pronotum less confertly punctate.

64. *P. FEMORATUS* Ol. Dej. Cat. ,445'. — *atomarius?* Mels. ,170 :2. Niger, nitens, confertim punctatus: capite flavo variegato (vel immaculato) antennis fuscis basi rufis: pronoto irregulariter flavo-maculato; apice tenuiter, lateribusque flavis: scutellum nigrum (macula flava): elytris irregulariter seriatim punctatis;



basi tenuiter, apice, guttulisque multis longitudinalibus *flavis*: femoribus basi apiceque *flavis*; tibiis basi *flavis*: pygidio minute punctulato, punctis piliferis; utrinque macula flava, alteraque exteriori: subtus punctulis piliferis. Long.  $1\frac{1}{2}$  lin.

♀ with the venter foveolate.

The labrum and clypeus are usually flavous, but this color is wanting in some individuals. In Dr. Melsheimer's species the colors of the pronotum are described as testaceous. Of three specimens, one has a flavous spot on the scutellum. Middle and Southern States. In Pennsylvania it appears in June and July on trees of the genus *Carya*.

65. *P. INFAUSTUS* *Hald.* Niger, rugose punctatus, subtus punctulis piliferis: capite dense punctato; labro, maculisque perpauca indistinctis *flavis*; antennis fuscis, basi dilutioribus: pronoto confertim punctato, punctis parvis: elytris irregulariter punctatis; lineolis elevatis; maculis parvis paucis *flavis*: pygidio minute punctato, punctis piliferis: femoribus intermediis macula flava apicali. Long.  $1\frac{1}{2}$  lin.

Venter scarcely foveolate ♀. The punctures are less crowded upon the head than upon the pronotum. Southern.

66. *P. SOBRINUS* *Hald.* †*Dej.*, 445". Niger, punctatus: prothorace disperse punctato, flavo, brunneo variegato: capite pedibus, pygidio, abdominis marginibusque *flavis*: elytris vix seriatim punctatis, flavo-lineolatis. Long.  $1\frac{1}{3}$  lin.

Head (except the orbits) punctate, flavous, with an indistinct tinge of rufous, vertex and frontal line brown; antennae pale fuscous, base flavous: pronotum densely, and in some parts confluent punctured, having other parts impunctate: scutellum black: elytra with black dilated impressed punctures, some of which are arranged in irregular series; apex, scutellar region, and numerous interrupted interstitial lines *flavous*: pygidium scarcely punctulate; beneath minutely punctulate, piliferous; feet flavous, femora indistinctly varied with brown. Venter foveolate ♀. Southern.

#### *F—a.*

67. *P. VIDUATUS* *F.*, 249. Say, Am. ent. pl. 28. Niger: capite punctato; labro, maculis 2 inter oculos, 1 inter antennas, et 1 suborbitali *flavis*; antennis fuscis, basi dilute rufis: pronoto disperse punctulato; lateribus, basi, apiceque tenuiter, lineola apicali, maculisque 2 basalibus *flavis*; marginibus extremis nigris; elytris punctato-striatis; sutura, margine tenuiter, vittisque 2 nigris: pygidio flavo; pedibus dilute rufis; genibus *flavis*; tarsis fuscis. Long.  $1\frac{1}{4}$  lin.

Venter with a terminal fovea ♀.

The vertex and orbits have but few punctures. The punctures upon the pronotum are not crowded, and they are finer than those of the head. Southern and Western.

68. *P. othonus* Say. Am. ent. pl. 28. Niger; capite punctato; labro, maculis 1 frontali, 1 infra oculum, et 2 frontalibus *flavis*; antennis fuscis basi rufulis: pronoto confluentur punctato; marginibus lineolaque apicali *flavis*: elytris punctato-striatis; punctis, sutura, vittisque 2 latis *nigris*: pygidio flavo: pedibus dilute rufis, flavo-variegatis. Long. 2 lin.

Distinguished from *P. viduatus* by the rugose pronotum, the want of the macula at the base; and by the deeper elytral striae.

69. This seems to be the place for *C. marginaticollis* Randall. 1838. Bost. J. n. h. 2,46. It is compared with *C. lituratus*, and must be allied to *othonus*, although the size given (probably an error) is only "one-twentieth of an inch." It is stated to be found upon hickory, (*Carya*.)

#### F—b.

70. *P. abdominalis* Say. J. acad. 3,437. — *pectoralis* Mels. Pr. ac. 3,171. Niger, supra griseo-flavescens, punctis impressis decoloratis: capite flavescente, sparse punctato, ferrugineo-variegato; antennis fuscis, basi pallidioribus: pronoto punctulato, ferrugineo-variegato: elytris flavis, punctato-striatis, striis decoloratis: pygidio flavo, maculis 3 *nigris* vel *obscuris*: abdominis marginibus flavis: pedibus rufescentibus, femoribus basi apice flavis. Long. 1½ lin.

Apex of the venter foveolate.

The ferruginous discoloration varies considerably in extent and intensity, and sometimes extends to the elytra. Upper Mississippi river and Lake Superior.

#### G.

71. *P. mollis* Hald. Niger, punctatus: capite pedibusque flavis: pronoto flavo, maculis 3 *nigris*: elytris seriatim punctatis, fascia subbasali apiceque flavis: abdomine flavo-marginato. Long. 1¼ lin.

Apex of the venter foveolate.

Head flavous, punctulate, vertex and a frontal spot obscure rufous; antennae and trophi flavous: pronotum punctulate, flavous, a large cordate dorsal macula, with a smaller one on each side *black*; pectus punctulate: scutel flavous: elytra with the apex and base *flavous*, except a humeral spot, the region of the scutel, and the suture, which are *black*, the last confluent with a wide subapical black fascia: pygidium, margin of the venter, and feet *flavous*; middle of the femora discolored. Missouri Territory.

#### MONACHUS† Chevr.

72. *M. safonatus* F. (Crypt.) 2,55. Cyaneus, nitidus, impunctatus: labro et antennarum articulis 1°—4° flavis: elytris seriatim punctatis, punctis minutis, postice obsolete: pygidio disperse punctato. Long. 1 lin.

The description of Fabricius requires only the basal articulation of the antenna to be flavous. In one specimen this color extends to the fifth articulation. There is an impressed marginal stria, and a short basal submarginal one. Middle and Southern States.

73. *M. ATER* † *Knoch.* (Clythra.) Niger, nitidus: labro et antennarum basi flavescens: pronoto laevi, cyanescente: elytris indistincte seriatim punctulatis. Long.  $1\frac{1}{4}$  lin.

More robust than the preceding, with the elytral punctures less distinct. Southern.

74. *M. AFFINIS* *Hald.* Cyaneus, laevis: labro, clypeo, antennis, pedibusque, dilute rufis: elytris distincte seriatim punctulatis. Long. 1 lin.

The elytra are more distinctly punctured than in the two preceding species; and the two exterior striae are impressed, punctulate, and entire. The prosternum will doubtless be found indistinctly rufous, as there is some appearance of this color in the individual characterized. Southern.

75. *M. AURITUS* *Hald.* Dej. ,449'. Cyaneus, nitidus: labro, clypeo, fronte, antennis, pedibus, prosterno, pronoti lateribusque *flavis*: pronoto impunctato: elytris distincte seriatim punctulatis. Long.  $\frac{2}{3}$  lin.

The individual characterized is Southern.

\* \* In the preceding pages a *comma* point between two numbers, indicates *volume* and *page*; a minute mark (') *plate* and *figure*; and a *colon* the number of species in an author's list. See p. 260, No. 59. The mark † indicates *uncharacterized*.

In the following INDEX, the numbers refer to the order of the species in the preceding pages; the parenthesis marks a synonym; the smaller letter next the number, the *genus*, and when placed next the authority, it indicates the genus according to that authority. This notation is intended chiefly for alphabetical catalogues, which should contain, in addition, a reference and a notation for locality.



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(35 <sup>a</sup>aencus <sup>†</sup>Dejean. 53 equestris <sup>†</sup><sup>a</sup>Ol.  
aereus <sup>†</sup><sup>c</sup>Sturm. 41 <sup>a</sup>fasciatus *S.*  
(63 <sup>b</sup>aesculi <sup>a</sup>Mels. 64 <sup>b</sup>femoratus <sup>a</sup>Ol.  
74 <sup>c</sup>affinis *H.* (63 femoratus <sup>a</sup>S.  
affinis <sup>†</sup><sup>a</sup>Sturm. 62 <sup>b</sup>flavicornis <sup>a</sup>Mels.  
20 <sup>a</sup>albicans *H.* flavoguttatus <sup>†</sup><sup>a</sup>D.  
21 <sup>a</sup>amatus *H.* 5 <sup>a</sup>formosus *Mels.*  
angularis <sup>†</sup><sup>a</sup>St. 27 <sup>a</sup>fulvipennis *H.*  
73 <sup>c</sup>ater <sup>†</sup>*Kn.* (Clythra.) 23 <sup>a</sup>geminatus *Nm.*  
(64 ? atomarius <sup>a</sup>Mels. 18 <sup>a</sup>gibbicollis *H.*  
10 <sup>a</sup>aulicus *H.* 4 <sup>a</sup>guttatus *H.*  
75 <sup>c</sup>auritus *H.* (6 guttatus <sup>†</sup><sup>a</sup>D.  
biguttatus <sup>†</sup><sup>b</sup>St. (16 <sup>a</sup>hamatus *Mels.*  
31 <sup>a</sup>binominis *Nm.* 37 <sup>a</sup>hepaticus *Mels.*  
55 <sup>b</sup>bivittatus <sup>a</sup>S. 14 <sup>a</sup>incertus *Ol.*  
7 <sup>a</sup>bivius *Nm.* 65 <sup>b</sup>infaustus *H.*  
(3 ? brunnipes <sup>†</sup><sup>a</sup>Ol. 19 <sup>a</sup>insertus *H.*  
57 <sup>b</sup>carbonarius *H.* (41 lateritius <sup>a</sup>*Nm.*  
(24 castus *Mels.* (24 lativittis *Germ.*  
16 <sup>a</sup>cinctipennis *Rand.* 42 larvatus <sup>a</sup>*Nm.*  
2 clathratus <sup>a</sup>*Mels.* 6 <sup>a</sup>lautus *Nm.*  
22 <sup>a</sup>confluens *Say.* lecontei <sup>†</sup><sup>a</sup>D.  
3 congestus <sup>a</sup>*F.* 36 <sup>a</sup>levis *H.*  
cyanipennis <sup>†</sup><sup>a</sup>D. 43 <sup>b</sup>limbatus <sup>a</sup>*Nm.*  
(1 decoratus <sup>†</sup><sup>b</sup>D. 13 <sup>a</sup>lineolatus *H.*  
52 detritus <sup>†</sup><sup>a</sup>Ol. litigiosus <sup>†</sup><sup>b</sup>D.  
9 <sup>a</sup>dispersus *H.* 24 <sup>a</sup>lituratus *F.*  
30 <sup>a</sup>distinctus *H.* 63 <sup>b</sup>luridus <sup>a</sup>*F.*  
diversus <sup>†</sup><sup>a</sup>D. 26 <sup>a</sup>luteipennis *Mels.*  
45 luteolus <sup>a</sup>*Nm.* 46 punctipes <sup>a</sup>*S.*  
44 lixus <sup>a</sup>*Nm.* 32 <sup>a</sup>quadriforis *Nm.*  
28 <sup>a</sup>mammifer *Nm.* (24 4-lineatus <sup>†</sup><sup>a</sup>D.  
69 <sup>b</sup>marginaticollis <sup>a</sup>*R.* 33 <sup>a</sup>4-maculatus <sup>†</sup>*S.*  
marginipennis <sup>†</sup><sup>a</sup>D. 4-maculatus <sup>†</sup><sup>a</sup>St.  
60 <sup>b</sup>m-nigrum <sup>a</sup>*Mels.* (34 4-verrucatus <sup>†</sup>*D.*  
minimus <sup>†</sup><sup>a</sup>D. 34 <sup>a</sup>quadruplex *Nm.*  
71 <sup>b</sup>mollis *H.* 5-maculatus <sup>†</sup><sup>a</sup>D.  
56 <sup>b</sup>morosus *H.* 5-vittatus <sup>†</sup><sup>a</sup>D.  
multipunctatus <sup>†</sup><sup>a</sup>D. (24 recurvus *Say.*  
8 <sup>a</sup>mutabilis *Mels.* 40 rugicollis *H.*  
50 nanus <sup>a</sup>*F.* 72 <sup>c</sup>saponatus <sup>a</sup>*F.*  
47 nigricornis <sup>a</sup>*S.* 1 scutellaris <sup>a</sup>*F.*  
nigripennis <sup>†</sup><sup>a</sup>D. (33 semicinctus *Ger.*  
33 notatus <sup>†</sup><sup>a</sup>D. signifer <sup>†</sup><sup>a</sup>D.  
29 <sup>a</sup>notatus *F.* 11 <sup>a</sup>simplex *H.*  
48 obsoletus <sup>a</sup>*Germ.* 66 <sup>b</sup>sobrinus *H.*  
(58 ornatcollis <sup>†</sup>*D.* 61 <sup>b</sup>sparsus <sup>a</sup>*Nm.*  
68 <sup>b</sup>othonus <sup>a</sup>*Say.* 59 <sup>b</sup>subfasciatus <sup>a</sup>*Lec.*  
(17 ornatus <sup>a</sup>*F.* subfasciatus <sup>†</sup><sup>a</sup>St.  
51 parvulus <sup>a</sup>*F.* <sup>b</sup>submaculatus <sup>†</sup>*Hmsg*  
(70 pectoralis <sup>a</sup>*Mels.* 25 <sup>a</sup>sulfuripennis *Mels.*  
49 picturatus <sup>a</sup>*Germ.* (41 tessellatus <sup>†</sup>*D.*  
(28 pretiosus *Mels.* 38 <sup>a</sup>tridens *Mels.*  
54 pubescens <sup>a</sup>*F.* 58 <sup>b</sup>trinotatus <sup>a</sup>*Mels.*  
(6 pulcher *Mels.* 17 <sup>a</sup>venustus *F.*  
pulicarius <sup>†</sup><sup>a</sup>D. 67 <sup>b</sup>viduatus <sup>a</sup>*F.*  
pulvinatus <sup>†</sup><sup>b</sup>St. 35 <sup>a</sup>viridis <sup>c</sup>*Mels.*  
12 <sup>a</sup>pumilus *H.* 15 <sup>a</sup>vitatus *H.*  
39 <sup>a</sup>punctatus *H.* xanthopterus <sup>†</sup><sup>a</sup>D.



ART. XXI.—*Observations on the Reproductive Organs, and on the Fœtus of the Delphinus Nesarnak.* By CHARLES D. MEIGS, M. D.

I am under obligations to Dr. W. S. W. Ruschenberger, U. S. Navy, for the objects that are described in this note.

On the late voyage of the U. S. ship Plymouth to China, while at no great distance from Rio Janeiro, a porpoise was captured by the seamen, in April 1848. Upon opening the animal she was found to be pregnant. The uterus and vagina, with a fœtus thirteen inches in length, were preserved in alcohol, and upon Dr. R.'s late return to the United States, from Canton, they were presented to me.

Professor Agassiz, at that time in the city, was invited to examine the specimens with me, and the observations then made were so remarkable, that that gentleman considers them well deserving of being laid before the Academy.

I now submit for the inspection of the members, both the original specimens and several drawings of them.

The womb is two-horned, and still contains the whole of the chorion. It is a very strong muscular uterus, divided by a thick partition. The cervix uteri appears to me to be not much deployed, and is still a thick and very strong cylinder, terminating by a well formed vaginal cervix, and os tincæ, that projects about three-fourths of an inch into the uterine extremity of the vagina. The mucous membrane of the vaginal cervix is formed into regular rugæ or plicæ, that passing inwards to the os uteri go upwards into the canal of the cervix. The os uteri is a transverse sulcus as in the human uterus. Vide Pl. XXXVI. fig. 2, and Pl. XXXV. fig. 1.

The vagina is about two inches and a quarter in length—in its present state. It is condensed and contracted by the alcohol, in which the specimen has been preserved for nearly a year. The specimen and the drawing show the arrangement of the rugæ of the vagina. Pl. XXXV. fig. 1, e.

Upon opening the vaginal cervix by an incision carried from the os upwards, we were surprised by finding a second os tincæ and cervix, similar to the former one.

The drawing shows, better than any description, the arrangement of this singular apparatus, and I submit to the members, this original specimen, in which the second or upper cervix and os are seen to be enclosed in the canal of the cervix, as the lower one is encased in the canal of the vagina. It will be seen upon comparing them, that the drawing gives a faithful representation of the facts. Pl. XXXVI. fig. 2, a, b, d.



The fœtus was developed in the left cornu of the womb, the right one being partially developed by the intrusion into its cavity of the chorion and allantois. The fœtus, as I have said, is thirteen inches in length, and must have floated free in the waters of the amnios. Such an inference is deducible from the fact that the animal is not permanently flexed; as in the terrestrial mammals. Pl. XXXV. fig. 1.

I am ignorant of the length of the uterus previous to the discharge of the ovum. Doubtless it must have contracted very much after it was opened. In its present contracted state, the womb is eleven inches long, by eight inches in its conjugate diameter. The walls are about one-third of an inch thick. Pl. XXXVI. fig. 1.

The whole interior aspect of the womb is pleated or folded like irregular *valvulæ conniventes*; and these *plicæ*, being very strongly expressed, and innumerable, have the effect of augmenting the superficial contents of the inner aspect of the womb two or three hundred per cent. beyond that of the external surface. I am not sure that the inner aspect is not four or five hundred per cent. above the outer aspect in superficial quantity.

The specimen, which I now exhibit, may serve to satisfy those members who may choose to make the computation. The drawing represents these pleats or folds; (Pl. XXXVI. fig. 1, d, d.) and I have also here, a drawing representing a section, magnified five diameters, to show the multiplication of superficies thus obtained.

I have said that the fœtus was developed in the left cornu, and that there was but one fœtus; nevertheless its allantois carried the chorion into the right cornu also, which was very considerably developed by the distending chorion and amnion, serving in this manner, greatly to multiply the points of contact betwixt the chorion and the maternal surface. Pl. XXXVI. fig. 1, b, d.

The chorion, whose inner surface is smooth, and even polished, is upon its exterior aspect pleated in such manner as to let its projections and sulci fit accurately the corresponding sulci and projections of the uterine folds; so that—if in the present specimen, the womb, before it was opened, was fourteen inches in length within—the chorion was also fourteen inches in its longest diameter: but, if the inner aspect of the uterus was greatly multiplied in its superficies, the outer aspect of the chorion was equally multiplied. Hence the surfaces of contact of the fœtal organ with the mother's womb exceeded by many hundred per cent. the apparent surface of contact.

As to the amnios and the allantois, they were removed with the fœtus, and given to me already separated, and so much broken and torn that I shall not venture to describe them now. I here exhibit them, however, to the members, who may perceive that they cannot be fitly described in this note. Pl. XXXV. fig. 1.

It appears to me that the structures thus briefly described are worthy of consideration, as disclosing a most remarkable adaptation of the organs to the nature

and condition of the cetaceous parent or dam ; and I shall venture to offer some remarks upon their economical uses or purposes. I believe the observation is new in comparative anatomy and embryology.

In gestation of the mammifera, the womb expands under a compulsion derived from the augmenting magnitude of the ovum ; which, like an acephalocyst, imbibes the materials or plasma from its placental disc or discs. There is a constant tendency of the fundus and corpus uteri to resist their extension, and an equally constant effort of the cervix and os uteri to retain the ovum within the womb. The progress of a gestation brings that contest to a close by developing the cone of the cervix, and changing it into a cylinder that can no longer counteract the expulsive effort of the fundus. The last conflict is labor, in which the fœtus is expelled.

Thus there is in the gravid womb a *facultas retentrix* and a *facultas expultrix*, that are in constant antagonism.

In the terrestrial mammals these forces are balanced according to the genus of the animal, which lives under an ordinary atmospheric pressure of fifteen pounds to the inch.

Mr. Scoresby in his *Account of the Arctic Regions, &c.*, vol. 2, p. 249, computes the surface of a large whale at 1540 square feet, and he has a foot-note of which the following is a copy.

“From experiments made with sea-water taken up near Spitzbergen, I find that thirty-five cubical feet weigh a ton. Now, supposing a whale to descend to the depth of 800 fathoms, or 4800 feet, which, I believe, is not uncommon, we have only to divide 4800 feet, the length of the column of water pressing upon the whale, by 35 feet, the length of a column of sea-water a foot square weighing a ton, the quotient  $137\frac{1}{7}$  shows the pressure per square foot upon the whale in tons, which, multiplied by 1540, the number of square feet of surface exposed by the animal, affords a product of 211,200 tons, besides the usual pressure of the atmosphere.”

Mr. S. says that we can have but an imperfect conception of such a degree of pressure, which exceeds in weight, sixty of the largest ships in the British navy, when manned and provisioned and fitted for a six months' cruise.

Is it not a remarkable thing that the mammiferous cetacea, when launched in the ocean, to be subjected to such inconceivable pressure, should be provided against one of the greatest hazards to which their state as marine mammals could expose them ?

Seeing the perpetual antagonism of the *facultas expultrix* and the *facultas retentrix* in ordinary gestation, it could not happen that the parent should plunge to the depth of even four or five hundred fathoms without losing the fruit of the womb.

Let it be stated that in any case, as in our specimen, the superficies of the gravid womb is one hundred inches, of which the os uteri has one inch and the rest of the



organ ninety-nine inches. Then at a depth of 800 fathoms the sea pressure per square inch, or that on the os uteri, is equal to 2055 pounds, while the sea pressure on the remaining 99 inches equals 203,445 pounds.

So great a reinforcement to the *facultas expultrix* would inevitably overcome the resistance of a single or simple os uteri. Hence, to obviate a great risk of losing the genera by the destruction of the embryos, the *facultas retentrix* has been fortified and made secure by an apparatus not in use in any terrestrial mammal. I should think no man need look for a more absolute demonstration of a plan or plans of creation.

But I have to remark that the exterior surface of the chorion in this mammal is converted into a placenta, in which respect it resembles the placenta of the pachyderms, as the mare and hog, in which the whole exterior surface of the chorion becomes placenta; while in the carnivora it is zoniform, and in ruminants consists of numerous placentules.

In this cetacean, not only is the exterior surface of the chorion become a fleshy and vascular process, but the surface is immensely multiplied in order greatly to increase the surface of contact and the chances of æration. For some of the cetacea make plunges that last for thirty minutes, before they return to the surface to breathe. "The average stay under water," says Mr. Scoresby, "of a wounded whale, which steadily descends after being struck, according to the most usual conduct of the animal, is about thirty minutes; but in shallow water, I have been informed, it has been sometimes known to remain an hour and a half at the bottom after being struck, and yet has returned to the surface alive."—Op. cit. p. 247.

Now, inasmuch as the foetal cetacean depends for its æration upon the branchial offices of its placenta, does it not appear that such protracted absence from the surface as thirty minutes, would suffice nearly to asphyxiate the dam, and certainly, to destroy the fruit of the womb, but for the vast multiplication of the ærating surface that I have described and figured in the present specimens? With so extensive a superficies of ærating or oxygenating branchia or placenta, the foetus might survive after the most protracted absence from the surface that the dam might be induced to suffer. Another proof of the wisdom and foreknowledge and plan of the Author of nature.

To know that plan; to look through nature, up to nature's God, ought to be the highest aim of the naturalist and the physiologist.

It might be interesting to the members to observe the mode of connection between the chorion or placenta and the womb. In separating these surfaces by the avulsion of the chorion, it is manifest that no vascular tractus is broken; and I cannot



conceive that any one could inspect this process of separation without resting in the absolute conviction that the union is not anatomical, but only, and merely, one of contaction.

Such is the case clearly in this genus: probably the same law prevails as to the *Balænas*, and, indeed, as to all the cetaceans.

The young mysticete, at birth, is from ten to twenty feet in length. If such a vast fœtus can be developed in utero, without the aid of the maternal placenta, as it is called, we have a fair inference as to the non-existence of such an apparatus in the other genera; and particularly in the human organ, where the average weight of the fœtus at term is only seven pounds. I avail myself of the present occasion to make this statement, because it confirms the views I have already expressed in my publications on the subject of the placenta.

The fœtus, which I now exhibit to the members, is perhaps not a sufficiently developed creature to warrant me in deciding upon the species of its dam. Nevertheless, after comparing it with all the specimens to which I have had access, I cannot but think it belongs to the species *Delphinus Nesarnak*. The appearance of the skin of the dam and that of the fœtus; the form of the muzzle or snout, so similar to that of a duck; the black termination of the jaws in a well formed bill,—all lead me to conclude the species to be that of the *Delphinus Nesarnak*, of Lacepède's *Histoire des Cétacés*—and this notwithstanding the *Nesarnak* is an Arctic porpoise, while the specimen was taken near Rio de Janeiro.

The drawing of the fœtus seems to me very faithfully to represent its magnitude and form.

The animal has nearly the stomach of a ruminant, i. e., it has three distinct cavities, not four. The paunch is absent but the bonnet and the many-plus, with the abomasum or red, are very similar to the ruminant stomach. Pl. XXXV. fig. 2.

The intestinal tube is very small. It has no cæcum and no colon.

Such an animal living in the water has no occasion for a cæcum or colon, since the dejection of the residue of its aliment would occasion no inconvenience.

An enormous cæcum would occupy too much of the internal cavity, which is required for the purposes of the respiration. Hence the abdominal cavity is exceedingly small; whereas the cavity of the thorax is vast, as fitting it to accommodate the enormous lungs required to endow the blood with oxygen during the plunges of the animal. I annex a drawing of the stomach and alimentary canal which may be compared with the specimens. Vid. Pl. XXXV. fig. 2.

I present a specimen and drawing to show the arrangement of the larynx. Vid. Pl. XXXV. fig. 3. There is a velum palati, with a slit or fissure, through which the

elongated larynx may pass upwards to the blow hole or nostril, to receive the air in aspiration. It is also clear that the larynx may be withdrawn from this fissure in the act of swallowing, and possibly to clear the mouth by an act of expiration or expuition.

The ovary (vide Pl. XXXVI.) is represented in the drawing ; it is of an enormous size, and worthy of remark as exhibiting the corpus luteum, which, as in the ruminants, has invaded or occupied nearly the whole of the stroma ovarii.

## DESCRIPTION OF THE PLATES.

## PLATE XXXV.

Fig. 1. A correct representation, full size, of the fœtus with its umbilical cord; to which is attached a remaining part of the amnios. In opening the abdomen the urinary bladder was cut open, and a probe passed along the urachus towards the allantois.

Fig. 2. The alimentary organs, to which is attached a small remaining portion of the liver. *a* is a thread passed into the *bonnet*, which communicates by a small aperature with the many-plus, in which is seen a thread *b*, that passes through a valvular opening into the third stomach, or red, which is the rennet.  
*c*. The small intestine which has no cæcum nor colon.

Fig. 3. A vertical view of the tongue glottis and lungs. *a* the tongue, *b* the glottis, which projects through a narrow slit in a velum. The glottis seems to be capable of inhaling or expiring air above this velum through the blow-hole when projected through the slit; when withdrawn, it doubtless can drive the air of the lungs out through the mouth, to expel any substances contained therein, that the animal may have occasion to reject.

Fig. 4. *a. b. c.* Show the same parts in profile.

## PLATE XXXVI.

Fig. 1. The two-horned womb of the Porpoise represented of full size. *a* the right, and *b* the left uterus. The fœtus was developed in the right cavity.

*c*. A large probe passing from the right into the left womb, through an opening in the strong septum between them.

*d. d. d.* Show the plicated or pleated arrangement of the internal membrane or surface of the wombs, which gives rise to a vast increase of the superficies or surface of contact. This surface with its foldings is a true *caduca*.

*e*. The vagina.

*f*. The os uteri with its pleated surface.

*g*. The cervix uteri incised longitudinally.

*h. h. h.* The chorion, which was left in the wombs, though much broken. The figure serves to show how its external or uterine aspect, being folded or pleated like the inner aspect of the wombs, gave rise to a vast multiplication of surface of contact and aeration.

*i*. The ovary split open.

Fig. 2. *a* the inner os *tincæ* not yet cut open; *b* the outer or lower os *tincæ* open and strained out to show its folds, and the manner in which the upper surface is invaginated in the lower one; *c* the vagina; *d* the canal of the cervix uteri.

Fig. 3. Section of a portion of the womb magnified, but giving a good idea of the pleated surface or *decidua* at *a*, while *b* shows the muscular or fleshy substance on which the deciduous coat is developed.





ART. XXII.—*Descriptions of New Fresh Water and Marine Shells.*

By T. A. CONRAD.

Of the following fresh water shells, those from Georgia were kindly loaned me for description by J. Hamilton Couper, Esq.

## UNIO.

*U. SECURIFORMIS.* Pl. 37, fig. 1.—Suborbicular, thick, compressed; valves slightly convex; umbo flattened, marked with obtuse, narrow, divaricated plaits; plaits on the lower half of the valves obscure and interrupted; umbonal slope rounded; posterior slope with strong oblique plaits towards the apex; beaks eroded; epidermis black; within white; cardinal teeth large, direct, profoundly sulcated.

Proceed. Acad. Nat. Sc., Vol. iv., p. 152.

Inhabits Flint River, Georgia.

*U. STAGNALIS.* Pl. 37, fig. 2.—Widely elliptical, ventricose, rather thin; towards the posterior extremity very thin and fragile; anteriorly regularly rounded; posteriorly somewhat pointed, with an acutely rounded extremity; basal margin regularly curved; summits prominent, eroded; posterior margin very oblique and nearly straight; epidermis ochraceous and olivaceous; rays green, not very distinct on the middle and anterior side, but more so posteriorly, some rather broad, others linear; posterior slope dark colored, rayed; within white and highly iridescent posteriorly; cardinal teeth much compressed and oblique, double in each valve; lateral teeth very slightly curved, finely granulated.

Proceed. Acad. Nat. Sc., Vol. iv., p. 152.

Inhabits mill ponds; Ogeechee River, Georgia.

*U. OGEECHEENSIS.* Pl. 37, fig. 3, 4.—Elliptical, thin, inflated; posterior side somewhat pointed, extremity subangular; valves slightly contracted from beak to base; summits rather prominent, decorticated, slightly undulated; epidermis ochraceous with interrupted green rays, some of them broad; within white, highly iridescent posteriorly; cardinal teeth oblique, compressed; lateral teeth rectilinear.

Proceed. Acad. Nat. Sc., Vol. iv., p. 153.

Allied to the preceding, but has a lighter colored epidermis with more distinct rays; is proportionally longer; the cardinal tooth in the left valve is longer and less lobed, and the lateral teeth are straight, without granules, and less oblique than in the preceding species, which is a larger shell.

*U. ROSACEUS.* Pl. 37, fig. 5.—Widely elliptical, ventricose above; posterior margin obliquely truncated, slightly sinuous; extremity subangular or acutely rounded; epidermis ochraceous and dark brown; rays indistinct, frequently broad, but composed of fasciculi of lines; surface with fine radiating wrinkles; within deep rose-purple; cardinal teeth prominent, oblique, compressed, trifid, or three teeth in the left valve.

Proceed. Acad. Nat. Sc., Vol. iv., p. 153.

Inhabits Savannah River. Allied to *U. ochraceus*, Say.

*U. ORATUS*. Pl. 37, fig. 6.—Widely elliptical, ventricose, gaping at both ends; posterior gape wide; anterior extremity rather acutely rounded; posterior margin sinuous, extremity subangular; basal margin forming a nearly regular curve; summits prominent; umbo and beak eroded; epidermis ochraceous, polished; cardinal teeth compressed, oblique; lateral teeth straight; within white, much stained with waxen yellow.

Proceed. Acad. Nat. Sc., Vol. iv., p. 153.

Inhabits Flint River, Georgia.

This shell has the polished epidermis of *U. cariosus*, but is without a ray. It is longer in proportion than that species with very different cardinal teeth, which are much nearer parallel with the margin above.

*U. CONTRARIUS*. Pl. 37, fig. 7.—Elliptical, moderately thick; valves somewhat flattened or plano-convex; umbo and beak not prominent, much eroded; umbonal slope acutely rounded; posterior margin straight above, truncated, direct; epidermis deep ochraceous, with linear radiating wrinkles, and obscurely rayed about the umbo; within pale flesh-color, stained with waxen yellow; cardinal teeth direct, thick, sulcated, not very prominent; lateral teeth reversed, or the double tooth in the right valve.

Proceed. Acad. Nat. Sc., Vol. iv., p. 153.

Inhabits Ogeechee River, Georgia.

*U. NUCLEOPSIS*. Pl. 37, fig. 8.—Obtusely subovate, slightly oblique, thick, not ventricose; umbonal slope rounded; posterior slope with a few obscure plaits; posterior margin subtruncated; basal margin slightly tumid near the middle; epidermis ochraceous, with a series of green spots along the umbonal slope; posterior slope obsoletely striated; within bluish white; cardinal teeth thick, direct, single in the right valve.

Proceed. Acad. Nat. Sc., Vol. iv., p. 154.

Inhabits Etowah River, Georgia.

*U. LIMATULUS*. Pl. 37, fig. 9.—Subelliptical, convex; posterior side somewhat pointed; umbonal slope angular; posterior slope subcarinated in the middle; posterior margin obliquely truncated; extremity truncated, direct; basal margin regularly rounded; beaks not prominent, eroded; epidermis highly polished, dark brown and ochraceous, obscurely rayed; within flesh color or pale salmon; cardinal teeth oblique, compressed, double in each valve; lateral teeth long, slightly curved.

Proceed. Acad. Nat. Sc., Vol. iv., p. 154.

Inhabits Savannah River.

*U. PERPLICATUS*. Pl. 38, fig. 2.—Obtusely subovate, very ventricose; rather thick, with about twelve oblique, profound plicæ, those behind the umbo recurved; ligament margin greatly elevated; posterior superior margin slightly concave, oblique, extremity truncated; epidermis blackish-brown, apex eroded; within tinged with purple; cardinal teeth direct, prominent, sulcated.

Proceed. Acad. Nat. Sc., Vol. i., p. 19. May 1841.

*U. ATROCOSTATUS*.—Lea. Trans. Amer. Philos. Soc. (N. S.) Vol. x., pl. 2, fig. 5, 1847.

Inhabits with *U. nodiferus*, near Jackson, Louisiana.



This species is most nearly related to *U. costatus*, (Raf.) but differs in being far more ventricose, and has very prominent umbones, which are just the reverse in the *costatus*. The diameter through the umbonial slope is profound.

*U. NODIFERUS*. Pl. 38, figs. 4, 8.—Obtusely subovate, ventricose, moderately thick; surface with a few nodules about the middle of the valves, and smaller ones near the ligament margin; a slight, not very wide, furrow extends from beak to base; posterior margin approaching to a regular curve; beaks eroded; within white; cardinal teeth robust, prominent, direct, and profoundly sulcated in old shells; epidermis chestnut-brown.

Proceed. Acad. Nat. Sc., Vol. i., p. 19, 1841.

Approaches *U. prasinus*, but differs in being proportionally longer, more convex; in having a brown epidermis, narrower anterior side, and oblique posterior margin.

*U. PLECTOPHORUS*.\* Pl. 38, fig. 7.—Trapezoidal, thick; valves flattened on the sides, slightly contracted, marked with irregular arched, obtuse, interrupted folds, extending from the beaks nearly to the base; umbonal slope angular; posterior slope plicated; beaks not prominent, profoundly eroded; ligament margin elevated; posterior extremity truncated obliquely inwards; basal margin contracted; epidermis nearly black; within white, with a purple margin; cardinal teeth direct, very thick, sulcated; lateral teeth slightly arched.

*U. ARATUS*. Proceed. Acad. Nat. Sc., Vol. iv., p. 154.

*U. PLECTOPHORUS*. “ “ “ “ “ p. 162.

Inhabits Flint River, Georgia.

Allied to *U. Sloatianus* and *U. trapezoides*, Lea.

*U. MISSISSIPPIENSIS*. Pl. 38, fig. 11.—Narrow-elliptical, ventricose, slightly contracted from beak to base; hinge margin parallel with the base; posterior margin very oblique, concave; extremity somewhat pointed, angulated; beaks with angular ridges; epidermis polished, olivaceous, with numerous dark green rays; within highly perlaceous; cardinal teeth prominent, oblique, double in each valve.

Found by Dr. Dickeson in one of the tributaries of the lower Mississippi. Allied to *U. Nashvillianus*, Lea., but is proportionally longer, with finer undulations on the beaks, and the rays extend over the whole disk.

## MELANIA.

*M. SUBLIRATA*. Pl. 38, fig. 1.—Elongate-conoidal; volutions six, the sides flattened above; whorls of the spire with a carinated angle near the base of each, and longitudinally ribbed; ribs not prominent; upper whorls with two distant revolving lines on each; base of the body whorl striated, the upper portion of body whorl obscurely ribbed; color olivaceous with obscure brown bands.

Inhabits Savannah River.

\* In the Proceedings of the Academy this name is erroneously printed *plectrophorus*.

*M. CÆLATURA.* Pl. 38, fig. 3.—Ovate-oblong, turrated; volutions six, with longitudinal ribs and unequal prominent revolving lines, subnodulous where they cross the ribs; the ribs on the body whorl do not reach the middle; the color ochraceous and brown; aperture narrow, elliptical; labium with interior brown bands; superior part of columella somewhat callous.

Proceed. Acad. Nat. Sc., Vol. iv., p. 154.

Inhabits Savannah River.

*M. SYMMETRICA.* Pl. 38, fig. 5.—Subulate; whorls nine, slightly convex, with longitudinal slightly curved, narrow ribs, interrupted near the suture by a revolving granulated line; ribs on the body whorl not extending as far as the middle; margin of labrum profoundly rounded; color ochraceous and black.

Proceed. Acad. Nat. Sc., Vol. iv., p. 155.

Inhabits Savannah River.

Near the apex, two or three volutions have a fine granulated carinated line.

*M. PERANGULATA.* Pl. 38, fig. 6.—Subulate; volutions nine or ten, with an acutely carinated angle on all except the body whorl, which is subcarinated; on each whorl of the spire is a revolving granulated line above the carina; color olive brown.

Proceed. Acad. Nat. Sc., Vol. iv. p. 154.

Inhabits Savannah River.

*M. NEBULOSA.* Pl. 33, fig. 9.—Elongate-conoidal; volutions six or seven, with revolving raised lines; whorls of the spire carinated below the middle, above which they are longitudinally ribbed, and have two or three revolving granulated lines; granules compressed; aperture widely elliptical; color ochraceous, with brownish-black stains.

Proceed. Acad. Nat. Sc., Vol. iv., p. 155.

Inhabits Savannah River.

*M. PERCARINATA.* Pl. 38, fig. 10.—Elongate-conoidal; volutions of the spire with a carinated line below the middle, and a revolving granulated line above; body whorl with a granulated revolving line near the suture, and three carinated lines, the superior one largest, the lower one fine; color dark olive brown.

Proceed. Acad. Nat. Sc., Vol. iv., p. 155.

Inhabits Savannah River.

The following new and interesting Shells are from the coasts of Lower California, and Peru, and were presented to the Academy by Dr. Thomas B. Wilson.

#### SOLECARDIA, *Con.*

Shell bivalve, equivalve; hinge with two diverging cardinal teeth, and a linear oblique cartilage pit between; cardinal plate profoundly grooved on each side of the teeth; muscular impressions two, small, rounded, remote from the margins, particularly from the base; pallial impression entire.

*S. EBURNEA*. Pl. 39, fig. 1.—Oblong oval, equilateral, ventricose, thin; extremities nearly equally rounded; basal margin arched; valves white, shining, minutely shagreened, towards the base minutely rugose, with fine impressed radiating lines; concentric lines towards the base finely waved, indenting the margin.

In this singular bivalve the pallial impression shows no junction with the adductor impressions, but joins the extremities of the cardinal plate. The muscular impressions are as distinct on the exterior as on the interior.

### PETRICOLA.

*P. SINUOSA*. Pl. 39, fig. 2.—Subtriangular; inflated anteriorly; profoundly sinuous posteriorly; ribs radiating, prominent, acute, except towards the anterior margin, where they are replaced by closely-arranged lines; basal margin profoundly sinuous; within brown, cavity of umbo white; cardinal teeth prominent, two in one valve, and one broad one in the other.

### PHOLADOPSIS, *Con.*

Inequivalved; right valve produced posteriorly, left valve overlapping the opposite; cartilage situated on a projecting callus.

*P. PECTINATA*. Pl. 39, fig. 3.—Ovate, very thin and fragile, profoundly gaping posteriorly; profoundly ventricose anteriorly; valves with elevated waved laminae terminating near a profound sinus, which extends from beak to base; right valve undulated near the posterior end, reflected, margin pectinated; both valves have concentric lines.

### PARAPHOLAS, *Con.*

*P. BISULCATA*. Pl. 39, fig. 4.—Ovate-oblong; anterior accessory valves or deposit strong, shining, gibbous on the margin of aperture, and having obscure decussated striæ, the transverse ones a little raised; anterior side of the larger valves with numerous prominent crenulated radii; a slightly oblique sulcus extends from beak to base, and a slightly impressed line runs from the beak to the posterior end of the closed portion of the base; between the two impressed transverse lines the valves have closely-arranged, rugose, longitudinal laminae, and posterior to these the laminae are remote and elevated.

### PENITELLA.

*P. WILSONII*. Pl. 39, fig. 5.—Ovate-oblong, very thin, profoundly ventricose; valves with a furrow from beak to base; the papyraceous anterior valves very wide; anterior valves with numerous oblique waved laminae, and radiating acute ribs; ligament margin sinuous; posterior side with concentric distant undulations; two small accessory valves behind the beak, which are reflected posteriorly; membranaceous appendage with a sinuous or concave margin where it joins the shell, and a deep annular groove anterior to the middle.

This rare and beautiful shell is dedicated to that liberal patron of natural science, Dr. Thomas B. Wilson, to whom we are indebted for a knowledge of the species.



## TRITON.

T. PERFORATUS. Pl. 39, fig. 6.—Subpyriform; volutions five or six; ribs revolving, flattened, slightly prominent, wide and narrow alternately, with narrow interstices and an occasional revolving line; angle of body whorl tuberculated; spire scalariform, the angle of each whorl with a tuberculated rib or carina; color cinereus; epidermis brown, rough, hairy, longitudinally ribbed; aperture wide; margin of labrum sinuous above, profoundly ribbed; ribs about half an inch long, on an ochraceous submargin; columella with white folds, and narrow, dark brown interstices; beak bent, umbilicated.

## OLIVA.

O. PROPATULA. Pl. 39, fig. 7.—Ovate-oblong, slightly gibbous towards the base; color pale ochraceous, marked with a few longitudinal zigzag brown lines, and with darker transverse hair-like lines, and a few spots; columella patulous, deeply sulcated inferiorly; deposit at the base carinated in the middle.

## REFERENCE TO PLATE XXXVII.

- |                                    |                              |
|------------------------------------|------------------------------|
| Fig. 1. <i>Unio securiformis</i> . | Fig. 6. <i>Unio oratus</i> . |
| 2. ——— <i>stagnalis</i> .          | 7. ——— <i>contrarius</i> .   |
| 3, 4. ——— <i>Ogecheensis</i> .     | 8. ——— <i>nucleopsis</i> .   |
| 5. ——— <i>rosaceus</i> .           | 9. ——— <i>limatulus</i> .    |

## REFERENCE TO PLATE XXXVIII.

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Fig. 1. <i>Melania sublirata</i> . | Fig. 7. <i>Unio plectophorus</i> . |
| 2. <i>Unio perplicatus</i> .       | 8. ——— <i>nodiferus</i> .          |
| 3. <i>Melania cælatura</i> .       | 9. <i>Melania nebulosa</i> .       |
| 4. <i>Unio nodiferus</i> .         | 10. ——— <i>percarinata</i> .       |
| 5. <i>Melania symmetrica</i> .     | 11. <i>Unio Mississippiensis</i> . |
| 6. ——— <i>perangulata</i> .        |                                    |

## REFERENCE TO PLATE XXXIX.

- |                                     |                                    |         |
|-------------------------------------|------------------------------------|---------|
| Fig. 1. <i>Solecardia eburnea</i> . | Fig. 7. <i>Oliva propatula</i> .   |         |
| 2. <i>Petricola sinuosa</i> .       | 8. <i>Donax protracta</i> .        | p. 208. |
| 3. <i>Pholadopsis pectinata</i> .   | 9. <i>Venus intapurpurea</i> .     | 209.    |
| 4. <i>Parapholas bisulcata</i> .    | 10. <i>Pecten fuscopurpureus</i> . | ib.     |
| 5. <i>Penitella Wilsonii</i> .      | 11. P—— <i>fragosus</i> ,          | 214.    |
| 6. <i>Triton perforatus</i> .       |                                    |         |

ART. XXIII.—*Revision of the North American Tailed-Batrachia, with descriptions of new genera and species.* By SPENCER F. BAIRD, Carlisle, Pennsylvania.

The following notes, introductory to a more detailed memoir on the same subject, will, it is hoped, throw some light upon this obscure portion of American zoology. To this we would refer for the descriptions of species, with their anatomical and physiological characters, giving only in this place brief outlines of the genera and the synonymy of the species. It is probable that reference to some, hitherto inaccessible, records will change the specific nomenclature to a certain extent; this, however, can affect only a few. No synonyms or references are quoted, but such as are based (as far as known) upon original descriptions, mere quotations from the previous descriptions of others being omitted.

## BATRACHIA URODELA, DUM.

### GROUP I. ATRETODERA, Dum. et Bib.

Branchial apertures obliterated at maturity.

*Section 1. Sphenoidal teeth absent.* Carpus and tarsus ossified in the adults.

AMBYSTOMA, *Tsch.* Vomerine teeth in an undulating transverse row, composed of several curves varying with the species. Tongue broad, fleshy, filling interspace of rami; entirely attached except at the lateral and anterior edges, where it is slightly free. Carpus, tarsus, and basi hyal ossified in extreme adults. Body very stout and clumsy. Skin in some species, with close set glands, secreting a milky fluid.

*a.* Tail sub-round. Toes rather long and slender, cylindrical or conical.

*β.* Tail compressed. Toes short, broad, sub-palmate.

NOTOPHTHALMUS, *Raf.* Tongue rudimentary; the end of the hyoid apparatus appearing in the mouth as a simple knob. Vomerine teeth forming an acute V in the palate; the vertex between the posterior nares, the branches much prolonged backwards. A bony orbit above the eye, formed by the union of processes from the frontal and tympanic bones, enclosing a foramen through which pass flexor muscles of jaw. Similar in this respect to *Cynops*, *Tsch.*, *Pleurodeles*, *Waltl.*, and *Euproctus*,

Genè. Ossification extending to hyoid apparatus, carpus and tarsus. Vertebra much compressed, with high crests. Three apertures in the skin of the cheeks, behind the eye, not communicating with the cavity of the mouth. Hind feet much flattened; first and fifth hind toes nearly rudimentary.

*Section 2. Sphenoidal teeth absent.* Carpus and tarsus not ossified in the adults.

*Sub-section 1.* Tongue entirely attached as in *Ambystoma*.

PLETHODON, *Tsch.* Sphenoidal teeth on two tangent plates attached to the sphenoidal bone. Skin glandular, exuding a milky fluid. Tail cylindrical. Body more slender than in *Ambystoma*. Eggs deposited in packets under damp stones.

*Sub-section 2.* Tongue attached anteriorly, evertile as in the *Raniformes*.

DESMOGNATHUS, *Baird.* Sphenoidal teeth in two narrow patches, attached to the edges of the sphenoidal bone. Occipital condyles very peculiar in consisting of short cylinders projecting from the ex-occipitals, with their axes parallel to that of cranium, and their extremities forming a spherically convex articulating surface. Crest of first cervical vertebra transverse, with a strong ligament passing from each end, across the posterior corner of the cranium, to be inserted into the lower jaw. These ligaments prevent the opening of the jaws beyond a very slight amount. Eggs (in the second species) wrapped round the body of the female, who remains in a damp spot until they are hatched.

HEMIDACTYLUM, *Tschudi.* Toes, four on the hind feet. Sphenoidal teeth in two broad short patches. Skin somewhat granular. Costal furrows more deeply impressed than common, extending to dorsal line. Tail narrower at the base than near the middle.

*Sub-section 3.* Tongue entirely protractile, capable of considerable protrusion, circular in shape, and supported on the tip of the constricted hyoid apparatus.

OEDIPUS, (*Tschudi.*) Body stouter than in *Plethodon glutinosus*. Sphenoidal teeth on two plates, not in contact; diverging behind. Toes dilated at the tips into sucker like disks as in *Hyla*.

PSEUDOTRITON, *Tsch.* Sphenoidal teeth much the same as in *Oedipus*, and the other genera of this sub-section. Body very stout, less so than in *Ambystoma punctata*. Tail equal to or less than the body. Breadth of skull about equal to the length.



SPELERPES, *Raf.* Body very slender. Tail as long or longer than the body. In some species a cirrhoid apparatus projecting from the edge of the upper lip, below the nostril.

BATRACHOSEPS, *Bon.* Characters much like the last. Toes four on the hind feet.

## SYNONYMY OF THE GENERA AND SPECIES.

AMBYSTOMA, *Tschudi.* (1838.) Class. der Bat. XIPHONURA, *Tsch.*

A. PUNCTATA, *Bd.* 1767.

*Lacerta punctata*, (1767) L. Syst. Nat. ed. 13, 370, 45.

*Salamandra p.* (1802) Lacep. Hist. Quad. Ov. I. 245, 314, (ed. of 1819.)

*L. maculata*, (1802) Shaw. Gen. Zool. Amph., 304.

*Salamandra venenosa*, (1803?) Bart. in Daud. Hist. Rept. VIII. 229, (in let. from Raf.)

*Lacerta subviolacea*, (1809) Bart. Am. Phil. Trs. O. S. VI.—p. 108, Pl. 4, fig. 6.

*S. subv.* Dekay. (1842) N. Y. Rept. 74, Pl. 21, f. 36.

*S. venenosa*, (1838) Holb. Herp. 1st ed. III. 105, Pl. 24.; (1842) 2d ed. V. 67, Pl. 22.

*Ambystoma subv.*, (1838) Tsch. Class. der Bat.

HAB. South Carolina, Catesby; Hol.—Carlisle, Pennsylvania, Baird.—Kennebec Co. Maine, Storer.—Meadville, Pennsylvania, Baird.

A. OPACA, *Bd.* 1807.

*Sal. o.*, (1807) Gravenhorst. Uebers. Zool. Syst. p. 431.—(1829) Grav. Delic. Mus. Vratisv. fasc. i. p. 75, Pl. 10.

*S. gravenhorstii*, Leukart. fide Fitz. (1825) neue Class. der Rept.

*S. fasciata*, (Sept. 1818) Green. J. A. N. S., I. 350.—(1838) Hol. Herp. 1st ed. III. Pl. 25; (1842) 2d ed. V. p. 71, Pl. 23.—(1840) Storer. Mass. Rept. 247.—(1842) Dekay N. Y. Rept. 77. Pl. 17. fig. 40.

HAB. Georgia, Virginia, Maryland; Mississippi, Baird. Massachusetts, Storer.

A. JEFFERSONIANA, *Bd.* January, 1827.

*Sal. j.* (Jan. 1827) Green. Cont. Mac. Lyc. I. No. 1, p. 4, Pl. fig. 1.—(1842) Hol. Herp. 2d ed. V. 51, Pl. 14.

*Triton niger*, (1842) Dekay. N. Y. Rept. 85, Pl. 15, f. 35.

*Xiphonura j.* (1838) Tsch. Class. der Bat.

HAB. Canonsburg, Pennsylvania, Green.

A. MACRODACTYLA, *Baird.*

*A. m.* (Sept. 1849) Bd. J. A. N. S., N. S., I. p. 292.

HAB. Oregon.

A. TIGRINA, *Bd.* August, 1825.

*Sal. t.* (Aug. 1825) Green. J. A. N. S., V. 116.—(1838) Hol. Herp. 1st ed. III, 109, Pl. 25.

*Triton t.* (1842) Hol. Herp. 2d ed. V. 79, Pl. 26.—(1842) Dekay, N. Y. Rept. 83, Pl. 15, f. 32.

A. LURIDA, *Bd.* (July, 1839.)

*Sal. l.* (July, 1839) Sager. Sill. Jour. O. S. 36, p. 322.

HAB. Detroit, Michigan.

A. MAVORTIA, *Baird.*

*A. m.* (Sep. 1849) *Bd.* J. A. N. S., N. S., I. p. 292.

HAB. New Mexico.

A. EPISCOPUS, *Baird.*

*A. e.* (Sep. 1849) *Bd.* J. A. N. S., N. S., I. p. 292.

HAB. Kemper Co. Mississippi.

Gen. NOTOPTHALMUS, *Rafinesque*, (March 1820.)

Annals of Nat., No. 24. = *Diemictylus*, Raf. Ib., Near *Cynops*, (1838) Tsch.

N. MINIATUS, *Raf.* March, 1820.

*Triturus* (N) *m.* (March 1820) Raf. Annals of Nat. No. 24.

*Sal. symmetrica*, (Nov. 1825) Harlan. J. A. N. S., V. 157.—(1838) Holb. Herp. 1st ed. II. 59, Pl. 11.—1842. Ib. 2d ed. V. p. 57, Pl. 17.—(1842) Dekay N. Y. Rept. 73, pl. 15, fig. 33.—(1840) Storer Mass. Rept. 246.

HAB. Lake Champlain and Northern New York, *Bd.* Massachusetts, Storer. Georgia, *Bd.* Meadville, Pennsylvania, *Bd.*

N. VIRIDESCENS, *Bd.* March, 1820.

*Triturus* (*Diemictylus*) *v.*, Raf. (March, 1840.) Annals of Nat. No. 22.

*Sal. dorsalis*, (Jan. 1828) Harlan. J. A. N. S., V. 101.—(1838) Holb. Herp. 1st ed. II. 57, Pl. 10.—(1840) Storer Mass. Rept. 249.

*Triton d.* (1842) Holb. Herp. 2d ed. V. p. 77, Pl. 25.

*Sal. millepunctata*, (1838) Storer. Bost. J. N. H., II. p. 60.

*Triton m.* (1842) Dekay. N. Y. Rept. 84, pl. 15, fig. 34.

HAB. Massachusetts, St. Lake Champlain and Northern New York, Carlisle, Pennsylvania; Cleveland, Ohio; Georgia; Baird.

N. TOROSUS, *Bd.* 1833.

*Triton t.* (1833) Eschschotlz. Zool. At. Pt. v. Pl. 21, fig. 15, (Scull.)

*T. ermanni*, (1835) Wiegman. "Erman Reise um die Erde."—1836 Wiegman Archiv.

*T. granulatus*, (March, 1849) Skilton. Sill. Jour. N. S. VII. 202.

HAB. Oregon City; Monterey; San Francisco; Baird.

Gen. PLETHODON, *Tschudi*, (1838) Class. der Bat. = *Phatnomotorhinus*, Bibron.  
( ) fide Bonap. Fn. it.

P. GLUTINOSUS, *Tschudi*. Sept. 1818.

*Sal. g.*, (Sept. 1818) Green. J. A. N. S. I, 357.—(1838) Hol. Herp. 1st ed. II. 129, Pl. 30;—(1842) 2d ed. V. 39, Pl. 10—?? (1840) Storer Mass. Rept. 252 (an *A. jeffersoniana*).—? (1842) Dekay N. Y. Rept. 81, Pl. 17, f. 42, (very young.)

*Sal. variolata*, (Dec. 1818) Gilliams. J. A. N. S., I. 460, Pl. 18, fig. 1.

*Sal. cylindracea*, (Nov. 1825) Harl. J. A. N. S., V. 156.

*Triton porphyriticus*, (1842) Dekay. N. Y. Rept. 85, Pl. 16, f. 37.

*P. g.*, (1838) *Tschudi*. Class. der Bat.

HAB. New York, Dekay. Carlisle, Pittsburg, Pennsylvania; Columbus, Mississippi; Florida, Baird.

P. CINEREUS, *Tsch.* Sept. 1818.

*Sal. c.*, (Sept. 1818) Green. J. A. N. S., I. 356.

*P. c.*, (1838) *Tsch.* Class. der Bat.

HAB. Southern Pennsylvania, Bd.

P. ERYTHRONOTA, *Bd.* Sept. 1818.

*Sal. e.* (Sept. 1818) Green. J. A. N. S., I. 356.—(1838) Holb. Herp. III. 13, pl. 27;—(1842) 2d ed. V. 43, Pl. 11.—(1840) Storer Mass. Rept. 245.—(1842) Dekay N. Y. Rept. 75, Pl. 16, f. 38.

N. B. Green quotes this species from Raf., whose description I cannot find.

HAB. Northern New York, Carlisle, West Pennsylvania, Baird. Massachusetts, Storer. Lake Superior, Agassiz.

Gen. DESMOGNATHUS, *Baird*.

D. NIGER, *Bd.* Sept. 1818.

*Sal. n.*, (Sept. 1818) Green. J. A. N. S., I. 352.

*Triton n.* (1842) Holb. Herp. V. 81, Pl. 27.

N. B. The only specimen seen is one in the collection of the Academy of Natural Sciences, Philadelphia, perhaps Dr. Green's original specimen.

D. FUSCUS, *Bd.* (March, 1820.)

*Triturus f.*, (March 1, 1820) Raf. Annals of Nature.

*Sal. intermixta*, (Aug. 1825) Green. Hall's Portfolio, Vol. 20, p. 159.—(Jan. 1827) Green, Cont. Mac. Lyc. No. 1, Vol. I.



*Sal. picta*, (Nov. 1825) Harlan. J. A. N. S., V. 136.—(1840) Storer Mass. Rept. 251.

*Sal. quadramaculata*, (1842.) Hol. Herp. 2d ed. V. 49, Pl. 13.

HAB. Northern New York; Carlisle, Pennsylvania; West Pennsylvania. Baird.

D. AURICULATUS, *Bd.* (1838.)

*Sal. a.* (1838) Hol. Herp. 1st ed. III. 115, Pl. 28 :—(1842) 2d ed. V. 47, Pl. 12.

HAB. Liberty County, Georgia.

Gen. HEMIDACTYLIUM, *Tsch.* (1838) Class. der Bat.

H. SCUTATUM, *Tsch.* 1837.

*Sal. scutata*, (1837) Schlegel. Abb. neuer Amph. Pl. 40, f. 4, 5, 6.—Fn. Japonica.

?*Sal. fusca*, (Sept. 1818) Green. J. A. N. S., I. 357.

*Sal. melanosticta*, (Sept. 1844) Gibbes. Pr. B. N. H. Soc. I. 195,—(1845) Journal B. N. H. Soc. V. 89, pl. 10.

*H. s.*, Tschudi. 1838. Class. der Bat.

HAB. Nashville, Troost. Charleston, Gibbes. Washington, D. C., Carlisle, Pennsylvania, Baird. New York City, Le Conte. Meadville, Pennsylvania, Baird.

#### Section C.

Gen. OEDIPUS, *Tsch.* (1838.) Class. der Bat.

O. PLATYDACTYLUS.

*Sal. pl.* ( ) “Cuv. Mem. du Mus.”

*O. p.* Tsch. (1838) Class. der Bat.

HAB. Xalapa.

Gen. PSEUDOTRITON, *Tsch.* (1838) = *Mycetoglossus*, Bibron.

fide Bon. Fn. Italica.

P. RUBER, *Tsch.* (1803.)

*Sal. rubra*, (1803) Daud. Hist. Rept. VIII. 227, Pl. 97, f. 2.—(1842) Holb. Herp. 2d ed. V. 35, Pl. 9.—(1842) Dekay N. Y. Rept. 80, Pl. 17, f. 43.

*Sal. rubriventris*, (Sept. 1818) Green. J. A. N. S., I. 353, (ad. living?)

*Sal. maculata*, (Sept. 1818) Green. J. A. N. S., I. 350, (bleached in spirits?)

*Sal. subfusca*, (Sept. 1818) Green. J. A. N. S., I. 351, (ad. in spirits?)

*Pseudotriron subfuscus*, (1838) Tsch. Class.

*Mycetoglossus ruber*. Bibron fide Bon. Fn. italica.

*Siren operculata*, (1796) Pal. de Beauv. Am. Phil. Trans. iv. 279, Pl. f. 3, (larva.)

*Proteus neocaesariensis*, (Sept. 1818) Green. J. A. N. S., I. 358, (larva bleached in spirits.)

HAB. Massachusetts, Storer. New York, Dekay. All Pennsylvania, Baird.

P. MONTANUS, *Bd.* Sept. 1849.

*P. m.*, Baird. J. A. N. S., New Series, I, p.

HAB. South Mountain, near Carlisle, Pennsylvania.

P. SALMONEUS, *Bd.* 1838.

*Sal. salmonea*, (1838) Storer in Hol. Herp. 1st ed. III. Pl. 22—(1842) Hol. Herp. 2d ed. V. 33, Pl. 8.—(1840) Storer Mass. Rep. 248.—Dekay N. Y. Rept. 76, Pl. 16, f. 39.

HAB. Massachusetts, Vermont; Storer. Northern New York, Carlisle, Pennsylvania, Western Pennsylvania; Baird.

This species will very probably turn out to be the same with *Salamandra porphyritica* of Green.

Gen. SPELERPES, *Raf.* (1832) = *Cylindrosoma*, Tsch. 1838.

S. LONGICAUDA, *Bd.* Sept. 1818.

*Sal. l.*, (Sept. 1818) Green. J. A. N. S., I. 351.—(1838) Hol. Herp. 1st ed. III. 111, Pl. 26; (1842) 2d ed. V. 61, Pl. 19.—(1842) Dekay N. Y. Rept. 78, Pl. 17, f. 41.

*Spelerpes lucifuga*, (1832) Raf. Atlantic Journal, No. 1, p. 22.

*Cylindrosoma longicauda*, (1838) Tsch. Class. der Bat.

HAB. New York; Dekay. All Pennsylvania; Baird. Kentucky, Raf.

S. GUTTOLINEATA, *Bd.* 1838.

*Sal. g.*, (1838) Hol. Herp. 1st ed. II. 61, pl. 12; (1842) 2d ed. V. 29; Pl. 7.

HAB. Mountains of Carolina; Hol.

S. BILINEATA, *Bd.* Sept. 1818.

*Sal. b.*, (Sept. 1818) Green. J. A. N. S., I. 352.—(1838) Hol. Herp. 1st ed. II. 127, Pl. 29; 2d ed. (1842) V. 55, Pl. 16.

*Sal. flavissima*, (Feb. 1826) Harl. Sill. Jour. X. p. 286.

HAB. Northern New York; Pennsylvania, East and West; Georgia; Baird.

S. CIRRIGERA, *Bd.* March, 1831.

*Sal. c.*, (March 1831) Green. J. A. N. S., VI. 253.—(1842) Hol. Herp. 2d ed. V. 53, Pl. 15.

HAB. Near New Orleans, Green.

Gen. BATRACHOSEPS, *C. Bonap.* (1841.) Fn. Italica.

B. QUADRIDIGITATA, *Bd.* 1842.

*Sal. q.*, (1842) Hol. Herp. 2d ed. V. 65, Pl. 21.

HAB. Georgia; Hol. Baird.

**B. ATTENUATA, Bon. 1833.***Sal. a.*, (1833) Eschscholtz. Zool. At. Pt. V. Pl. 21, figs. 1-14.*B. a.*, (1841) Bon. Fauna Italica, Vol. II.

HAB. San Francisco, Esch.

The following species are only known to the author by their descriptions. Some of them are quite doubtful, those most so are preceded by a note of interrogation. The first four probably belong to, or near, *Ambystoma*.

**SALAMANDRA TALPOIDEA, Hol. 1838.***S. t.*, (1838) Hol. Herp. 1st ed. III. 117, Pl. 29; 2d ed. (1842) V. 73, Pl. 24.

HAB. Sea islands of Georgia, Hol.

**SALAMANDRA PORPHYRITICA, Green. 1827.***S. p.*, (Jan. 1827) Green. Cont. Mac. Lyc. Vol. I. pt. 1; Pl. f. 2.—(1842) Hol. Herp. 2d ed. V. 83, Pl. 28.

HAB. Meadville, Pennsylvania; Green.

**SALAMANDRA INGENS, Green. 1831.***S. i.*, (March 1831) Green. J. A. N. S., VI. 254.—(1842) Hol. Herp. 2d ed. V. 85, pl. 29.

HAB. New Orleans, Green.

**TRITON ENSATUS, Eschsch. 1833.***T. e.*, (1833) Eschscholtz. Zool. At. Pt. V. Pl. 22, figs. 1-12.

HAB. San Francisco, California, Esch.

**SALAMANDRA GRANULATA, Dekay. 1842.***S. g.*, (1842) Dekay. N. Y. Rept. 78, Pl. 23, f. 66.—(1842) Hol. Herp. 2d ed.

HAB. Essex County, New York, Dekay.

**?SALAMANDRA COCCINEA, Dekay. 1842. An. *N. miniatus*, Raf.***S. c.*, (1842) Dekay. N. Y. Rept. 81, Pl. 21, f. 54.

HAB. Hamilton County, New York.

**SALAMANDRA TERETICAUDA, Eschsch. 1833.***S. t.*, (1833) Eschscholtz. Zool. Atlas, Pt. V. p. 14.

HAB. San Francisco, California, Esch.

**"SALAMANDRA OCELLATUS, Fitz."***S. c.*, Fitzinger, as quoted in Fitz. neue Class. Rept. (1825).**"SALAMANDRA SIMILIS, Fitz."***S. s.*, Fitz. Same as last.



SALAMANDRA BEECHEYI, *Gray*. 1839.

*S. b.*, (1839) *Zool. of Blossom*, Pl. 31, fig. 3. Catalogued in Griffith's Cuvier.

SALAMANDRA GREENI, *Gray*.

*S. g.*, *Gray*. Catalogued in *Griff. Cuv.*, probably only a catalogue name.

SALAMANDRA SINCIPUT ALBIDA, *Green*. 1818.

*S. s.*, (Sept. 1818.) *Green*. *J. A. N. S.*, I, 352.

?SALAMANDRA PUNCTATISSIMA, *Wood*. 1825.

*S. p.*, (March 1825) *Wood*. *J. A. N. S.*, IV, 306.

HAB. Locality unknown. Probably European.

SALAMANDRA AGILIS, *Sager*. 1839.

*S. a.*, (July 1839) *Sager*. *Sill. Jour.* XXXVI, p. 322.

HAB. Detroit, Michigan, *Sager*.

TRITURUS HYPOXANTHUS, *Raf*. 1820.

*T. h.*, (1820) *Raf*. *Annals of Nature*, No. 20,

HAB. Kentucky, *Raf*.

TRITURUS NEBULOSUS, *Raf*. 1820.

*T. n.*, (1820) *Raf*. *Annals of Nature*, No. 23.

HAB. Long Island, *Raf*.

?TRITURUS LUTESCENS, *Raf*. 1832.

*T. l.*, (1832) *Raf*. *Atlantic Jour.* No. 3, p. 121.

HAB. Kentucky, *Raf*.

?SAL. LURIDA, *Raf*. 1832.

*S. l.*, (1832) *Raf*. *Atlantic Jour.* No. 2, p. 63.

HAB. Cumberland County, Kentucky, *Raf*.

PSEUDOTRITON NIGRA, *Tsch*.

*P. n.*, *Tschudi*. *Class. der Bat.* Quoted from *Mus. Lug.*

#### GROUP II. TREMADOTERA, Dum. et Bib.

Branchial apertures persistent.

α. Branchiæ caducous.

Gen. MENOPOMA, *Harlan*. (1825) = *Abranchus*, *Harl.*, 1825. = *Salamandrops*,  
*Wagler*, ( ) = *Eurycea*, *Raf*. (1832).

MENOPOMA ALLEGHANIENSIS, *Harl.* 1803.

*Salamandra alleghaniensis*, (1803) *Daud*. *Hist. Rept.* Vol. 8, p. 231.

*Salamandre des monts alleghanis*, (1802) Sonnini et Latreille, Suites a Buffon II. 253.

*Leverian Water Newt*, (1802) Shaw. Gen. Zool. Amph. p. 363.

*Cryptobranchus\* salamandroides*, (1821) Leukart. Isis, 1821, p. 257. (Shaw and Leukart describe the same specimen.)

*Abranchus\* a.*, (1825) Harlan. An. N. Y. Lyc., I. 221.

*Menopoma\* a.*, (1825) Harlan. An. N. Y. Lyc., I. 270.—1842, Hol. Herp. 2d ed. V.—(1842) Dekay N. Y. Rept. 89, pl. 18, f. 44.

*Eurycea\* mucronata*, (1832) Raf. Atlantic Jour. No. 3, 121.

*Cryptobranchus a.*, (1838) Van der Hoeven. Tydsch. van Nat. Gesch. Pl. f. 3, 4, (Scull.)

HAB. Tributaries of Ohio river, not of the Great Lakes. Susquehanna river, below Columbia, Pennsylvania.

M. FUSCA, *Holb.* 1842.

*M. f.*, (1842) Hol. Herp. 2d ed. V. 99, Pl. 33.

HAB. Western part of South Carolina, Hol.

Gen. AMPHIUMA, *Garden.* (1821) Corr. with Linnæus. *Chrysodonta*, Mitch. (1822.)

A. MEANS, *L.* 1821.

*A. m.*, L. (1821)—(1842) Hol. Herp. 2d ed. V. 89, Pl. 30.—(1823) Harlan. J. A. N. S., III. 55, (Anatomy.)

*A. didactylum*, (1828) Cuv. "Mem. du Mus. XIV. p. 4, figs. 1, 2, 3."—(1833) Wagler. Desc. et icon Amph. Pl. 19, fig. 1.

*Chrysodonta\* larvaeformis*, (1822) Mitch. "Med. Recorder, No. 19, July 1822."

HAB. Southern States.

A. TRIDACTYLUM, *Cuv.* 1828.

*A. t.*, (1828) Cuv. "Mem. du Mus. 14, " (1833) Wagler. Desc. et icon Amph. Pl. 19, f. 2.—1842, Hol. Herp. 2d ed. V. 93, Pl. 31.

HAB. South Western States.

. Branchiæ persistent.

Gen. NECTURUS, *Raf.* 1819. = *Sirena* Raf. 1818. = *Menobranchus*, Harl. 1825. *Phanerabronchus*, Fitz. (1826).

N. LATERALIS. 1823

*Triton l.*, (1823) Say. Long's expd. I. p. 5.

*Sirena maculosa*, (Nov. 1818) Raf. Am. Monthly Mag. IV. 41.

*Necturus\* maculatus* (June 1819) Raf. in de Blainville Jour. de Phys. 88, p. 417.

*N. maculosus, luteus, fuscus*, (March 1820) Raf. Annals of Nature.

*Menobranchnus\* lateralis*, (1825) Harl. An. N. Y. Lyc., I. 221;—(1838) Hol. Herp. 1st ed. III. 119, Pl. 30;—(1842) 2d ed. V. 115, Pl. 38;—(1842) Dekay N. Y. Rept. 87, Pl. 18, f. 48.

*Protee tetradactyle*, (1807) Lac. Ann. du Mus. 10, p. 330, Pl. 17.

*Phanerobranchnus cepedii*, (1826) Fitz. Neue Class. Rept. (a prior description.)

HAB. Lake Erie, Ohio and Alleghany Rivers, Baird.

N. MACULATUS, *Bd.* 1827.

*Proteus m.*, (Oct. 1827) Barnes. Sill. Jour. XIII. p. 68.

*Menobranchnus m.*, (1842) Hol. Herp. 2d ed. V. 111. Pl. 37.

HAB. Lake Champlain, Baird.

N. ———, *Gibbes*. This species recently found in Santee river, S. C., by Dr. Lewis R. Gibbes of Charleston, has not yet been published by its discoverer.

Gen. SIREN, *L.* (1769) "Amoen. Acad."

S. LACERTINA, (1769) *L.* "Amoen. Acad. VII. 311."—(1811) Cuv. Rept. dout. 98, Pl. 2. f. 1-7.—( ) Cuv. "Oss. foss. V. 2, Pl. 27, f. 1."—(1842) Hol. Herp. V. 101, Pl. 24.

HAB. Southern States.

S. INTERMEDIA, *Leconte.* 1828.

*S. i.*, (1828) Ann. N. Y. Lyc. II. 133. (Read Aug. 21, 1826.)—(1837) Rusconi. Obs. sur la Sirene, &c., Pl. 6.—(1842) Hol. Herp. 2d ed. V. 107, Pl. 37.

*Pseudobranchnus i.*, Gray.

HAB. Southern States.

S. STRIATA, *Leconte.* 1824.

*S. s.*, (1824) Leconte. Ann. N. Y. Lyc. I., 52, Pl. 4;—1842, Hol. Herp. 2d ed. V. 109, Pl. 36.

*Pseudobranchnus s.*, Gray.

HAB. Southern States.

Gen. SIREDON, *Wagler.* 1830.

S. MEXICANUS, *Shaw.* 1800?

*Gyrinus m.*, (1800?) Shaw and Nodder Nat. Misc. pl. 342, 343.

*Siren pisciformis*, (1802) Shaw. Gen. Zool. Amph. p. 612.



*Siredon axolotl*, (1833) Wagler. Icones Amph. Pl. 20.

*Axolotl* (1811) Cuv. Rept. dout. in Humb. Obs. Zool. 104, Pl. 14.

*Hypocthon pisciformis*, (1829) Gravenhorst. Del. Mus. Vratislav. p. 89.

*Acholotes guttatus*, (July 1844) R. Owen. Ann. and Mag. Nat. Hist. XIV. p. 23.

HAB. Lakes near City of Mexico, Baird.

S. MACULATUS, *Bd.* 1844.

*Acholotes m.*, (July 1844) R. Owen. Ann. and Mag. Nat. Hist. 14, p. 23.

HAB. Rio Grande, Owen.

It is only because there is no positive proof to the contrary, that I retain the genus *Siredon* as real, placing it at the bottom of the series. It so much resembles the larva of *Ambystoma punctata*, in both external form and internal structure, that I cannot but believe it to be the larva of some gigantic species of this genus. It differs from all known perennibranchiates in possessing the larval character of the gular or opercular flap, this being unattached to the subjacent integument and free to the extremity of the chin. The non-discovery of the adult is no argument against its existence; I had caught hundreds of the very remarkable larva of *Pseudotriton salmoneus* near Carlisle before I found an adult. Until then I knew not where to refer the animal, supposing this species to exist no nearer to me than the mountains of northern New York and Vermont.

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*Descriptions of four new species of North American Salamanders, and one new species of Scink.*

AMBYSTOMA MACRODACTYLA, *Baird.* Skull longer than broad. Toes long, unwebbed. A broad dorsal reddish brown stripe. Beneath dark brown, unspotted.

Specimens in the Academy of Natural Sciences of Philadelphia. Brought from Astoria, Oregon, by J. K. Townsend, M. D.

Body rather more slender than in the other species of *Ambystoma*; the proportions nearly those of *Desmognathus fuscus*, (Raf.) The colors somewhat like those of a badly preserved *Plethodon erythronotus*, (Green.) Ground color dark brown. A broad dorsal stripe, originally, it is probable, of a chestnut brown color, now very obscure. Sides sprinkled with greyish. The brown of the sides becomes more concentrated towards the vertebral line. Tail sub-round, not compressed. Largest specimen about  $2\frac{3}{4}$  inches. From the snout to the insertion of the hind legs  $1\frac{1}{2}$  inches.

AMBYSTOMA MAVORTIA, *Baird.* Skull broader than long. Toes short and broad.

Tail much compressed. Color dark brown, with several large yellowish blotches beneath, and transverse bands of the same on sides of body and tail.

One specimen procured in New Mexico by Dr. Wislizenus while attached to Col. Doniphan's expedition.

Body thick and clumsy, more so than in *Ambystoma punctata*. Feet short; toes broad. Tail slightly ensiform; longer than the head and body.

General color (as preserved in spirits) a dull black or dark brown, with two or three yellowish blotches occupying the greater part of the belly. About nine broad transverse bands of yellowish on the sides of the body, confluent to a certain extent with that on the belly. Similar markings on the tail, forming nearly complete ellipses, and about twelve in number. The back is not crossed by the yellowish, but is rather darker than the ground color. The interspaces of the transverse yellowish markings are confluent with the dark brown on the back. Extremities blotched like the body. Total length eight inches.

This species comes nearest to *Triton ensatus*, Esch., it differs from it in color, and in the arrangement of the palatine teeth.

*AMBYSTOMA EPISCOPUS*, Baird. Head wedge shaped. Skull longer than broad. Tail much compressed, shorter than the body. Body yellowish with dark mottlings and darker spots.

One specimen sent by Clinton Lloyd, Esq., from Kemper County, Mississippi.

Proportions of body nearly those of *Ambystoma opaca*, Grav. The specimen much corrugated, and its colors obscured by alcohol. The general color appears to have been a shade of yellowish over the whole body, obscured on the back by very minute dusky mottlings. This mottling less evident on the feet and tail; abdomen and tail beneath almost entirely free from it. Head, back, and sides of the tail with numerous spots of a darker mottling than that just described. These are sub-circular distributed rather uniformly on the head and body; they are larger, and more irregular on the sides of the tail; their average size is that of the iris. On the sides, between the fore and hind legs, the dark mottling is concentrated into an obscure broad dark band. Length about five inches.

*PSEUDOTRITON MONTANUS*, Baird. Similar to *P. ruber*, (Daud.) Tail as long as the body. Iris dark, without the longitudinal bar.

Two specimens obtained in the South Mountain, near Carlisle, Pennsylvania.

Ground color of all the upper parts reddish brown, with sparse circular spots of well defined black or dark brown. Beneath deep salmon color: spots few on the sides and the outside of the limbs.

Iris dark chestnut brown almost black, with faint mottlings of bronze on the inner border, and without the dark bar of *P. ruber*. In this latter species the iris is brassy yellow with a dark longitudinal bar.

Proportions of body most like those of *P. salmonea*, (Storer.) The insertion of the hind legs is just half way between the snout and tip of tail. In *P. ruber* it is considerably nearer the tail, which thus becomes shorter than the head and body. The crown of the head is more elevated, and the occiput more convex in *P. montanus* than in *P. ruber*, the skull also is more elongated.

The spots on *P. ruber* are more numerous, and generally not so well defined. When also the ground color in *P. ruber* is darker than the usual rich salmon color, the spots are very much crowded, indistinct, and confluent with the ground tint.

Costal furrows in *P. montanus* 17; but 16 in *P. ruber*.

Of the two specimens obtained, one was six inches long, the other three. The latter was even more characteristically marked than the former. Both were described when living.

*PLESTIODON ANTHRACINUS*, Baird. Size between *Lygosoma lateralis* and *Plestiodon fasciatus*, without any indication of a vertebral line. Four narrow longitudinal yellow lines, and on each side a broad stripe of anthracite black.

Upper parts dark bronze; each scale has a faint border of this color, with a central cloud of the same. Small blotches on the plates of the head. The lateral band of black begins at the nostril in a sharp point, passes back including the eyelids and widening to the ear; after this it continues parallel to beyond the vent, when it tapers to the end of the tail. The tint of the black is that of highly polished anthracite coal. On each side of this lateral anthracite band is a narrow stripe of pale yellow, the upper passing through the middle of one row of scales, the lower including the contiguous edges of the rows. The remainder of the row of scales above the upper yellow stripe is also anthracite, with which color the sides immediately below the lower stripe are also tinged. Beneath yellowish white. Under the microscope each lower scale exhibits a finely dotted reticulation. Tail dark blue above, beneath lighter. Outside of legs and feet black like the sides, inside lighter. Iris black.

In a single very old specimen the whole head to behind fore legs was tinged with the red color found in almost all of the *Plestiodontes*.

Measurements of a specimen of medium size. Total length  $5\frac{1}{4}$  inches; tail from vent  $3\frac{1}{4}$ ; head to ear  $\frac{3}{8}$ ; breadth of head  $\frac{1}{4}$ ; greatest breadth of dorsal band  $\frac{3}{16}$ ; of lateral band  $\frac{1}{8}$ .

Found quite abundantly about old logs, in the North Mountain near Carlisle, Pennsylvania. More plentiful than either *Plestiodon fasciatus*, or *P. quinquelineatus*.



ART. XXIV.—*Descriptions of new species of the Genera MICRASTUR, G. R. Gray, TANAGRA, Linn., and SYCOBIUS, Vieill.* By JOHN CASSIN.

MICRASTUR, *G. R. Gray.*

Pl. 40.

*M. GUERRILLA*, nobis.\* ♀ ad.? Capite, cauda, alis totoque corpore supra umbrinis, saturiore in capite. Gula, collo antico, abdomine, crissoque albis, maculis aut lineis nonnullis fuscis in crisso, semitorque alba angusta in cervice, plumis apice fuscis. Plumis pectoris, hypochondriorum et tibiarum albis, fasciis tribus vel quatuor fuscis; tetricibus caudæ superioribus maculis parvis nonnullis albis. Cauda, apice et fasciis quatuor vel quinque angustis, albis.

Long. tot. (exuvix) a rostri apice usque ad finem caudæ 15 poll., alæ 7, caudæ 6½ pollices.

*Hab.* Jalapa, Mexico.

♀ adult? Upper surface of the body, head, wings and tail umber or hair brown, darkest on the head. Cheek brown, a few feathers of which color advance upon the neck in front, forming a partial collar. Neck behind with a narrow collar of white, all the feathers of which are tipped or edged with brown. Throat, fore neck, abdomen and under tail coverts white, with a few brown spots or bars on the latter. Breast, flanks and thighs, white, every feather having about three or four bands of brown. Edge of the wing at the flexure and inner wing coverts white with a few crescent shaped spots of brown. All the quills with broad white bars on their inner webs, fifth primary longest. Upper tail coverts with a few white spots. Tail with four or five narrow white bars and tipped with white.

Total length (of skin) from tip of bill to end of tail about 15 inches, wing 7, tail 6½ inches.

♂ young? Under parts slightly tinged with fulvous or buff. Breast, flanks and thighs with the bands narrower, and the throat with a more decided brown collar. A few superciliary feathers white, tipped with brown. Back and wing coverts with ferruginous and white spots. Upper tail coverts with the white spots more numerous.

Total length (of skin) from tip of bill to end of tail about 14 inches, wing 6½, tail 6 inches.

*Hab.* Jalapa, Mexico.

This species resembles some stages of plumage of the *M. xanthothorax*, (Cuv.) and the *M. leucauchen*, (Temm.) Pl. col. 92, 306. It may readily be distinguished from either of those by the absence of the handsome rufous chestnut color of the breast and back, which prevails in all the specimens I have seen of them, and also by the broader and much lesser number of the bands upon the feathers of the under surface of the body.

\*From "Catalogue of Birds collected by Mr. William S. Pease, during the march of the Army of the United States from Vera Cruz to the city of Mexico." Proc. Acad. Nat. Sci., Philada., Vol. iv. p. 87, October, 1848.

Two specimens (♂ and ♀ ?) formed part of the highly interesting collection made by Mr. William S. Pease, in Mexico; a third specimen, in more adult plumage, was previously received from Mr. Edward Wilson, who obtained it in Paris. The three specimens are now in the collection of the Academy.

TANAGRA, *Linn.*

Pl. 41, fig. 3.

*T. NIGRO-AURITA*, nobis.\* Capite supra, mento, gulaque coccineis. Vitta lata, a naribus per oculos ad aures nitente nigra. Corpore supra, alis, caudaque, cinero-nigris; infra, a pectore usque ad crissum albis.

Long. tot. (exuviae) a rostri apice usque ad finem caudae,  $6\frac{1}{2}$  poll., alae 3 1-10, caudae 2 8-10 pollices.

*Hab.* Rio Negro, America australi.

Superior and point of inferior mandible black; remaining portion of the inferior mandible yellow. Head above, chin and throat, crimson, which color ends in a point upon the breast. Head crested. A broad stripe from the base of the bill through the eye to the ear, glossy black. This stripe completely separates the crimson of the upper part of the head from that of the throat. Upper surface of the body, wings and tail, cinereous black. Entire under parts (from the breast) white. Legs (in skin) nearly black.

Total length (of skin) from tip of bill to end of tail about  $6\frac{1}{2}$  inches, wing 3 1-10, tail 2 8-10 inches.

*Hab.* Rio Negro, South America.

This bird has the same general appearance as *Tanagra gularis*, Linn., and *T. capitata*, D'Orbigny. From either of those species it may at once be distinguished by its black nares and ears, and also by its having the throat and point upon the breast of the same crimson exactly as the crest, without the slightest appearance of the purple into which the crimson changes upon the breast in both the species mentioned.

Several specimens of this curious species have been sent from Europe by Mr. Edward Wilson, to whose remarkably valuable additions to the collections of this Academy, I have so frequently had occasion to allude. I have seen several other specimens brought from the Rio Negro, in a collection made by a gentleman formerly resident at Pará.

\* From Proceedings Acad. Nat. Sci., of Philadelphia, Vol. IV. page 85, October, 1848.

SYCOBIUS, *Vieill.*

Pl. 41, figs. 1 and 2.

*S. SCUTATUS*, nobis.\* ♂. Capite supra, vitta latissima in pectore, crissoque coccineis. Mento, gula, alis, cauda, et corpore toto supra et infra nigris. ♀. Mari simillima, sed capite supra, nigra.

Long. tot. (exuviæ) a rostri apice usque ad finem caudæ,  $5\frac{1}{4}$  poll. alæ  $3\frac{2}{3}$ , caudæ  $2\frac{2}{3}$  pollices.

*Hab.* Africa occidentali.

♂. Upper part of the head and neck, broad pectoral band, and under tail coverts bright crimson. Throat black, which color forms a large gular patch, extending to, but scarcely including the eyes. Crimson of the breast uniting on the sides of the neck with that of the head. All other parts black. ♀. Broad pectoral band and under tail coverts crimson; all other parts, including the head, black.

Total length of skin, from tip of bill to end of tail, about  $5\frac{3}{4}$  inches, wing  $3\frac{2}{3}$ , tail  $2\frac{2}{3}$  inches.

*Hab.* Western Africa.

There are in the collection of this Academy two pairs of the species now described, which were brought from Western Africa by Robert MacDowell, M. D., surgeon, attached to the colonial government of Sierra Leone.

It bears a greater resemblance to *Sycobius rubricollis*, (Swainson,) Vieill. Ois. chant. pl. 43, than to any other species which I have seen or have found described; but from this and from all others, so far as I know, it may be distinguished by its crimson under tail coverts, and by its broad pectoral band of the same color.

\* From Proceedings Acad. Nat. Sci., of Philadelphia, Vol. IV. page 157, February, 1849.





ART. XXV.—*New species of MYLIOBATES from the Eocene of South Carolina, with other genera not heretofore observed in the United States.* By ROBERT W. GIBBES, M. D., Correspondent of the Academy of Natural Sciences of Philadelphia, &c.

The family of Placoid fishes is found in abundance in the Tertiary formations. In those deposits of South Carolina their teeth are particularly numerous, though usually much broken. Among the *Squalidæ* I have identified and described (with those here noticed) ten genera and forty-five species;—of *Pristis* I have published a new species, and of *Myliobates* I have numerous fragments. Two species are distinctly represented by specimens now noticed and figured.

Of the genus *Myliobates*, Muller and Henlé recognise five recent, while Professor Agassiz has described fifteen fossil species, chiefly from the London clay.

This genus is characterized by broad transverse teeth on a flat plate, bounded laterally by three rows of narrow hexagonal teeth of equal length, united by fine sutures. The arrangement resembles that of a tessellated pavement.

The specimen figured Pl. 42, figs. 1, 2, 3, has some resemblance to *M. micropleurus*, Agassiz, but the lateral edges of the large transverse dental plates are more unequal, as well as the form of the small ones, and the sutures are more curved backwards. There is also perceptible a slight longitudinal flattening traversing the median line, and it is more arched laterally. The lateral plates are too much broken for description. The plates on the inner surface, Pl. 42, fig. 2, are very regular, and on the suture surface, Pl. 42, fig. 3, are grooved in the form of a compressed V.

It was found in the Eocene marl of Ashley river, South Carolina, and was presented to me several years since by Mr. F. S. Holmes of Charleston, whose name I attach to it, *MYLIOBATES Holmesii*.

The second species, Pl. 42, fig. 4, was found in the Buhrstone (Eocene) formation in the neighborhood of Orangeburg, South Carolina. It is more regular in the form of the dental plates, which are less curved; the surface is more convex and flattened by abrasion on the anterior third. It corresponds with no described species. It is very common, as I have many fragments from various localities. The plates being nearly straight it may be designated *MYLIOBATES transversalis*.

*PTYCHODUS POLYGYRUS*, Agassiz. Five years ago I received from a friend a specimen of *Ptychodus polygyrus*, (Pl. 42, figs. 5, 6,) supposed to be from Alabama. Lately Dr. Ames of Montgomery, Alabama, kindly forwarded to me another from the *Cretaceous* of Alabama, (Pl. 42, fig. 5a,) which fixes the origin of the former individual.

PLATAX, *Agassiz*.

A singular bone has been sent to me from the *Pliocene* marl of Darlington, South Carolina, which Professor Agassiz considers the interapophyseal bone that supports the dorsal spines of *Platax*—a genus of Ctenoid fishes still existing in our present seas. Several views of a specimen are here given, Pl. 42, figs. 11, 12, 13.

## SQUALIDÆ.

## CARCHARIAS.

In my monograph of the *Fossil Squalidæ* of the United States, I mentioned having met with a fragment of what I considered a *Carcharias*. I have recently found among some specimens from the *Eocene* of Ashley river, one of which is figured in Pl. 42, fig. 8. Professor Agassiz agrees with me that it is a true *Carcharias*. It resembles that described by him as *C. tenuis*. Until others are found I am unable to decide upon its specific characters.

## CARCHARODON.

*C. LEPTODON*, *Agassiz*. I have recently identified this species from the *Eocene* of Orangeburg, South Carolina. Pl. 42, figs. 7, 9. It has the form of the variety of *C. angustidens*, figured by Professor Agassiz as *C. heterodon*, though it is more slender and acutely pointed. The absence of the lateral denticles and the slenderness are its specific characters. The serratures appear also to be more minute.

## GALEOCERDO.

The figure Pl. 42, fig. 10, represents a symphyseal tooth of a species of Galeocerdo. I have not seen the specimen, but am indebted to Capt. A. H. Bowman of the Topographical Engineers, U. S. A., for a drawing of it, found in the *Eocene* sand of Ashley river near Charleston, South Carolina.

## REFERENCE TO PLATE XLII.

- Figs. 1, 2. *Myliobates Holmesii*, Gibbes.  
 Fig. 3. Edge view of the same.  
 Fig. 4. *Myliobates transversalis*, Gibbes.  
 Figs. 5, 6, 5a. *Ptychodus polygyrus*, Agassiz.  
 Figs. 7, 9. *Carcharodon leptodon*, Agassiz.  
 Fig. 8. *Carcharias*.  
 Fig. 10. Symphyseal tooth of *Galeocerdo*.  
 Figs. 11, 12, 13. Interapophyseal bone of *Platax*, Agassiz.



ART. XXVI.—*Descriptions of two species of Distoma with the partial history of one of them.* (Plate 43.) By JOSEPH LEIDY, M. D.

One of the most remarkable divisions of organized nature, and that which probably more than all others has at once excited the wonder, disgust, and horror of mankind, is the class of animals known as Entozoa. Their habitation, frequency of occurrence and numbers, and their often terrific appearance, are sufficient reasons to have given rise to such feelings. From the great variety and singularity of their form, their habits, and the mystery in which their origin and progressive development has always been involved, they have ever caused naturalists to attach peculiar interest to them, and they have been studied with a patience and zeal which has not been excelled in any other branch of human learning.

In the term Entozoa has been included many animals of very different zoological characters, but in the present state of our knowledge, the general distinction founded upon the character of their habitation is probably as good a classification as can be adopted.

We are often astonished at the extent of ecto-vitality : at the idea of a drop of water from any stagnant pool containing as many living bodies as there are human beings on the globe, etc., yet when we consider closely ecto-vitality, we will probably be no less astonished at its extent. Thus, when we reflect upon the moving mass containing millions upon millions of *Bodo*, in the large intestine of the toad, frog, salamander, in the intestine of the house-fly, &c.; the innumerable hosts of monads, vibrios, &c., in the intestinal and other fluids of most animals; the infinity of spermatozoids; the numerous *Gregarinæ* in the ventriculus of insects we may suspect internal and external life almost to be in equilibrio in their extent. But it is not only the lowest forms of entozoa which are so numerous : I have removed fifty-six specimens of *Distoma* from the pericardial cavity of a snail; I have preserved over six hundred specimens averaging the one-tenth of an inch in length of a nematoid worm which I took out of the abdominal cavity of two individuals of *Passalus cornutus*; from a single *Julus marginatus* I obtained 140 specimens of *Gregarina*, 78 of an *Ascaris*, 27 of another nematoid which I have named *Aorurus*, over 1000 of *Nyctotherus*, besides innumerable monads, vibrios, and entophytes. My friend Dr. J. L. LeConte informed me he had seen a pint of *Ascarides* taken from the intestinal canal of a *Boa constrictor*. I found at one time fragments of 80 specimens, averaging

five inches in length, of *Tænia canina*, in the intestine of a small terrier dog, and Krause mentions an instance of a two and a half year old horse, which contained over 519 *Ascaris megalocephala*, 191 *Oxyuris curvula*, 214 *Strongylus armatus*, var. major, 69 *Tænia perfoliata*, several thousand *Strongylus tetracanthus* in the intestines, 287 *Filaria papillosa* in the thoracic and abdominal cavities, and 6 *Cysticercus fistularis* upon the peritoneal covering of the liver.\* Numerous other instances might be given to demonstrate the extent of entozoic vitality, but those I have mentioned will suffice.

All animals under certain circumstances become the residences of entozoa, and these appear to be most frequently presented as we descend in the scale of organic activity of animal life. Entozoa are most frequent among invertebrata, next among fishes, then reptiles, and least so among birds and mammalia. My much respected friend, Dr. Samuel Jackson, Professor in the University of Pennsylvania, entertains the opinion, as animals descend in the series, and higher ones undergo a degradation of structure, as in disease, they become more liable to entozoic life, and he has mentioned to me the fact, that the well-fed and nutritioned inmates of our hospitals, in post mortem examinations, seldom present the existence of intestinal worms, when compared with the accounts of post mortem examinations of the hospitals of continental Europe. In connection with this opinion arises the question whether entozoa are the cause or effect of disease. From my observations I am inclined to believe, with the distinguished helminthologist Dujardin, that they are usually the effect of disease, as is expressed in the preface to his excellent work entitled "Hist. nat. des Helminthes."† "D'après cela, on peut se demander si les helminthes sont véritablement nuisibles aux animaux dans lesquels ils habitent? je suis pour la négative, tant j'ai vu d'exemples d'animaux bien portants qui contenaient plus d'helminthes que d'autres individus de chétive apparence: les helminthes se développent dans un site qui leur convient, sans nuire plus que les lichens sur l'écorce d'un arbre vigoureux. Ils ne peuvent devenir nuisible, généralement, que par suite d'une multiplication excessive, laquelle semble alors être une des conséquences d'un affaiblissement provenant d'une tout autre cause, d'une mauvaise alimentation, du séjour dans un lieu froid et humide, etc.; sans cela, les helminthes naissent et meurent dans le corps de leurs hôtes, et peuvent paraître et disparaître alternativement sans inconvénients."

After these general remarks upon Entozoa, I present to the Academy descriptions of two species of Distoma, which I suppose to be new, with the partial history of one of them.

\* Gurlt u. Hertwig's Magazin für die gesammte Thierheilkunde, 1839, S. 215. Wiegman's Archiv, 1840, S. 196.

† Paris, 1845, p. xiii.



*DISTOMA HORRIDUM.* Corpus album, postice brunneo variegatum, spathiforme, spinulis minutissimis in annulis transversis dispositis; disco anteriore subtus et pone apicem sito, ore magno, rotundo, margine incrassato; intestini ramis rectis; foramine genitali mox ante discum ventralem sito; pene exserto, curvato, basi vagina tecto; testiculis 4, epididymibus tenuibus conjunctis; ovariis 2, lateralibus, lobatis; oviducto, longissimo, plicato, valdeque contorto.

Long.  $2\frac{3}{8}$  lin.; lat. 1-27 unc.

Parasiticum in *Boa constrictore*, in pelve et uretere renis.

Body white, posteriorly variegated with brown arising from the ova along the tortuous and folded oviduct, spathiform, narrowing from behind forwards, furnished with minute spinous appendages arranged in circles around the body, of which there are in the neighbourhood of 200; length of spines 1-1142d in. Oral acetabulum globular, placed just posterior to the anterior apex of the body, 1-107th in. in diameter. Oral orifice large and round when expanded, 1-160th in. across. Pharynx broad, 1-320th in. long. Oesophageal bulb oblong, 1-123d in. broad. Oesophagus 1-114th in. long, dividing into two long straight intestinal branches, which are dilated or clavate posteriorly. Ventral acetabulum round, a very little larger than the anterior, with the appearance of a transverse opening, 1-100th in. in diameter. Generative orifice just anterior to the ventral acetabulum. Penis exserted, curved, cylindrical, 1-63d in. long; an apparent second portion, rather longer and with a sigmoid curve, is contained in a sheath, at the posterior part of which the vas deferens is connected. Testes four in number usually globular and distant; the first or most posterior is 1-80th in. in diameter, the second 1-97th in., the third is subreniform, and is in contact with the last and is 1-160th in.; the fourth is 1-89th in. Ovaries two, lateral and anterior to the testes, white, about 1-35th in. long, each consisting of ten to thirteen oval or rounded lobes, connected together by a delicate tube; the two joined by a transverse duct which opens into a very long sinuous and folded oviduct, occupying the posterior two-thirds of the body. Vagina opening at the base of the exserted penis. Ova very numerous, brown, oval, 1-727th in. long by 1-1333d in. broad.

*Dimensions.*—Greatest length  $2\frac{3}{4}$  lines; shortest  $1\frac{1}{2}$  lines; greatest breadth posteriorly 1-20th in., anteriorly on a line with the penis 1-33d in.

*Habitation and Remarks.*—Of this species of *Distoma* I found twenty-six specimens in the ureters and pelves of the kidneys of a *Boa constrictor*, which died in the menagerie in this city. They were not contained in cysts, but were loose, and were enveloped in mucous, probably the result of irritation produced by the spinous appendages of the entozoön. The spinous appendages exist from the oral acetabulum to the posterior extremity of the body, and are arranged in transverse annuli around the latter, which give the body itself the appearance of being annulated. It



is probable these appendages served in some measure to retain the animal in its apparently precarious position. The movements of the *Distoma* were rather sluggish, shortening and elongating. The oral orifice frequently dilated to such an extent as to make the acetabulum appear like a cup. In the contraction of the animal, the intestinal rami, from their comparative shortness did not become sinuous. This species belongs to the second subgenus, *Dicrocalium* of Dujardin, characterized by "the intestine having two simple branches prolonged backward, and preceded by a simple moderately long oesophagus; anterior disk naked or without spines or lobes; ventral disk sessile;" first section:—"testicles situated behind the ventral disk before or among the folds of the oviduct."\*

It approaches most to *Distoma assula*,† but this has only two testes; the posterior coloring, the form of the body, and extent of the spinous appendages also differ.

It is not more than one third or one half the size of *Distoma naja*.‡

*DISTOMA VAGANS.* D. Helicis, Proc. Acad., Vol. iii. p. 220.—Corpus album, ovale vel subrotundum, læve, sub epidermate tenui distinctissime fasciatum; disco anteriore, subrotundo, subtus et pone apicem sito; ore duplici, apertura exteriore triangulari, interiore rotundato; intestini ramis sinuatis; disco ventrali minore, rotundato, apertura transversa, margine incrassato circumcincta.

Long. 1-26 unc.; lat. 1-42 unc.

Parasiticum in Helice alternata et H. albolabre, in pericardio, etc.

The *Distoma vagans* I have found in three stages of its existence in *Helix alternata* and *H. albolabris*. In some one of these stages it is almost constantly found in the former species of *Helix*. In none of them at any time can the slightest trace of a generative apparatus be found, so that the animal no doubt undergoes further development in some other animal. From an aperture, which is visible in the second and third stages, posterior to the ventral acetabulum, I suspect the species belongs to the subgenus *Brachylaimus*, Duj., "intestine divided immediately behind the oesophageal bulb;" second section:—"male genital orifice behind the ventral acetabulum, towards the middle of the posterior part of the body."§

*Description of the first stage.* (Fig. 13.)—Body white, oval or elongated, furnished with an oval caudal appendage. Oral and ventral acetabula nearly equal, circular, 1-247th in. Oesophageal bulb subrotund, 1-400th in. Intestine dividing immediately after its origin from the bulb into two very capacious and moderately tortuous branches. Tail often with the appearance of an interior cup-shaped cavity; sometimes apparently perforated at the extremity; length 1-400th in.

Total length 1-80th in., breadth 1-123d in., but can lengthen itself to 1-40th in. by 1-200th in.

\*Dujardin. Hist. Nat. des Helminthes, p. 391.

‡Hist. Nat. des Hel., p. 398.

†Rudolphi Entozoorum Synopsis, p. 377.

§Ibid., p. 407.

*Second stage.* (Fig. 2.)—Body oval or subrotund, smooth, beneath the epidermoid covering fasciated. Oral acetabulum placed beneath the anterior apex of the body, 1-160th in., with a double oral orifice: external aperture triangular; interior round or elliptical. Oesophageal bulb oblong, 1-296th in. long by 1-222d in. broad. Oesophagus short. Intestinal rami tortuous. Ventral acetabulum orbicular, 1-174th in. in diameter, with an orifice opening into an excavation in its interior; orifice with a thickened margin, transversely elliptical, or round when most dilated. A third orifice, generative, situated a little more than one third the distance between the ventral acetabulum and the posterior extremity of the body. Vascular system consisting of a large double tortuous trunk on each side of the body commencing in a bulbous dilatation, about the 1-666th in. in diameter, near the middle line of the body posteriorly. Furnished with a posterior contractile sac communicating with the dilatations of the vascular canals, and with the exterior. Length of the sac 1-195th in., breadth, when fully dilated, 1-470th in.

Whole length 1-30th in., capable of elongating to 1-20th; breadth 1-42d in.

*Third stage.* (Fig. 8.)—Animal more active, usually elongated. Posterior contractile sac remaining permanently contracted, and cut off from the vascular canals. The latter consisting of four principal vessels on each side of the body, forming a very tortuous and intricate plexus. The principal or largest of the four vessels, furnished from its commencement posteriorly to where it turns upon itself anteriorly with vibrillæ.

*Remarks.*—During the earlier two stages of the existence of *Distoma vagans* in *Helix alternata* and *H. albolabris*, it is found within the pericardial cavity bathed in the liquor pericardii, and never in cysts, or in other organs of the body. The *Distoma* in the second of the earlier stages is the most frequently observable, and indeed it is a rare exception to find a specimen of *H. alternata* without it. In one instance I found as many as fifty-two individuals of the second stage together with four of the first stage in the latter species of *Helix*, which is an enormous number, when we consider the size of the pericardial cavity, for it measures only two lines in length by one in breadth, so that the cavity was distended by these parasites, and probably they impeded to some extent the action of the heart of the animal. The usual numbers found are from one to a dozen. In the first stage the *Distoma* is more active than in the second: in the latter being sluggish and only elongating or shortening upon irritation or pressure. Usually they lie loosely bathed in the liquor pericardii, but occasionally they are found hanging by means of the oral acetabulum to epithelial shreds attached to the surface of the heart. Just before entering into the third stage, they are almost always found in the last mentioned condition. The third stage is not of such frequent occurrence, or more properly it is not so readily



detected ; I have usually found it in the abdominal cavity, the retractor muscles, the olfactory sinus, or the substance of the foot. This is the most active of the three stages, and during this period it contracts and elongates the body and changes its shape into a variety of forms as are represented in figure 14, *c—k*.

The distinctive features of the three stages are well marked, which principally are : the caudal appendage to the first stage ; the posterior contractile sac communicating with the exterior and the vascular canals in the second ; and the closed vascular system and presence of circulatory vibrillæ in the third stage.

In the first stage the vascular canals are indistinct, but a principal vessel, on each side of the body, passing forwards in a tortuous manner and then back again, are readily observable. In the middle line of the body posteriorly I have observed the outlines of a short apparent canal, which also appeared to communicate with an excavation in the interior of the caudal appendage. In some instances the caudal cavity was indistinct, in others it appeared to open exteriorly by an orifice posteriorly.

The intestinal rami are comparatively much more capacious than in the other stages, and were filled with a finely granular matter, with yellowish corpuscles like oil, measuring from 1-5000th in. to 1-3333d in., and minute spicular bodies from 1-3333d in. to 1-1200th in. long, by 1-10,000th to 1-5000th in. thick. Among the granular contents of the intestines in several instances I have observed from three to ten nucleated organic cells, with granular contents measuring 1-800th in. in diameter, and recalling to mind the organic cells in the interior of the body cell of *Gregarina*.

In the change from the first to the second stage the animal enlarges, the intestinal rami become narrower and more tortuous, the vascular canals more distinct, the central posterior short canal apparently becomes the contractile posterior sac of the second stage, and the caudal appendage drops off leaving an opening at the posterior part of the body communicating with the contractile sac. The removal of the tail is gradual, it commences at the place of attachment to the body, by an absorption anteriorly and posteriorly, so that it hangs by two peduncles one upon each side, and resembles a cup suspended by two strings from the posterior part of the body. These peduncles are next removed, and the tail is detached, and sometimes the animal is observed with two pointed tubercles, one on each side of the posterior orifice of the body, indicating the points of connection of the lateral peduncles. Occasionally I have met with four of these prominences, arising from there having been four points of absorption, after which for a short time the tail was suspended by means of four peduncles. Sometimes the peduncle of one side only is detached, and the tail remains hanging upon one side by the other peduncle as is represented in fig. 9.

In the second stage the body is furnished with distinct transverse muscular bands, a condition which was not distinguishable during the first stage. (Fig. 2.)



The posterior contractile ventricle or sac is an oblong cavity with muscular parietes, the longitudinal striæ of which are quite distinct. It communicates with the exterior by a posterior infundibular orifice, and at its anterior part by means of two short canals with the dilated or bulbous commencement of the vascular canal on each side. When fully contracted it forms a narrow longitudinal canal. Whether by expansion this sac takes within it some of the liquor pericardii in which it lives, and upon contraction sends it throughout the vascular canals, I did not determine. The vascular canal commences posteriorly a little in advance and laterally to the contractile ventricle, and proceeds forwards in a very tortuous manner as far as the side of the oral acetabulum, when it turns back and almost retraces its steps in the same tortuous manner to the posterior extremity of the body, where it terminates in fine branches. In its course backwards it gives off numerous lateral branches which divide and subdivide among the organs and tissues of the body, and anastomose with the corresponding branches of the other side.

The oesophagus after leaving its bulb is short; the intestinal rami first of all turn obliquely forwards and outwards and then pursue a tortuous course backwards. They are irregularly cylindrical and contractile. The contents consist of a fine granular matter, without the spiculæ of the first stage.

The aperture situated between the ventral acetabulum and posterior extremity, is often closed by contractile power as not to be distinctly visible. It opens into what appears to be the visceral cavity, the outline of which is distinguishable just without the course of the intestinal rami.

In the change from the second to the third stage the animal loses its sluggish character, contracting and lengthening its body extremely, and protruding the acetabula, the ventral one of which appears pediculated from the cylindrical prolongation of that part of the body to which it is immediately attached. The posterior contractile sac becomes inactive, is cut off from its connection with the vascular canals, and is often indistinct. How the animal escapes from the pericardial sac I am unable to say; I have examined over sixty *Helices* without ever being able to discover anything like a perforation in it.

In its third stage I have never seen the *Distoma* in the pericardial sac, but always in the tissues attached to the foot or in the substance of the latter itself. In this stage it is always more elongated than in the others.

Instead of their being two, there are now four principal vascular canals on each side of the body, and these having a more or less tortuous course forwards and backwards form a very complex plexus. From them pass off numerous smaller branches, varying much in their course, and distributed by subdivision to all the body. In the longest of the principal vessels (from the dot *a* to *b* in fig. 8,) the interior surface is furnished with actively moving vibrillæ. This movement of the

vibrillæ continues even after the vessel is torn into small fragments, but gradually becomes slower and slower until it finally ceases. When in full activity it resembles a rapid succession of waves crossing each other, (fig. 11, *a.*) as it becomes slower the crossing appearance ceases, (*d.*) it then appears as a spiral, (*b.*) and lastly as one wave slowly falling upon the other, (*c.*) In one instance I saw a corpuscle at the commencement of the vessel rapidly driven round in a circle (fig. 10,) through the agency of the vibrillæ. Besides this new source of circulatory movement, all the vessels have the power of contracting, even to such a degree as to become totally invisible. After this stage it is probable that this *Distoma* finishes its development in some other animal, or possibly as an ectozoon.

*Intimate structure.*—The body is invested with a very delicate transparent epidermoid membrane, beneath which are observable transverse muscular bands, and as the animal shortens as well as contracts and elongates, we would almost infer the existence of longitudinal muscular bands. The latter, however, do not exist, and the shortening is produced by the same bands which produce the elongation. This appears at first thought almost impossible, but the arrangement of the muscular bands is peculiar, very remarkable, and renders the two opposite movements perfectly easy by the same set. Instead of being continuous bands, they are isolated muscular or sarcous cells arranged in rows and separated by narrow intervals, which from their inherent power of shortening and lengthening in any direction will give the body a resultant movement. This arrangement and change will be better understood upon referring to figure 12. When the sarcous cells are extended transversely to their greatest extent, the body appears broadest. As these shorten, the body is narrowed and somewhat elongated. When they reach their greatest degree of contraction they then elongate in the direction of the length of the animal, and the elongation of the body corresponds to the extent to which the sarcous cells are capable of extending in that direction. These cells appear homogeneous, opalescent, and translucent.

Within the muscular layer and forming the general parenchyma of the body is a fine, transparent, vesicular structure. These vesicles are very delicate, contain no nuclei, and measure from 1-12,500th in. to 1-3570th in. in diameter; some I measured as large as 1-1850th in. These same bodies either fill up the interspaces between the viscera in the visceral cavity, or else they form a layer upon the interior parietes of that cavity, a point I could not determine.

The acetabula are hollow globular bodies with thick muscular parietes, the latter character being distinguished by the striation and inherent contractility.

The mouth is a sort of shallow canal, formed by the thickness of the parietes of the oral acetabulum. Both orifices of this oral canal are capable of contracting

together or separately, and one may be frequently more contracted than the other, as is represented in fig. 4. In expansion the inner orifice usually appears round, the outer one triangular. In the greatest degree of contraction the outer orifice looks like a transverse slit with puckered edges as in fig. 3.

The orifice of the ventral acetabulum when opened is transversely elliptical, (fig. 5.) In some instances I have observed several round granular corpuscles moving in the cavity of this acetabulum during its movements of contraction and expansion.

Dujardin\* speaks of a *Distoma* found in the intestine and liver of Limaces, which bears considerable resemblance to *D. vagans*. The latter is, however, larger, and never occupies the position of the former.

\*Hist. Nat. des Hel., p. 472.



## REFERENCES TO PLATE XLIII.

The figures are all highly magnified.

Fig. 1. *Distoma horridum*: *a.* ventral acetabulum with the mouth dilated; *b.* pharynx; *c.* œsophageal bulb; *d.* œsophagus; *e.* intestinal rami; *f.* ovaries; *g.* oviduct, containing numerous ova; *h.* vagina; *i.* testes; *k.* vaginal or basal portion of the penis; *l.* penis; *m.* ventral acetabulum, with the appearance of a transverse fissure or orifice in its centre.

Figs. 2 to 16 inclusive, *Distoma vagans*.

Fig. 2. *D. vagans* in the second stage. *a.* oral acetabulum, with the two oral orifices represented, the external triangular, the internal transversely elliptical; *b.* pharynx; *c.* œsophageal bulb; *d.* œsophagus; *e.* intestinal rami; *f.* contractile sac communicating with the exterior and the vascular canals; *g.* vascular canals; *h.* ventral acetabulum, with its elliptical orifice represented; *i.* male generative aperture.

Fig. 3. Oral acetabulum with the orifices contracted or closed.

Fig. 4. Oral acetabulum with the oral orifices dilated; the exterior triangular, the interior circular.

Fig. 5. The ventral acetabulum, with its orifice dilated. Three corpuscles are exhibited which were moved to and fro in the contraction and expansion of the organ.

Fig. 6. The globular form of the oral acetabulum.

Fig. 7. The posterior contractile sac closed or contracted to its utmost degree.

Figs. 3 to 7 inclusive were drawn from the animal in the second stage.

Fig. 8. Circulation, or vascular system of the third stage. *a.* to *b.* the vessel which is supplied on its inner surface with vibrillæ.

Fig. 9. Posterior contractile sac, and partly detached tail, from the animal in the second stage.

Fig. 10. Commencement of the vessel furnished with vibrillæ, from the third stage, representing the revolution of a molecule through the agency of the vibratory action.

Fig. 11. Appearances produced by the decreasing rapidity of the vibratory movement in fragments of the vessel furnished with vibrillæ. The progressive decrease is represented in the course *a.*, *d.*, *b.*, *c.*

Fig. 12. Represents the mode of contraction in different directions of the sarcous cells beneath the epidermis.

Fig. 13. *D. vagans* in the first stage: *a.* oral acetabulum; *b.* pharynx; *c.* œsophageal bulb; *d.* œsophagus; *e.* intestinal rami; *f.* caudal appendage; *g.* blood vessels; *h.* ventral acetabulum; *i.* organic nucleated cells among the contents of the intestinal rami.

Fig. 14. Outlines of the forms into which *D. vagans* will change itself in the second stage of its existence.

Fig. 15. Vesicular or general parenchymatous structure of the body.

Fig. 16. Granular, globular, and spicular contents of the intestinal rami of the first stage.

ART. XXVII.—*An attempt to classify the Longicorn Coleoptera of the part of America North of Mexico.* By JOHN L. LeCONTE, M. D.

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#### PART I. CONTAINING THE CERAMBYCI.

In the present essay I have made many innovations in the former arrangements of these insects. These will be found more obvious in the first group, the *Lepturidæ*. The indistinct characters of the genera as left by Serville and Mulsant, have long rendered some other classification necessary; since being founded on very slight and arbitrary differences of form, they unite together many species which, agreeing in certain trivial circumstances, differ widely in general appearance. Such is the genus *Pachyta*, which on account of its heterogeneous nature I have been compelled to suppress altogether. Such again is *Grammoptera*, which was established on *Leptura* with linear elytra. If a comparison of a large number of species be made, this character is found to be entirely fallacious, so that however clear the mathematical distinction may be between lines that are and are not parallel, it will be seen that in nature this distinction cannot obtain. The proportions and form of the elytra vary in *all the genera*, and it would be quite as rational to separate into *distinct genera*, those with incised and those with dehiscent elytra.

Although these characters are thus shown to be mere specific marks, we may derive much aid from them in forming sections in those genera which contain many species; they may thus be made to alleviate the labor of identifying species: and in

the following pages have been made to contribute greatly to this very desirable object. Indeed, the genera *Leptura* and *Strangalia* might perhaps have been merged together, since they only differ in the degree of prominence of the posterior thoracic angles; this character is found to be variable, so that I have great doubt of its generic value.

Whilst thus exposing the faults of the heretofore arrangements of this group, it is by no means presumed that the present scheme is unobjectionable. All that is claimed for it is, that it is more applicable to American species, as well as those European species which commonly occur in collections.

The large increase of genera may be objected to, no less than eight new ones having been added to the *Lepturæ* alone, but these are recognized at once by certain peculiarities of habitus, and the characters on which they are founded are, so far as I know, invariable. The generic table appended to these remarks will render this sufficiently obvious.

There does not appear to be much accurate parallelism between the European and American species of this family; and most of the genera found in Europe are equally developed on this continent. An exception to this principle is found in *Rhagium*, of which we have but a single species. *Vesperus* and *Rhamnusium* are peculiar to the old continent, but here *Desmocerus* represents the former and *Centroderus* the latter. Peculiar to America are *Piodes*, *Gaurotes*, and *Typocerus*, the five other new genera are distributed over both continents. There are two species of this group which are indigenous to Europe and America, viz: *Acmaeops strigilata* and *Strangalia sexmaculata*: they are confined to the Northern regions neither of them occurring south of Lake Superior.

The genus *Distenia* will be found among the *Cerambycidæ*. I know not why it has been associated with the *Lepturæ*, with which its affinity is very slight: it is much more closely allied to *Eburia* and *Cerasphorus*.

Before passing to the specific details of this tribe, it may be proper to say a few words on the characters which distinguish the *Lepturæ* from other sections of the *Longicornia*, and to ascertain the true value of the division which they form.

*Longicornia* have been divided by Latreille, Serville, and other authors, into three groups, *Prionidæ*, *Cerambycidæ*, and *Lepturidæ*. The first group distinguished by the deflexed labrum, rudimentary inner-maxillary lobe, and the antennæ inserted in front of the eyes. The second group has the head not narrowed into a neck and the antennæ are placed between the eyes. The third is separated on the single character of the head being narrowed posteriorly into a kind of neck. The second group is again divided into two: *Cerambycini*, with porrected head and dilated palpi, and and *Lamiarii*, with deflected head and piliform palpi.

This arrangement is very unsatisfactory, since by following it, we associate with *Prioni*, *Asemum*, *Crioccephalus*, and other genera, which in form are true *Callidia*;



while *Disteniä*, although strongly resembling *Cerasphorus*, is put among *Lepturæ*. Again, there are many true *Cerambyci*, (e. g. *Itenopterus*,) which have the head elongate and porrected: *Necydalis* likewise has the head suddenly contracted behind precisely like *Toxotus*, while the front is deflected and the palpi filiform; so that it becomes difficult to determine whether the genus belongs to the *Lepturæ*, *Cerambyci* or *Lamiæ*.

So fallacious are the received characters, that a genuine *Saperda*-form with abbreviated elytra, has been described both by Newman and Haldeman as a *Molorchus*, (*Thia*, Nm., *Tessaropa*, Hald.) and another genus (*Encylops*, Nm.) allied to *Necydalis*, has been placed near *Toxotus*. A new genus from Georgia has a remarkable resemblance to *Dorcadion*, whilst the head is prolonged behind the eyes, and its true affinity is with the gibbous *Clyti*. It is thus plainly seen that these divisions so distinct in nature, have not yet any natural distinctions in our systems.

Dr. Zimmerman has recently recognized the importance of a character heretofore neglected, and through his kindness I am enabled to make use of it in the present essay. He finds that in all *Lamia*-forms, the anterior tibiæ have an oblique sulcus internally, which in many cases becomes so deep as to form an emargination, such as is observed in most *Carabica*. This character, with a single exception, is wanting in all other *Longicornia*. Making use of it and at the same time suppressing the primary group *Lepturæ*, as not possessing sufficiently distinct characters, we obtain three great divisions which embrace all *Longicornia*.

1. LAMIÆ.	2. CERAMBYCI.	3. PRIONI.
<i>Tibiæ</i> anticæ intus oblique sulcatæ.	<i>Tibiæ</i> intus non sulcatæ. ( <i>Michthysomate excepto</i> .)	<i>Tibiæ</i> intus non sulcatæ.
<i>Palpi</i> semper filiformes.	<i>Palpi</i> sæpissime compressi.	<i>Palpi</i> compressi.
<i>Antennæ</i> verticales.	<i>Thorax</i> immarginatus.	<i>Antennæ</i> frontales.
<i>Thorax</i> immarginatus.		<i>Coxæ</i> anticæ valde transversæ.
<i>Coxæ</i> anticæ globosæ.		

The *Cerambyci* may again be divided into three groups according to the form of the anterior coxæ and tibiæ.

1. LEPTURIDÆ.	2. CERAMBYCIDÆ.	3. SPONDYLIDÆ.
<i>Tibiæ</i> filiformes.	<i>Tibiæ</i> filiformes.	<i>Tibiæ</i> anticæ compressæ.
<i>Coxæ</i> anticæ conicæ.	<i>Coxæ</i> anticæ vel globosæ vel subtransversæ.	<i>Coxæ</i> anticæ subtransversæ.

Having now laid the ground work of a classification, we may proceed to investigate the relations existing between the different groups which have thus been obtained.

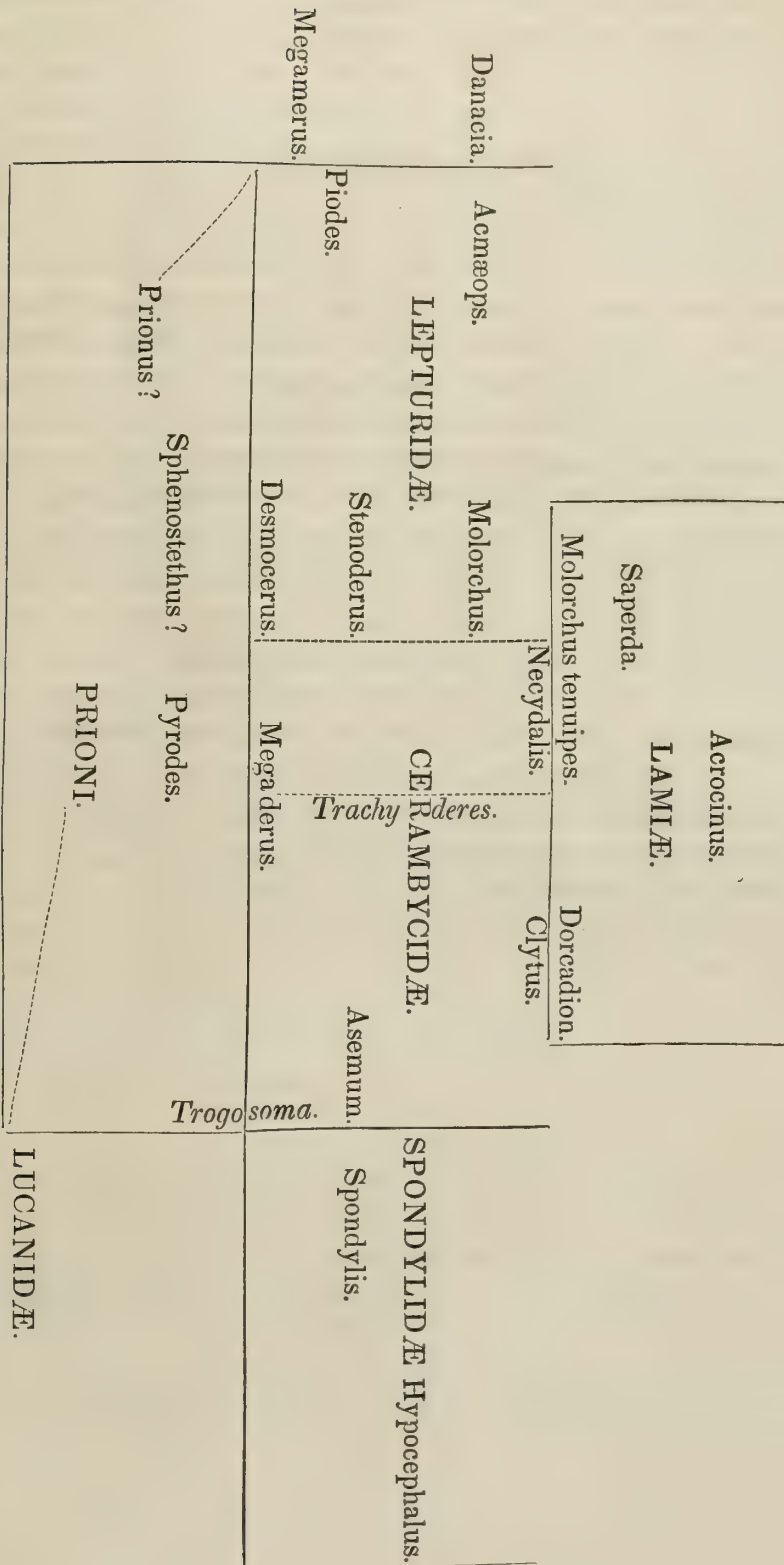
The *Lamiæ*\* meet the *Cerambyci* in several points, *Dorcadion* tending towards *Clytus*, while *Saperda* unites with *Necydalis*; some tropical forms tend towards *Dorcacerus*.

The *Prioni* meet the *Cerambyci* in two points. *Pyrodes* approaches *Megaderus* and *Tragosoma*, *Asemum*: they then lead to the *Lamellicornia* in *Lucanus*. The *Leptura* branch of the *Cerambyci* is related to the *Phytophaga* by *Acmæops*, which approaches *Donacia*. *Piodes* is a very anomalous form which seems closely allied to the *Prioni*, but I am inclined to believe it more nearly related to *Megamerus Kingii*, (McLeay) among the *Phytophaga*, which is said to have the same coriaceous structure as the *Prionus* and *Piodes*. On the other side, this branch is closely connected with the *Cerambyci* by *Necydalis*, so that no character can be used to separate them, excepting the conical coxæ. The *Spondylus* branch is related to the typical *Cerambyci*, through *Asemum* and *Callidium*: this form attains its highest development in *Hypocephalus*, which is another isolated form connected only with the contents of its own group.

The very peculiar appearance of the *Spondylidæ* might lead many to consider it as of equal value with that which is observed in the *Lamiæ* or *Prioni*, separating them by their short and robust legs, with dilated and dentated anterior tibiæ. Now, although these species differ in this respect from the typical *Cerambyci*, yet on comparing several together, great differences are found in these same organs. *Hypocephalus* has only a few large teeth on the tibiæ, *Spondylis buprestoides* a fine serration, while *Scaphinus* (*Prionus muticus*, Fabr., *Spondylis sphaericollis*, Lec.) has a large expansion at the end of each tibia. The antennæ of *Spondylis* are at the base of the mandibles as in *Prionus*, but on examining the *Callidia* a gradual transition will be found between this position and the one assumed in the typical *Cerambyci*. The relations just pointed out, as far as they can be exhibited on a plane surface, are shown in the following diagram.

\*This group is to be considered as the highest form of the Longicorn beetles; since with perfection of organisation, it is entirely free from all complicated relations. Its affinities are only with other Longicornia, and with only one section of them; and this isolation must always be a property of the highest division of any group, no matter what its extent may be, since the highest form is that in which some typical idea attains its maximum of development. We find in every group a highest form, in which, to use a physical symbol, the branch terminates, and in every case the comparative value of this branch may be ascertained by tracing its connection with others; that which soonest assumes a distinct form will be the highest.

PHYTOPHAGA.





We may now proceed to divide the *Lepturidæ* according to the following scheme commencing with those most nearly related to the central group *Cerambycidæ*, and proceeding upwards to the most isolated form *Leptura*.

A. Frons declivis, oculi intus valde emarginati, antennæ inter oculos sitæ.

- |  |             |
|--|-------------|
| 1. Caput postice constrictum, oculi transversi, elytra abbreviata. | NECYDALIS.  |
| 2. Caput postice constrictum, antennæ filiformes.                  | ENCYCLOPS.  |
| 3. Caput postice non constrictum, antennæ nodosæ.                  | DESMOCERUS. |

B. Frons plana, caput modice constrictum, vel sensim angustatum, oculi minus profunde emarginati; antennæ ante oculos vel vix inter oculos sitæ.

- |  |             |
|--|-------------|
| 4. Oculi intus parum emarginati, mesosternum latum planum.   | PIODES.     |
| 5. Oculi intus parum emarginati mesosternum prosternumque gibba.   | RHAGIUM.    |
| 6. Oculi antice emarginati, transversi, tibiæ calcaribus terminalibus.   | ARGALEUS.*  |
| 7. Oculi antice emarginati, vix transversi, tibiæ calcaribus ante apicem sitis, palpis apice rotundatim truncatis. | TOXOTUS.    |
| 8. Oculi integerrimi, palpi recte truncati, mesosternum triangulare.   | ACMÆOPS.    |
| 9. Oculi vix emarginati, mesosternum gibbum.   | GAUROTUS.   |
| 10. Oculi magni antice emarginati, tibiæ calcaribus terminalibus.  | CENTRODERA. |
| 11. Oculi vix emarginati, palpi oblique truncati, mesosternum parallelum.  | EVODINUS.   |

C. Frons plana, oculi valde emarginati, antennæ inter oculos sitæ.

- |   |              |
|---|--------------|
| 12. Caput postice subangustatum, palpi labiales latiores.   | ANTHOPHYLAX. |
| 13. Caput pone oculos valde constrictum, palpi labiales non latiores, thorax angulis posticis productis, antennæ articulis non impressis. | STRANGALIA.  |
| 14. Thorax angulis posticis productis, antennæ articulis 5-11 impressis.  | TYPOCERUS    |
| 15. Thorax angulis posticis non productis, antennæ articulis non impressis.   | LEPTURA      |

Subdivision I. LEPTURIDÆ.

GROUP 1.

This group is distinguished by a short head and deflexed front; the antennæ are situated between the eyes, which are emarginate: the body is linear, not narrowed posteriorly: it approaches the genuine *Cerambycidæ*, and likewise the *Lamiariæ*, from the latter it is distinguished by the simple anterior tibiæ, from the former by the conical anterior coxæ. The palpi are cylindrical, not dilated.

\* Rhamnusium has the same characters, but is distinguished by having the mouth not prolonged, and the antennæ shorter than the body and serrate.

NECYDALIS, *Lin.*

aput thorace latius, quadratum, basi subito constrictum.

Oculi transversi.

Antennæ filiformes.

Elytra valde abbreviata, apice rotundata; alæ rectæ.

Corpus filiforme, pedibus tenuibus, posticis elongatis.

*N. MELLITUS*.—Niger, tenuiter pubescens, thorace punctulato, latitudine longiore, utrinque profunde constricto, medio canaliculato, elytris alutaceis, parum punctatis, testaceis margine infuscato, medio oblique impressis, abdomine pedibus, antennarumque articulo 1<sup>mo</sup> rufo testaceis. Long. 48—80.

♂ Hald. 44.

♀ *Necydalis americanus*, Hald. 44.

*Molorchus mellitus*, Say. B. J. L. 194; Harris Hartford Tr., 89.

New York to Georgia and Missouri, rare. Although Mr. Say observed what he has considered as both sexes of this species, I prefer citing *N. americanus* as the true female. My specimen (taken in coitu with *N. mellitus* by Mr. Brevoort,) is much larger than the male, but only differs by its black abdomen and shorter antennæ. The under surface of the abdomen is rufo-testaceous, as in the male. The abdomen is more acute and less dilated towards the tip.

ENCYCLOPS, *Newman.*

Caput thorace latius, quadratum, basi subito constrictum.

Oculi globosi, prominuli, superne subito emarginati.

Elytra abdomine haud breviora, apice rotundata.

Antennæ filiformes.

Corpus filiforme, pedibus tenuibus, posticis elongatis.

*E. CÆRULEUS*.—læte viridi-æneus, opacus, thorace reticulato-punctato, antrorsum angustato constrictoque, lateribus tuberculato, elytris confertim punctatis, subtus cinereo-pubescens pedibus flavis, antennis nigris. Long. 3.

Hald. l. c. Ap. 375.

*Leptura cærulea*, Say. J. Ac. 5, 280.

*Encyclops pallipes*, Nm. Ent. Mag. 5, 392.

Middle and Northern States, rare.

DESMOCERUS, *Serv.*

Caput thorace angustius, postice non constrictum.

Oculi intus valde emarginati.

Antennæ nodosæ.

Elytra abdomine haud breviora, apice rotundata.

Corpus parallelum, antrorsum angustatum, pedibus mediocribus.

The thorax is narrowed in front, with the posterior angles acutely produced. The mesosternum is plane, and triangular, and the tibial spurs are placed at the apex.

1. *D. PALLIATUS*.—Cyaneus, thorace rugose-punctato, elytris dense punctatis, ante medium flavis, puncto utrinque basali, scutelloque nigris. Long. .92.

Hald. 58.

*Cerambyx palliatus*, Forster.

*Desmocerus cyaneus*, Dej. Cat. : Serv. Am. Ent. 4, 202.

*Stenocerus cyaneus*, Fabr. El. 2, 305. Ol. 69, 3, 26.

Massachusetts to Georgia : on *Sambucus niger*. In the male the antennæ are more nodose, the yellow portion of the elytra is smaller, and the blue extends farther upon the suture.

#### GROUP 2.

In this group the front is not suddenly deflexed : the head is sometimes elongate, with the mouth produced ; it is never very deeply constricted behind, and is often but very slightly narrowed behind the eyes, which are not deeply emarginate. It differs from the next group by the position of the antennæ, which are either in front of the eyes or on a line with the anterior margin. The palpi are compressed and more or less dilated. This group seems to verge towards the *Prionidæ* (in *Piodes*) and to be closely related to *Donacia* in some other genera.

#### PIODES.

Oculi vix prominuli, intus paulo emarginati.

Mesosternum subtriangulare postice truncatum.

Labrum brevissimum deflexum.

Corpus crassum obesum, supra glabrum, coriaceum.

Caput basi non constrictum, mandibulæ edentatæ : mentum transversum trapezoidale, ligula antice paulo emarginata, lobis apice rotundatis. Palpi desunt. Antennæ ante oculos sitæ, breviusculæ, articulis 5-11 æqualibus, 4<sup>to</sup> paulo brevior, 3 iterum longior. Thorax brevis utrinque modice constrictus, lateribus acute tuberculatus. Elytra postice non attenuata, apice rotundata. Tibiæ apice intus oblique truncatæ, calcaribus paulo ante apicem sitis.

1. *P. CORIACEA*.—Nigro-picea, parum nitida, capite thoraceque confertissime rugose-punctatis, elytris rugosis. Long. .75.

Oregon. Mr. Wilcox. One specimen with the palpi wanting. The whole appearance of this insect is that of a *Prionide* ; it differs, however, essentially by its immarginate thorax, and conical anterior coxæ.

Head quadrate, very densely rugosely punctured, eyes scarcely prominent. Mandibles rather long, edentate. Antennæ scarcely longer than the head and thorax, thorax wider than long, very densely rugosely punctured, dorsal line finely impressed. Elytra twice as wide as the thorax, one-half longer than wide, truncate at base, dilated a little behind the middle, rounded at apex, densely rugous, with a few scattered punctures.



RHAGIUM, *Fabr.*

Oculi parum prominuli, oblongi, intus paulo emarginati.

Prosternum inter coxas prominulum gibbum, pone coxas vix deficiens.

Mesosternum breve, gibbum, postice emarginatum.

Palpi dilatati.

Corpus depressiusculum; caput longe pone oculos modice constrictum; antennæ ante oculos insertæ, breves; mandibulæ unidentatæ. Mentum trapezoideum vix transversum. Thorax acute spinosus, utrinque modice constrictus. Tibiæ apice recte truncatæ, calcaribus ad apicem sitis.

R. LINEATUM.—Nigrum punctatum, griseo-pubescent, thorace linea dorsali lævi, elytris tricostatis, testaceo marmoratis, obsolete nigro-bifasciatis, antennarum articulo 5<sup>to</sup> elongato, 4 præcedente paulo brevioræ. Long. .31.—72.

Sch. Syn. 3, 414. Kb. N. Z. 178: Hald. 58.

*Stenocorus lineatus*, Ol. 4, 69, 22.

Maine to Chihuahua. Under pine bark. Abundant.

## ARGALEUS.

Oculi majusculi, parum prominuli, sub-transversi, antice emarginati, postice oblique truncati.

Mesosternum angustum acutum.

Caput elongatum, ore attenuato, postice vix constrictum.

Tibiæ apice recte truncatæ, calcaribus ad apicem sitis.

Corpus utrinque angustatum, maris gracilius. Mandibulæ edentatæ, antennæ ante oculos insertæ, longæ, articulo 4<sup>to</sup> breviusculo, 5<sup>to</sup> elongato. Mentum vix transversum, lateribus rotundatum, antice truncatum.

Thorax utrinque constrictus, acute tuberculatus: elytra postice angustata, apice subtruncata.

This genus is very near to *Rhamnusium*, but the head is not blunt; the form is similar to *Rhagium*. *Toxotus cursor* of Europe must be referred here.

## §1. Palpi labiales articulo ultimo subtransverso, securiformi.

1. A. NITENS.—Niger, punctatus, pube longa tenui albida vestitus, capite parvo, canaliculato, tuberculo laterali apice obtuso, elytris testaceis, glabris, disco sæpius infuscato, apice oblique truncatis. Long. .63.

Lec. Agass. Exp.

Found at the mouth of Pic River, Lake Superior. If Kirby had not compared his *Pachyta liturata* with the European *P. 4-maculata*, (which belongs to the third group of this family,) I should have referred my specimens to his species.

## §2. Palpi labiales articulo ultimo longiusculo, triangulari.

2. A. ATTENUATUS.—Niger, punctatus densius griseo-pubescent, capite magno subtiliter canaliculato, thorace paulo latiore canaliculato, disco utrinque longitudinaliter elevato, tuberculo laterali acuto elytris testaceo marmoratis, inequaliter pubescentibus, apice recte truncatis. Long. .60.

Lec. Ag. Exp.

*Pachyta attenuata*, Hald. l. c.

The male is much more slender than the female, and the lateral outline of the elytra is concave. I found a considerable number of this species at Eagle Harbor, on Lake Superior.

TOXOTUS, *Serv. Meg.*

Oculi paulo prominuli, antice emarginati postice vix truncati.

Mesosternum angustum subparallelum, truncatum.

Palpi paulo dilatati apice subrotundatim truncati.

Tibiæ intus ad apicem oblique truncatæ, calcaribus ante apicem sitis.

Corpus gracile, utrinque angustatum, vel subangustatum. Antennæ ante oculos sitæ, longiusculæ, minus tenues, articulo 4<sup>to</sup> brevi. Mentum transversum antrorsum subangustatum, truncatum. Thorax utrinque constrictus, lateribus vel tuberculatus vel spinosus.

The form of the head varies in this genus. In some species the sides are parallel as in *Rhagium*, (*T. cylindricollis*), in others where the eyes are more prominent, the head appears narrowed behind those organs, (*T. cinnamopterus*.) The character that especially distinguishes this genus, is the position of the terminal spurs of the tibiæ, which, instead of being apical, are situated at the upper end of a deep oblique incisure.

1. *T. SCHAUMII*.—Niger thorace acute spinoso, utrinque valde constricto, elytris rugulosis, albido-pruinosis subparallelis apice oblique truncatis, femoribus medio late flavis. Long. .97.

This fine species is found in Ohio. I have dedicated it to my friend Dr. Schaum, by whom it was presented to me.

Black, finely pubescent. Head finely punctured, with an impressed line between the eyes; labrum rounded, emarginate. Antennæ with the third joint elongate, the fourth shorter than the fifth, which is equal to the following. Thorax narrowed in front, shining, finely and sparsely punctured, lateral tubercle acute, dorsal line deep. Elytra scarcely narrowed behind, finely rugous, pruinose with very short hair, tip obliquely truncate inwards. Legs black, femora yellow, base and tip black.

2. *T. CYLINDRICOLLIS*.—Rufus, supra fuscus, vel niger, subtiliter punctulatus, sericeo-pubescent, capite profunde canaliculato, thorace canaliculato, tuberculo obtuso, elytris postice angustatis, apice intus profunde incisus. Long. .8.

Say. Journ. A. N. S., 3, 417.

*T. dentipennis*, Hald. 58

*T. dives*, Nm. Entom.

Var. *T. atratus*, Hd. 58.

Varies much in color: but the base of the femora, the under surface of the body, and the tip of the antennæ are always rufous. The male is more slender, and the antennæ are as long as the body. Pennsylvania, Alabama, Missouri.

3. *T. TRIVITTATUS*.—Niger parcius pubescens, subtiliter punctatus, thorace canaliculato, tuberculo laterali obtuso, elytris postice attenuatis, nigris vitta discoidali lata, margineque flavis, margine extimo nigricante, abdomine flavo. Long. .65.

Hald. b. c. 58: Say? Journ. A. N. S. 3, 422.

*Leptura vittigera*! Randall. R. I. 1, 29.

Maine to Pennsylvania. Professor Baird. Say's specimen was from Mississippi, and is described with yellow legs: it may be a distinct species.

4. *T. VESTITUS*.—Niger capite thoraceque punctatis, longius pubescentibus, hoc canaliculato, longiusculo, tuberculo laterali valde obtuso, elytris sericeis postice angustatis, apice intus truncatis. Long. .5.

Hald. 59.

Oregon and California. Messrs. Wilcox and Pease. The elytra and feet are sometimes reddish, the male has long and thick antennæ, like the preceding.

5. *T. CINNAMOPTERUS*.—Fusco testaceus, densius flavo pubescens, capite punctato, oculis prominulis, vix emarginatis, thorace punctato, obsolete canaliculato, longiusculo, tuberculo laterali subacuto, elytris postice angustatis, apice intus truncatis. Long. .5.

Hald. Ap. 374.

*T. asculi*, Hald. 59.

*Leptura cinnamoptera*! Randall. B. I. 2, 45.

Massachusetts, Pennsylvania, Carolina: very rare.

#### ACMÆOPS.

Oculi integerrimi subprominuli.

Mesosternum triangulare.

Palpi paulo dilatati, apice recte truncati.

Antennæ articulo 4<sup>o</sup> haud brevior.

Tibiæ apice recte truncatæ, calcaribus terminaliter sitis.

Corpus varium, aliis crassum, aliis postice angustatum. Antennæ ante oculos sitæ, gracillimæ, articulis 3—5 subæqualibus. Mandibulæ edentatæ, labrum breve: caput pone oculos modice constrictum, vel vix constrictum. Thorax antrorsum angustatus, angulis posticis non productis.

Has the appearance of *Leptura*, but differs in the form of the head and eyes, as well as in the situation of the antennæ. The ligula instead of being divided into long diverging lobes, is formed as in *Toxotus*. This genus contains a large portion of the old genus *Pachyta*, with some of Mulsant's *Anoplodon*.

#### §1. Corpus gracile, postice attenuatum, ore brevi.

1. *A. LONGICORNIS*.—Niger thorace utrinque constricto, canaliculato, punctato, elytris punctatis, subtilius versus apicem, testaceis apice subtruncatis, femoribus basi rufis. Long. .47.

*Leptura longicornis*, Kirby N. Z. 185.

Mas. antennæ corpore haud brevioribus: variat elytris nigris, vitta dorsali pone medium extendente, alteraque submarginali antice obsoleta testaceis.



Black, head and thorax thickly punctured, frontal line obsolete. Thorax thickly punctured, slightly pubescent, narrowed in front, constricted at each end, obtusely angulated in the middle, convex with a deep dorsal channel. Elytra at base one-half wider than the thorax, subparallel (♀), or gradually narrowed behind (♂); apex subtruncate: testaceous, suture black; punctures larger at the base than at the tip. Femora with a rufous basal ring: anterior legs entirely rufous.

2. *A. SUBPILOSUS*.—Niger, thorace breviusculo, densius punctato, longius villosus, utrinque subconstricto, elytris punctatis, subtilius versus apicem, apice rotundatis. Long. .45.

Oregon. Mr. Wilcox. Varies with the elytra, antennæ and feet testaceous. The antennæ of the male are shorter than the body.

Black, head and thorax very thickly punctured, almost scabrous, pubescent with long yellow hair. Thorax wider than long, narrowed in front, rounded on the sides, and slightly constricted at each end: dorsal line deep: scutellum pubescent: elytra wider than the thorax, slightly attenuated towards the tip, which is rounded, slightly pubescent, punctures at the base large and distant. Anterior tibiæ curved.

3. *A. MILITARIS*.—Niger pubescens, thorace confertissime punctato, lateribus rotundato, canaliculato, elytris densius punctatis, apice rotundatis, macula parva humerali flava. Long. .35.

Oregon. Mr. Wilcox. Black, with rather long ashy pubescence. Antennæ shorter than the body; head and thorax very densely punctured, the latter not longer than wide, narrowed in front, rounded on the sides, convex, not at all constricted, dorsal line distinct. Elytra at base wider than the thorax, gradually slightly narrowed toward the tip which is rounded: coarsely and thickly punctured, punctures a little smaller towards the apex: marked with a small yellow humeral spot.

§2. Corpus minus gracile, elytris parallelis, ore elongato.

4. *A. QUADRIVITTATUS*.—Testaceus, thorace convexo, antrorsum angustato, impresso, elytris grossius punctatis, sutura, vitta dorsali alteraque ad marginem subinterrupta nigris, antennis tenuibus, articulis apice nigris. Long. .23—3.

*Leptura quadrivittata*, Lin. teste Hald. 65.

*L. vittata*, Say.

*L. directa*, Nm. Entom.

*Anoplodera 4-vittata*, Hald. 65.

Common in Pennsylvania, Ohio, and Alabama. The male has the antennæ as long as the body, and the anterior tibiæ are armed with an obtuse tooth on their inner margin.

5. *A. STRIGILATUS*.—Niger parcius pubescens, capite valde punctato, thorace minus dense punctato, antice angustato, utrinque constricto, convexo, vix canaliculato, elytris densius punctatis, testaceis, vitta humerali, apiceque truncata nigricantibus. Long. .3.

Lec. Ag. Exp.

*Leptura strigilata*, Fabr. El.

*L. semimarginata*, Rand. B. J. 2, 20.

Maine and Lake Superior. Varies with the elytra entirely fuscous.

6. *A. DISCOIDEUS*.—Niger, opacus, parce pubescens, capite linea frontali lævi, thorace parcius punctato, antrorsum angustato, apice constricto, disco triangulariter valde depresso, ante basin utrinque tuberculatim prominulo, elytris sat grosse punctatis, apice truncatis, sutura margineque toto aurantiacis. Long. .3.

Lec. Agassiz Exp.

*Pachyta discoidea*, Hald. 60.

Lake Superior, Massachusetts, and Pennsylvania.

7. *A. PROTEUS*.—Niger pubescens, thorace punctato, antrorsum angustato, apice constricto, disco triangulariter modice depresso, canaliculato, ante basin utrinque prominulo, elytris punctatis, postice paulo angustatis, apice truncatis, rufis, vel nigris, vel sutura vittisque lata fuscescentibus. Long. .4.

Lec. Agass. Exp.

*Leptura Proteus*, Kb. N. Z. 186.

*Pachyta sublineata*, Hald. 60.

Lake Superior and Pennsylvania. The feet vary from black to rufous, the base of the femora is always rufous.

### §3. Corpus crassum, elytris parallelis, ore non attenuato.

8. *A. ATER*.—Violaceo-niger, capite thoraceque dense punctatis, hoc antrorsum angustato lateribus medio obtuse angulatis, elytris grossius punctatis. Long. .35.

Oregon. Mr. Wilcox. Differs from the following in the thorax which is not at all constricted or channeled.

9. *A. NIGRIPENNIS*.—Flavo-testaceus vix pubescens, capite fusco, thorace convexo, disco parce punctato antrorsum angustato, profundius constricto, basi modice constricto, lateribus subangulato, elytris punctatis, nigris. Long. .4.

Missouri. Dr. Engleman. Body short and thick, testaceous, scarcely pubescent, head densely punctured, fuscous, mouth pale, antennæ half as long as the body, fourth joint a little shorter than the fifth, first joint pale. Thorax shining, with a few scattered punctures, transverse, narrowed and deeply constricted in front, posterior constriction fainter, sides obtusely angulated. Elytra twice as wide as the thorax, scarcely twice as long as wide; punctures less deep than in the following species, a little smaller towards the apex, which is rounded.

10. *A. VARIANS*.—Niger vix pubescens, capite scabro, thorace disco parce punctato, antrorsum angustato, utrinque constricto, canaliculato, lateribus rotundatim angulatis, elytris valde punctatis, subtilius versus apicem. Long. .4.

Missouri, Wisconsin. Dr. Engleman. Varies with the thorax rufo-testaceous, the pleuræ of the thorax are thickly punctured.

11. *A. THORACICUS*.

*Pachyta thoracica*, Hald. 60.

Differs from *A. varians* by its densely pubescent thorax. Not having a specimen I am unable to point out any other character. It was found in Pennsylvania, and is in Dr. Melsheimer's Cabinet.

12. *A. FUSCICEPS*.—Pallida paulo pubescens, thorace parce punctato, canaliculato, antrorsum angustato, utrinque constricto, lateribus obtuse angulatis, elytris valde punctatis latius marginatis; pectore, capite scabro, antennisque extrorsum fuscis. Long. .27.

Cattaraugus County, New York. Mr. Haldeman.

This species has the same form as *A. varians*, but is smaller, with a less convex thorax, the lateral angles are obtuse, but not rounded, and the margin of the elytra is much wider.

#### Species mihi ignota.

13. *A. LONGICEPS*.—Niger punctatus, ex pube alba subincanus, capite elongato, prothorace canaliculato, elytris luridis, litura antica, sutura apiceque nigris. Long. 4 lin.

*Leptura longiceps*, Kb. N. Z. 187.

Found in Lat. 54°. Similar to *A. Proteus*, but the posterior angles of the thorax are not diverging.

#### GAUROTES.

Oculi integerrimi, prominuli.

Mesosternum antice subito deflexum, postice truncatum.

Palpi parum dilatati, apice recte truncati.

Tibiæ apice recte truncatæ.

Habitus omnino *Acmaëopis* §3, at mesoterno lato gibbo Rhagio similis. Corpus obesum; caput pone oculos sensim paulo angustatum, ore vix attenuato. Antennæ tenues elongatæ, articulo 4<sup>to</sup> paulo brevior. Mentum transversum antrorsum vix angustatum. Thorax antrorsum angustatus, apice constrictus. Elytra thorace multo latiora postice paulo angustata, apice truncata.



1. *G. CYANIPENNIS*.—Niger brevissime pubescens, capite punctato, thorace lateribus subangulato, convexo, obsolete punctato, elytris glabris, viridicyaneis, nitidissimis, parce punctatis, punctis postice fere obsolete, antennis pedibusque flavis. Long. .35.—.46.

*Leptura cyanipennis*, Say. J. Ac. 3, 423.

*Pachyta cyanipennis*, Hald. 60.

*P. Leonardii*, † Hald. 60.

*P. Servillei*, Serv. Am. Ent. 4, 214.

*P. Ione*, Newman Entom.

Massachusetts to Carolina.

### CENTRODERA.

Oculi magni globosi, antice emarginati, (minus profunde in ♂.)

Mesosternum planum subtriangulare, apice truncatum.

Palpi parum dilatati (♀) vel dilatati (♂) apice oblique truncati.

Antennæ ante oculares, elongatæ, tenues, articulo 4<sup>to</sup> paulo breviores.

Tibiæ apice recte truncatæ.

Habitus *Rhamnusii*, at capitis forma oculisque magnis differt. Corpus lineare, cylindricum. Caput mox pone oculos paulo angustatum, ore non attenuato. Mentum transversum, antice non angustatum. Thorax elongatus, cylindricus, utrinque constrictus, lateribus acute spinosus.

1. *C. DECOLORATA*.—Rufo-testacea, capite punctato, canaliculato, thorace parce punctato, disco utrinque gibboso, medio canaliculato, elytris valde punctatis, apice subtruncatis. Long. 1.0.

*Rhamnusium ? decoloratum !* Harris Ins.

*Toxotus rubidus*, Dej. Cat.

*T. rubidus*, Hald. 58.

Niagara and Massachusetts. The male has the palpi moderately dilated, the antennæ almost as long as the body, and the unguicular joint of the anterior tarsi depressed and dilated.

2. *C. PICTA*.—Fusca, pubescens, capite thoraceque confertissime subtiliter punctatis, subcanaliculatis elytris fere glabris, grossius punctatis, testaceis lineis pluribus confluentibus fuscis. Long. .55.

*Toxotus pictus*, Hald. 58.

Pennsylvania, Rev. D. Ziegler: South Carolina. The male has the palpi very much dilated, the antennæ longer than the body, and the last joint of the anterior tarsi depressed and dilated.

### EVODINUS.

Oculi oblongi, intus parum emarginati.

Mesosternum planum, parallelum, truncatum, coxis magnis.

Palpi dilatati, oblique truncati.

Tibiæ apice recte truncatæ.

Corpus gracile utrinque angustatum. Caput mox pone oculos modice angustatum, ore attenuato. Antennæ ante oculos sitæ, longæ tenues. Mentum latitudine non brevius, antice subangustatum. Thorax elongatus, antrorsum angustatus, utrinque constrictus, lateribus angulatus. Elytra postice angustata, apice subtruncata.

This genus by its characters is very closely allied to the preceding, but it has the form of *Strangalia*, with which genus the structure of its mouth entirely agrees.

1. *E. MONTICOLA*.—Niger subtilissime punctatus, dense albido-pubescens, thorace canaliculato, elytris flavis utrinque maculis 2 parvis ante medium transversim sitis, 2 majoribus ad marginem conjunctis, apiceque nigris, antennis extrorsum rufescentibus. Long. .4.

Lec. Agassiz Exp.

*Leptura monticola*, Rand. B. J. 2, 27.

Lake Superior on Cornus flowers ; also on roses.

### GROUP 3.

From the preceding group this is distinguished by the antennæ being inserted between the eyes, immediately at the emargination, which is deep. In most of them the head is strongly constricted behind.

### ANTHOPHYLAX, Lec.

Caput pone oculos parum constrictum ore subattenuato.

Palpi modice dilatati, labiales multo latiores.

Antennæ 11-articulatæ, elongatæ, filiformes.

Habitus quamadmodo Argaleo similis. Corpus utrinque subangustatum. Mentum quadratum antice subangustatum. Thorax antrorsum angustatus, utrinque constrictus, angulis posticis non productis, lateribus acute tuberculatus. Elytra apice integra.

To this genus belongs *Pachyta 4-maculata* of Europe.

1. *A. VIRIDIS*.—Niger albido-pubescens, thorace dense subtilius punctato, obsolete canaliculato, elytris viridi æneis, confertim cribrato punctatis, obsoletissime substriatis, antennis articulis basi rufescentibus. Long. .7.

Lec. Agass. Exp.

Eagle Harbour, Lake Superior.

2. *A. MALACHITICUS*.—Violaceus, vel cyaneus, nitidus, thorace dense minus subtiliter punctato, subcanaliculato, elytris confertim cribrato-punctatis, tibiis tarsis, genibusque nigris, femoribus læte flavis. Long. .52.

Lec. Agass. Exp.

*Lepturu malachitica*, Hald. 64.

*Stenura cyanea*, Hald. Pr. A. N. S., 3, 151.

*Pachyta Leonardii* ! Harris Ms.

Lake Superior, Massachusetts, Pennsylvania.

STRANGALIA, *Serv.*

Caput pone oculos subito valde constrictum.

Palpi parum dilatati, recte truncati, labiales non latiores.

Antennæ 11-articulato, vel filiformes, vel vix serratæ.

Thorax angulis posticis productis.

As thus defined, this group will contain many *Pachyta* of authors, and the greater part of Serville's genus *Grammoptera*. That the labor of determining the species might be lessened, I have endeavored to arrange them according to their affinities into the following sections.

## A. Thoracis angulis posticis acutis.

1. Corpus attenuatum, thorace apice tubulato, constrictoque, basi impresso. Sp. 1—3.
2. Thorace postice impresso, angulis non deflexis, elytris triangularibus, apice emarginatis fronte triangulariter impressa. Sp. 4—7.
3. Corpus valde attenuatum, thorace haud impresso, angulis non deflexis, elytris dehiscentibus, apice excisis. Sp. 8—15.
4. Corpus angustum lineare, elytris lineolatis, truncatis, grosse punctatis. Sp. 16—17.
5. Elytris parallelis, concoloribus, grosse punctatis, thorace haud impresso: corpus minus angustatum. Sp. 18—24.
6. Elytris dehiscentibus, grosse punctatis thorace postice profunde impresso. Sp. 25.
7. Thorace convexo, elytris triangularibus, maculatis, fronte ad apicem haud impressa. Sp. 26—30.

## B. Thoracis angulis posticis laminatim productis. Sp. 31—32.

## A.—1.

1. S. SCALARIS.—Valde elongata, picea, dense subtiliter rugose-punctata, pubescens, thorace longiusculo, antrorsum angustato, utrinque constricto, canaliculato, lateribus subsinuatis, elytris medio coarctatis, apice dehiscentibus, rotundatisque, macula communi subsellata, ad medium flavo-pubescente, palpis antennisque rufis. Long. .95.

*Leptura scalaris*, Say. J. A. N. S. 5, 278.

Found at Saratoga, and given to me by Mr. James Thomson.

2. S. COARCTATA.—Valde elongata, picea, dense subtiliter rugose-punctata, pubescens, thorace campanulato, utrinque subconstricto, elytris medio coarctatis, basi rufescentibus, apice dehiscentibus, rotundatisque, abdomine rufescente. Long. 8 lin. lat. 2.

*Toxotus coarctatus*, Hald. 59: Dej. Cat.

Pennsylvania. Mus. Mels. Very similar to the preceding, but the thorax is bell-shaped and rounded on the sides.



3. *S. EMARGINATA*.—Elongata, nigra nitida, parcius pubescens, thorace antrorsum angustato, postice impresso, lateribus subangulatis, elytris triangularibus, aurantiacis, dense pubescentibus, punctatisque, apice emarginata, late nigra. Long. 1.0.

*Leptura emarginata*, Fabr. El. 2, 356. Ol. 73, 3, 6.

*Stenura emarginata*, Dej. Cat. : Hd. 62.

The male has a narrower body, and the last joint of the abdomen is deeply and widely emarginate.

A.—2.

4. *S. OBLITERATA*.—Elongata, pubescens, capite rufo, valde canaliculato, fronte, oculorum marginibus, maxillis, gulaque nigris, thorace valde punctato, campanulato, subcanaliculato, lateribus subangulatis, elytris confertim punctatis, flavis, maculis utrinque 2 ante medium, altera magna ad medium alteraque ante apicem nigricantibus apice rufa intus emarginata, pedibus rufis genubus posticis, tarsisque nigris. Long. .65.

*Stenura obliterata*, Hald. 62.

Oregon. Mr. Wilcox.

5. *S. DELETA*.—Testacea capite profunde canaliculato, supra nigricante, thorace campanulato, antrorsum parum angustato, valde punctato, disco late nigricante, elytris maculis utrinque 3 (antereiore parva) nigricantibus, apice rufa intus emarginata, antennis pectore, genubus posticis, tarsisque nigris. Long. .48.

Massachusetts. Dr. Zimmerman.

Testaceous yellow, pubescent. Head deeply channeled, black above with the antennal protuberances pale. Antennæ elongate, black, indistinctly annulate. Thorax bell-shaped, a little wider than the head, longer than wide, scarcely narrowed in front, where it is rounded and constricted, base slightly impressed; disc densely punctured, obsoletely channeled, blackish. The margins broadly testaceous. Elytra at base wider than the thorax, slightly dehiscent at the tip, which is emarginate inwards: they are testaceous, thickly punctured, each marked with a small lateral blackish spot behind the humerus, and two other large ones extending almost to the suture: tip rufous as far as the posterior spot. Beneath testaceous, prosternum, pectus, tarsi, and tip of the posterior femora and tibiæ black.

6. *S. SUBHAMATA*.—Elongata, nigra pubescens, capite canaliculato, thorace elongato, campanulato subtilius dense punctato, postice profundius impresso, elytris grossius punctatis, macula hamata basali, alteraque elongata pone medium flavis, apice intus emarginata, antennis annulatis, femorum basi, coxisque flavis. Long. .5.

Hald. 61.

*Leptura subhamata*, Rand. B. I. 2, 44.

*Stenura armata*! Hald. 63.

*Leptura interrupta*? Nm. Entom.

Massachusetts to Pennsylvania. Rare.

7. *S. ELEGANS*.—Elongata, flavo testacea, pubescens, capite valde canaliculato, vertice fusco, thorace subtilius punctato, antrorsum angustato, lateribus parum sinuato, postice impresso, linea longitudinali nigra, elytris grossius punctatis, apice intus emarginatis, margine sutura, fascia ad medium, maculaque marginali pone humeros nigris : pedibus posticis nigris basi flavis, antennis annulatis articulo 1<sup>mo</sup> antice flavo. Long. .6.

*Stenura elegans*, Dej. and Hald. ined.

Saratoga. Mr. James Thomson. Found also in Pennsylvania. The intermediate femora have a black spot on the inner surface.

A.—3.

8. *S. SEX-NOTATA*.—Valde elongata, rufo-testacea, thorace campanulato, antrorsum angustato, valde punctato, lateribus rotundato, elytris apice acutis, grossius punctatis, sutura maculisque utrinque tribus nigris : antennis pectore pedibusque nigris, his basi flavis. Long. .42.

Hald. 61. Dej. Cat.

Georgia. Rare.

9. *S. STRIGOSA*.—Valde elongata, rufa, punctata, flavo-pubescens, thorace elongato, antrorsum angustato, lateribus subsinuato, utrinque testaceo, margine basali apicalique nigris, disco lineis duabus obsolete nigricantibus, elytris apice acutis, divaricatis, basi, faciisque 2 nigro cinctis flavis ad medium, coxis femoribusque versus apicem fuscis. Long. .55.

Newman Entomologist.

Inhabits East Florida. Dr. Zimmerman. The male of this and the other species of this group have long antennæ, and the last joint of the abdomen is deeply excavated.

10. *S. BICOLOR*.—Valde elongata rufa pubescens, thorace elongato, antrorsum angustato, lateribus vix sinuato subtilius dense punctato, disco utrinque obscuriore, elytris nigris, apice acutis divaricatis. Long. .55.

Dej. Cat. : Hald. 61.

*Leptura bicolor*, Swed. Act. Holm. 3, 197 : Say. J. Ac. 3, 418.

New York to Alabama.

11. *S. LUTEICORNIS*.—Valde elongata, testacea pubescens, dense punctata, thorace elongato, antrorsum angustato nigro bivittato, elytris apice acutis, puncto humerali, fasciisque 3 nigris, femoribus posticis apice nigris. Long. .5.

Dej. Cat. : Hald. 61.

*Leptura luteicornis*, Fabr. El. 2, 361. Ol. 73, 3, 4.

New York, Maryland, Georgia.

12. *S. OBSOLETA*.—Valde elongata, subtus nigra, abdomine testacea, supra flavo-testacea, dense punctata pubescens, thorace elongato, antrorsum angustato, lateribus vix sinuatis, angulis posticis parum divergentibus, nigro bivittato, elytris apice acutis, maculis utrinque duabus posteriore fere ad suturam extendente, antennis, tibiis femoribus posticis ad apicem, tarsisque nigris. Long. .47.

Hald. l. c. 61.

Pennsylvania: Haldeman. Very similar to certain varieties of the next species, but the angles of the thorax are less divergent, and the abdomen is testaceous.

13. *S. FAMELICA*.—Valde elongata, subtus nigra, supra flavo-testacea, dense punctata, capite fusco, thorace antrorsum angustato, lateribus subsinuatis, angulis posticis nigris, divergentibus, nigro bivittato, elytris apice acutis, macula parva laterali ad medium, alteraque pone medium nigricantibus, antennis nigris pedibus posticis (femorum basi excepta) fuscis. Long. .5.

Nm. Entomol.

Maryland, Alabama, Missouri. Varies with a yellow head and obsolete elytral spots.

14. *S. ACUMINATA*.—Valde elongata, nigra, cinero-pubescens, thorace elongato, antrorsum angustato, lateribus subrectis, confertim punctato, linea postica dorsali lævi, elytris testaceis, sutura margine, apiceque acuta nigricantibus. Long. .37.

*Leptura acuminata*, Ol. 73, 3, 35.

*Strangalia emaciata*, Nm. Ent. : Hald. 61.

The abdomen is sometimes testaceous. New York and Pennsylvania.

15. *S. UNICOLOR*.—Valde elongata, nigra punctata, thorace elongato, antrorsum angustato, linea postica dorsali lævi, in fovea parva desinente. Long. 5 lin.

Hald. l. c. 62.

Pennsylvania, Mus. Mels.

#### A.—4.

16. *S. LINEOLA*.—Valde elongata, nigra cinero-pubescens, thorace converso, latitudine sesqui longiore, lateribus modice rotundatis, confertissime punctato, elytris grossius punctatis, postice parum angustatis apice truncatis, testaceis, sutura linea dorsali fere integra, margine subinterrupta, apiceque nigris, antennis annulatis, pedibus testaceis tarsis fuscis. Long. .4.

*Leptura lineola*, Say. J, Ac. 3, 421.

*Stenura lineola*, Hald. 63.

Pennsylvania, Massachusetts, Carolina.

17. *S. LATERALIS*.—Elongata, nigra pubescens, thorace valde convexo, latitudine vix longiore, lateribus rotundato, confertissime punctato, elytris postice subangustatis, apice truncatis, grossius punctatis testaceis sutura linea dorsali subintegra, marginali subinterrupta, apiceque nigris, antennis annulatis, pedibus testaceis, tarsis fuscis. Long. .35—.45.

*Leptura lateralis*, Mels. Cat.

*L. indirecta*? Nm. Entom.

*Stenura cincta*, Hald. 63.

*S. lineolata*, Dej. Cat.

Pennsylvania, Maryland, New York. Very similar to the preceding but a little broader, and with a less elongate thorax. It may prove to be a variety, as I have but a single specimen with an elongate thorax. I have changed the name given by Mr. Haldeman, as there is already a *Leptura cincta* in Europe.



## A.—5.

18. *S. AMERICANA*.—Elongata, parallela, nigra pubescens, capite thoracique læte rufis, subtiliter punctatis, hoc antrorsum subangustato, lateribus sinuatis, utrinque ad basin impresso, elytris confertim punctatis, apice vix truncatis. Long. .5.

*Stenura americana*, Hald. 63.

*S. fulvicollis*, Dej. Cat.

Georgia and Ohio. Very rare. Drs. LeConte and Schaum.

19. *S. CAPITATA*.—Elongata, parallela, nigra pubescens, capite thoraceque late rufis, minus subtiliter punctatis, hoc convexo, antrorsum angustato lateribus rotundato, medio versus basin transversim impresso, elytris grossius minus confertim punctatis. Long. .3.

*Leptura capitata*, Nm. Ent.

*Grammoptera capitata*, Hald. 65.

Georgia. Missouri, Michigan. Rare.

20. *S. RUFICOLLIS*.—Elongata, parallela, nigra pubescens, thorace rufo convexo, antrorsum angustato, lateribus rotundato, confertim subtilius punctato, elytris dense minus subtiliter punctatis, apice rotundatis, pedibus anticis rufescentibus. Long. .24.

*Leptura ruficollis*, Say. J. Ac. 3, 421.

*L. hæmatites*, Nm. Entom.

*Grammoptera ruficollis*, Hald. 66.

Massachusetts to Carolina.

21. *S. SUBARGENTATA*.—Elongata parallela, nigra, pube albida sparsim vestita, capite thoraceque subtiliter confertissime punctatis, hoc longiusculo, antrorsum subangustato, lateribus ante medium rotundatus linea dorsali postica lævi, elytris minus subtiliter punctatis, apice rotundatis. Long. .27.

*Leptura subargentata*, Kb. N. Z. 184.

North side of Lake Superior.

22. *S. CHALYBEA*.—Subelongata, parallela, parum pubescens, capite thoraceque dense subtiliter punctatis, nigris, hoc quadrato, lateribus parallelis, capite non latiore, elytris cyaneis, parcius grosse punctatis, apice rotundatis, antennis pedibusque flavis. Long. .18.

*Pachyta chalybea*, Hald. 60.

Pennsylvania. Rare. Dr. Melsheimer. The sides of the thorax are parallel almost to the apex, where they are suddenly rounded.

23. *S. SIMILIS*.—Caput nigrum, antennæ fuscæ, articulo basali flavido; thorax niger, lanugine aurea obsitus, elytra punctata, nigra, propedes flavidi, meso et metapedes femoribus basi flavidis apice nigris, tibiis tarsisque fuscis. Long. .225. (Nm.)

*Leptura similis*, Kb. N. Z. 185.

*Leptura exigua*, Nm. Ent.

I have not met with this species.

24. *S. NANA*.—Nigra puncta, ore ferrugineo, propedes pallidi, femorum macula elongata nigra meso et meta-pedes nigri femoribus basi pallidis. Long. .175.

*Leptura nana*, Newman Ent.

Nor with this.

A.—6.

25. *S. CRUENTATA*.—Minus elongata, nigra nitida parum pubescens, capite thoraceque parce subtiliter punctatis, hoc antrorsum magis angustato, lateribus subsinuato, postice depresso, profundeque impresso, angulis posticis magis productis, elytris apice valde dehiscentibus, subtruncatis, grossius punctatis lateribus cruentatis, abdomine femoribusque posticis basi sanguineis. Long. .4.

*Stenura cruentata*, Hald. 64.

Pennsylvania. Rare. Dr. Melsheimer.

A.—7.

26. *S. QUAGGA*.—Modice elongata, nigra subtiliter confertim punctata, valde aureo-pubescens, fronte flava, thorace convexo, campanulato, lateribus subangulato, disco transversim nigro, elytris thorace duplo latioribus, postice angustatis, apice truncatis, nigris fasciis 4 læte flavis, 1<sup>mo</sup> ad suturam latiore, pedibus rufo-testaceis, antennis fuscis. Long. .4—52.

*Leptura quagga*, Germ. Ins. Nov. 521.

*Leptura aurigera*, Nm. Ent.

*Stenura Zebrata* † Hald. 62.

Pennsylvania, Georgia, New York.

27. *S. CORDIFERA*.—Breviuscula, utrinque angustata, valde tomentosa nigra subtiliter punctata thorace convexo, antrorsum valde angustato, lateribus rotundatis subsinuatis, elytris apice dehiscentibus, subacutis flavis, maculis duabus lateralibus apiceque nigris. Long. .42.

*Leptura cordifera*, Ol. 73, 41.

*Pachyta cordifera*, Dej. Cat.: Hald. 59.

New York, Pennsylvania, Maryland. Varies with the suture and anterior subsutural spot black.

28. *S. INSTABILIS*.—Breviuscula, utrinque angustata, valde tomentosa, nigra confertim minus subtiliter punctata, thorace convexo, antrorsum valde angustato, lateribus modice rotundatis subsinuatis, elytris apice dehiscentibus subacutis flavis, sutura macula magna cordata communi ante medium, duabusque magnis sublateralibus apiceque nigris, his vitta parva conjunctis. Long. .46.

*Pachyta instabilis*, Hald. 59.

Oregon. Mr. Wilcox. Very similar to the preceding but the punctures are larger, and the black spots are longitudinally confluent.

29. *S. CONVEXA*.—Breviuscula utrinque angustata, nigra pubescens, confertim punctata thorace campanulato, lateribus antice rotundatis, subtiliter canaliculato, elytris dehiscentibus flavis, margine basali sutura fasciis 2 interruptis apiceque nigris, hac rotundata. Long. .4.

Oregon. Wilcox. Resembles the next species, but is broader and the thorax is very differently formed.

30. *S. SEX-MACULATA*.—Minus elongata, nigra dense punctata pubescens, thorace convexo, campanulato, lateribus ad medium subangulatis, antice valde obliquis non rotundatis, elytris flavis, lateribus subsinuatis, apice subtruncatis, paulo dehiscentibus, margine basali, sutura fasciis 2 interruptis apiceque nigris; antennis tibiis tarsisque rufescentibus. Long. .4.

*Leptura 6-maculata*, Lin.: Kb. N. Z. 182 .

The anterior fascia is composed on each side of 3 confluent spots. I have a variety in which the second fascia is entire and much dilated in front. The antennæ are nearly as long as the body, with the fourth joint short.

#### B.

31. *S. NIGRELLA*.—Longiuscula nigra confertim punctata, nigro-pubescens, thorace pube nigra erecta densius vestito, antrorsum angustato, utrinque constricto, linea dorsali tenui lævi, elytris apice oblique emarginatis, punctis postice subtilioribus. Long. .65.

*Leptura nigrella*, Say. J. A. N. S. 5, 279.

*Stenura nigrella*, Hald. 63.

Lake Superior to Georgia.

32. *S. PLEBEJA*.—Longiuscula, nigra confertim punctata, thorace longiusculo, pube longa tenui flava densius piloso, antrorsum parum angustato, linea tenui dorsali lævi, elytris apice oblique emarginatis, testaceis punctis postice subtilioribus. Long. .52.

*Leptura plebeja!* Rand. B. Jr. 2, 28.

Maine and Lake Superior. Very similar to the preceding, but the thorax is rather more elongate, and the hair with which it is covered is yellow, and not erect.

#### Species mihi ignota, sectionis incertæ.

33. *S. TENUIOR*.—Nigra pube flava, elytris flavo 4-fasciatis, pedibus abdomineque testaceis. Long. 5½ lin.

*Leptura tenuior*, Kb. N. Z. 181.

Canada. Resembles *Leptura 4-fasciata* of Europe. Probably belongs to A.—3.

#### TYPOCERUS.

Caput pone oculos subito valde constrictum.

Palpi vix dilatati, labiales non latiores.

Antennæ sub-12-articulatæ, articulis 6-11 compressis utrinque impressis.

Thorax angulis posticis productis.



This genus is very close to the preceding, and only differs in the structure of the antennæ. These organs in the male are rather thick, with the sixth and following joints compressed. Carinated on the edge, with a denuded granulated elliptical impression of each side; the eleventh joint is constricted in the middle and furnished with two pairs of impressions. In the female the antennæ are less compressed, the side not carinated, the impressions are smaller than in the male, those on the external surface being sometimes scarcely visible. The body is arched, and narrowed at each end.

#### A. Antennarum articulo 6<sup>to</sup> impresso.

1. *T. ZEBRATUS*.—Niger, fulvo pubescens, thorace grosse confertim punctato, margine utrinque aureo villosa, lateribus vix rotundatis, elytris sat dense punctatis, apice dehiscentibus intus emarginatis, fasciis 4 flavis, basali arcuata; pedibus rufis, tarsis nigris. Long. .4—55.

*Leptura zebra*, Fabr. El. 2, 364.

*L. zebra*, Ol. 73, 3, 33.

*L. nitens*? Forster Cent. Ins. 45.

*Stenura zebra*, Hald. 62.

New York to Georgia. Common.

2. *T. FUGAX*.—Niger, dense fulvo-pubescens, thorace confertim subtilius punctato, lateribus parum rotundatis, elytris rufis sat dense punctatis apice dehiscentibus, intus emarginatis, rufis fasciis 4 flavis plus minusve obsolete, margine basali nigro, ano pedibusque rufis, tarsis fuscis. Long. .46.

*Leptura fugax*, Fabr. El. 2, 359.

*L. velutina*, Ol. 73, 3, 32.

In the male the abdomen is frequently entirely rufous. Found everywhere.

3. *T. LUNATUS*.—Niger pubescens, thorace convexo, grossius foveatim punctato, margine postico aureo-piloso, elytris sat dense punctatis, apice paulo dehiscentibus, intus emarginatis, macula utrinque arcuata basali fulva, humeris relictis nigris. Long. .36.

*Leptura lunata*, Fabr. 2, 360.

*Stenura lunata*, Dej. Hald. 63.

*Leptura arcuata*, Ol. 73, po. 46 : tab. 4, 47.

Pennsylvania to Georgia.

4. *T. LUGUBRIS*.—Niger pubescens, thorace convexo, subtilius punctato, lateribus modice rotundatis, scutello argenteo-piloso, elytris confertim subtilius punctatis, apice dehiscentibus intus emarginatis. Long. .4.

*Leptura lugubris*, Say. J. Ac. 3, 419.

*Stenura lugubris*, Hald. 63.

New York, Pennsylvania.

B. Antennarum articulo 6<sup>to</sup> haud impresso.

5. *T. SINUATUS*.—Niger dense fulvo-pubescent, confertim punctatus, thorace convexo, subcanaliculato, lateribus rotundato, margine antico posticoque aureo-villoso, elytris flavis, sutura fascia ante medium, alteraque extrorsum latiore pone medium, macula laterali ad medium, apiceque nigris, pedibus rufis. Long. .5.

*Leptura sinuata*, Nm. Entom.

Var. *Stenura 8-notata*, Hald. 62.

Pennsylvania, Maryland, and Missouri Territory. The bands of the elytra are sometimes rufous: sometimes too they are reduced to submarginal spots: the latter is the variety described by Haldeman. For a very complete series of this species I am indebted to my friend Professor Agassiz.

Species forte hujus generis, mihi ignotæ.

6. *T. DISTANS*.—Thorace conico, punctatus, ater, fascia inter oculos thoracisque lateribus fulvis, elytris apice latioribus, subtruncatis.

*Leptura distans*, Germ. Ins. Nov. 524.

Kentucky. On account of the peculiar form of the elytra, this species may belong to *Euryptera*, Serv.

7. *T. LATERALIS*.—Ater thoracis lateribus humerisque elytrorum rufis.

*Leptura lateralis*, Ol. 73, 3, 37.

The figure represents it as being of the size and form of *T. lunatus*.

8. *T. BADIUS*.—Niger aureo-lanuginosus, elytris badiis, vestigiis incertis flavis, pedes badii, thorax crebro punctis punctatus puncti magnis profundis. Long. .65.

*Leptura bedia*, Nm. Entom.

Seems to be similar to *T. fugax*, but much larger.

9. *T. NOBILIS*.—Aureo lanuginosus, caput et thorax fusca, antennæ nigræ, elytra flava, apicibus humerisque ferrugineis, fasciis 3 nigris ornata, thorax subtiliter punctatus, pedes et abdomen lutea. Long. .5.

*Leptura nobilis*, Nm. Entom.

He says it is similar to *T. fugax*, and *zebratus*.

10. *T. ABDOMINALIS*.—Niger abdomine sanguineo, ano nigro. Long. 8 lin.

*Stenura abdominalis*, Dej. Cat. Hald. 63.

Georgia.

LEPTURA, *Lin.**Leptura*, Dej. *Trigonarthis*, Dej. *Grammoptera*, Serv.

Caput pone oculos subito valde constrictum.

Palpi vix dilatati, labiales vix latiores.

Antennæ 11-articulatæ, articulis haud impressis.

Thorax angulis posticis haud productis.

Differs from *Strangalia* in the form of the thorax alone. Our species may be arranged into seven groups, as follows :

- A. Thorace postice modice constricto, elytris triangularibus fere glabris, grossius punctatis.
  - a. Elytris apice incisis. Sp. 1—3.
  - b. Elytris divaricatis, fere integris. Sp. 4—5.
- B. Thorace longiusculo, utrinque subconstricto, elytris parallelis, truncatis fere glabris. Sp. 6—8.
- C. Thorace globoso, utrinque constricto, elytris parallelis integris. Sp. 9.
- D. Thorace convexo, canaliculato, lateribus subangulato.
  - a. Elytris parallelis parum pubescentibus. Sp. 10—11.
  - b. Elytris triangularibus truncatis, valde pubescentibus. Sp. 12—14.
- E. Thorace lateribus parum rotundato, elytris elongatis, vix triangularibus. Sp. 15—18.

## A.—a.

1. *L. CANADENSIS*.—Nigra parum pubescens, thorace elongatulo, antrorsum angustato, cribratim punctato, elytris dense grosseque punctatis, punctis versus apicem subtilioribus, basi sanguineis. Long. .47—.65. ♂ antennis elongatis serratis concoloribus. *L. tenuicornis*, Hald. 64.  
♀ antennis articulis 3, 4, 5, 7 et 9 basi pallidis, 6 et 8 pallidis apice nigris.  
*L. canadensis*, Fabr. El. 2, 357 : Ol. 73, 27.

Georgia, New York, Canada.

2. *C. ERYTHROPTERA*.—Nigra parum pubescens, thorace latitudine non longiore, antrorsum angustato, lateribus rotundatis, cribroso; elytris sanguineis dense grossius punctatis, subtilius versus apicem. Long. .7.  
Kirby N. Z. 180.  
*Leptura cinnamoptera*, Hald. 64.

New York and Missouri Territory. I have never seen a male : the female has antennæ like the preceding. Mr. Haldeman changed the name of this species, believing Kirby's to be preoccupied by Germar : but Say's *Leptura rubrica* having priority by one year, this necessity is obviated.

3. *L. RUBRICA*.—Nigra, thorace flavo pubescente, longiusculo, antrorsum angustato, lateribus rotundatis, cribroso, elytris sanguineis, minus dense grosse punctatis, subtilius versus apicem, antennis articulis 6—10 pallidis apice nigris. Long. .45—.6.  
Say J. A. N. S. 3, 418, (1824.)  
*Leptura erythroptera*, Germ. Ins. Nov. 522, (1825.)

New York to Georgia. The male has the abdomen sanguineous.



A.—*b*.

4. *L. CIRCUMDATA*.—Nigra, breviter parce pubescens, thorace elongatulo, subcampanulato, cribroso, elytris grosse punctatis, pallidis margine apiceque nigris. Long. ·27.

Ol. 73, 4, 48. : Hald. 65.

Pennsylvania ; rare.

5. *L. VAGANS*.—Nigra thorace pubescente, globoso, antrorsum angustato, cribroso, elytris grosse punctatis, apice valde dehiscentibus, antennis articulis 6—10 basi pallidis. Long. ·42.

Variat. *a.* humeris sanguineo rufis : Ol. 73, 46.

*β.* macula humerali, alteraque magna apicali rufis.

*γ.* elytris fulvo-rufis, sutura maculaque discoidali communi nigris.

*δ.* elytris fulvo-testaceis.

*L. brevis*, Kb. N. Z. 182.

Pennsylvania and New York.

## B.

6. *L. 8-NOTATA*.—Valde elongata, nigra nitida pube flava erecta parce vestita, thorace elongato, utrinque impresso, subtilius punctato, elytris thorace plus sesqui latioribus subparallelis minus dense punctatis, maculis utrinque 4 seriatim posticis flavis, pedibus posticis basi cum tarsis flavis. Long. ·45.

Say J. A. N. S. 3, 419.

*Leptura stictica*, Nm. Entom.

Var. *L. 4-punctata*, Hald. 64.

New York, Pennsylvania and Mississippi. The variety is in Dr. Melsheimer's collection : in it the two anterior pairs of spots are obsolete.

7. *L. VITTATA*.—Elongata nigra nitida parce pubescens, capite dense punctato, plaga pone oculos lævi, thorace elongata, postice impresso, parce punctato, densius ad latera, elytris parallelis, apice subtruncatis, thorace latioribus, versus scutellum impressis, minus dense grossius punctatis, subtilius ad apicem, vitta lutea a basi ultra medium extendente. Long. ·45.

Ol. 73, 45.

*Leptura abbreviata*, Germ. Ins. Nov.

*L. semivittata*, Kirby N. Z. 183.

New York, Alabama. The third, fourth, and fifth joints of the antennæ are equal. The outline of the vitta is sinuous externally. The luteous color sometimes extends to the margin. The female has a shorter and more inflated thorax.

8. *L. PUBERA*.—Nigra nitida cinereo-pubescens, thorace convexo, latitudine non longiore, subcampanulato, lateribus rotundato, dense punctato, parcius in disco, elytris subparallelis apice truncato-emarginatis, grossius minus dense punctatis, subtilius versus apicem. Long. ·3—·37.

Say J. A. N. S. 5, 279.

New York, Georgia, Lake Superior. The male has the thorax elongate and scarcely rounded on the sides.

## C.

9. *L. SPHERICOLLIS*.—Nigra nitida, capite thoraceque impunctatis, hoc glabro, utrinque valde constricto, elytris parallelis, apice rotundatis, sat dense punctatis, breviter cinereo-pubescentibus, pedibus plus minusve testaceis. Long. .32.

Say J. A. N. S. 5, 280.

*Leptura paupercula*, Nm. Entom.

Varies with the thorax rufo-piceous. *Leptura allecta*? Nm. Ent.

Lake Superior, New York, Ohio.

## D.—a.

10. *L. RUFULA*.—Nigro-picea, subnitida, capite thoraceque confertissime punctatis hoc campanulato, lateribus angulato, disco longitudinaliter late impresso, elytris parallelis testaceo-rufis, sat dense punctatis, breviter pubescentibus, apice oblique subtruncatis, pedibus rufis, genubus tarsisque nigris. Long. .37.

*Pachyta rufula*, Hald. 60.

Lake Superior. The fourth joint of the antennæ is shorter than the fifth.

11. *L. BIFORIS*.—Testacea, parce pubescens, capite thoraceque fuscis, confertim punctatis, hoc convexo, antrorsum angustato, utrinque valde constricto, profunde canaliculato, elytris postice subangustatis, apice oblique truncatis, densius punctatis, subtilius versus apicem macula laterali ad medium fusca. Long. .45—6.

Newman Ent. : Hald. 64.

New York and Pennsylvania. June : rare. The fourth joint of the antennæ is shorter than the fifth.

## D.—b.

12. *L. PROXIMA*.—Latiuscula, nigra, capite thoraceque pube erecta flava dense vestitis, confertissime punctatis, hoc brevi, convexo, antrorsum valde angustato, lateribus subangulatis, basi profunde constricto, disco late canaliculato, elytris luteo-testaceis, confertim punctatis, apice truncata late nigra. Long. .55—7.

Say J. A. N. S. 3, 420.

*Leptura subpubescens*, Kb. N. Z. 180.

*Trigonarthris proxima*, Hald. 65.

*T. terminata*, Dej. Cat.

Lake Superior, Missouri Territory, Maine, and Pennsylvania : rare.

The male is narrower and shaped like *L. chrysocoma*. This species with the next constitutes Dejean's genus *Trigonarthris*. They only differ from other *Lepturæ* in having the intermediate tarsi as broad and as short as the anterior pair. They are, however, more dilated in the males, and, moreover, are not alike in all *Lepturæ* : for these reasons I have thought it more natural to replace these species among the genuine *Lepturæ*.

13. *L. ATRATA*.—Brevis nigra, capite thoraceque pube erecta flava dense vestitis, confertim punctatis, hoc convexo, antrorsum valde angustato, basi constricto, lateribus subangulatis disco subcanaliculato, elytris postice angustatis confertim punctatis, subtilius versus apicem, hoc late truncato. Long. .56.

*Trigonarthris atrata*, Dej. Cat.

Georgia : very rare.

- 14.—*L. CHRYSOCOMA*.—Niger dense aureo-pubescens, thorace cribroso, convexo, antrorsum valde angustato lateribus valde rotundatis, postice modice constricto subcanaliculato, elytris postice angustatis, apice truncatis, rufo-testaceis, margine postice infuscato, confertissime subtiliter rugose punctatis. Long. .6.

Kirby N. Z. 179 : tab. 5, fig. 2.

*Leptura iridis*, Dej. Cat.

Found in the Northern part of New York, and at Lake Superior on roses and iris  
The male is narrower than the female, and has longer antennæ.

### E.

15. *L. AURIPILIS*.—Nigra dense aureo-pubescens, thorace confertissime punctato, convexo, antrorsum modice angustato, lateribus paulo rotundatis, canaliculato, elytris postice angustatis, apice truncatis, rufo-testaceis, confertissime subtiliter punctato rugosis, ano, tibiis tarsisque rufis. Long. .6.

Santa Fé, New Mexico. This species is very similar to the preceding, but the form of the thorax at once distinguishes it.

Subelongate, black, densely covered with golden hair, head and thorax densely punctured, the latter scarcely as wide as long, somewhat narrowed in front, slightly constricted behind, disc convex finely canaliculate, sides slightly rounded. Elytra one-half wider than the thorax, narrowed behind, where they are slightly divergent and truncate, rufo-testaceous, covered with very fine punctures. Beneath black, covered with golden hair, margin of the abdominal segments and anus testaceous. Feet black, tibiæ and tarsi rufous.

16. *L. TIBIALIS*.—Nigra, breviter flavo-pubescens, capite thoraceque confertissime punctatis, hoc convexo antice parum angustato, apice basique constricto, lateribus vix rotundato, elytris confertim punctatis, subparallelis, apice paulo dehiscentibus, introrsum oblique leviter truncatis, macula laterali ad medium, altera majore pone medium apiceque nigris, tibiis tarsisque flavis, illis apice fuscis. Long. .43.

Lec. in Agass. Exp.

One specimen. St. Ignace, Lake Superior.

17. *L. QUADRICOLLIS*.—Elongata, nigra capite thoraceque confertissime punctatis, dense flavo-pilosis, hoc quadrato, convexo, antrorsum non angustato, elytris postice subangustatis, grossius sat dense punctatis. Long. .41.

Vermont. Professor C. B. Adams. Elongate black, beneath covered with thick yellow pubescence, head and thorax very thickly punctured, almost granulate, the



latter square, not narrowed in front, apex very slightly constricted, disc convex, covered with long erect yellow hair. Elytra a little wider than the thorax, slightly narrowed behind; disc depressed, tip scarcely truncate; tolerably thickly covered with large punctures, which become smaller behind. Antennæ nearly as long as the body, third and fourth joints shorter than the fifth.

18. *L. MUTABILIS*.—Elongata depressa, nigra breviter cinereo-pubescentis, capite thoraceque confertissime punctatis, hoc quadrato, antrorsum parum angustato, utrinque leviter impresso, elytris postice vix angustatus, apice subtruncatis, dense punctatis, nunc nigris, nunc testaceis apice nigris. Long. .4.—.52. Newman Entom.

*Leptura luridipennis*, Hald. 65.

Found from Lake Superior to Alabama.

Species hujus generis mihi ignotæ.

19. *L. INTERRUPTA*.—‘Hirta parallela, nigra utriusque elytri vitta ante medium interrupta testacea, caput et thorax hirta nullo modo nitida; elytra crebre punctata, sternum et abdomen lanugine argentea obsita. Long. .425.’

Newman Ent.

20. *L. VIBEX*.—Caput nigrum ore flavido, antennis fuscis, thorax convexus, nitidus niger; elytra nigra, utriusque vitta albida e basi ultra medium extendente, pedes pallidi, profemoribus macula minuta, meso- et meta-femoribus apice late nigris. Long. .325.

Newman Ent.

“Allied to *Leptura longicornis*, Kirby.” The shape of the head and eyes is not mentioned. This species may be an *Acmeops*.

21. *L. GULOSA*.—‘Linearis, nigra supra nitida, subtus argenteo-sericea, gula rufescente, elytris vitta postice abbreviata lutea, apice truncatis. Long. 5 lin.’

Kirby N. Z. 184.

Nova Scotia. Very near to *L. vittata*, but the throat is red, and the fifth joint of the antennæ is longer than the fourth.

Species ignotæ, generis incerti.

‘*PACHYTA LITURATA*.—Atra villosa-incana, elytris nudis, luridis, lituris tribus nigris, anticis duabus subparallelis. Long. 7—9 lin.’

Kirby N. Z. 178.

Vide note to *Argaleus nitens*.

*LEPTURA BIVITTATA*.—Elytra pale yellowish white, with two black vittæ on each. Long. 2.5 inch. Inhabits Missouri.

Say J. A. N. S. 3, 416.

The thorax is obtusely tuberculate on the sides, the elytra rounded at the tip. It seems to be a *Toxotus*.

(To be continued.)

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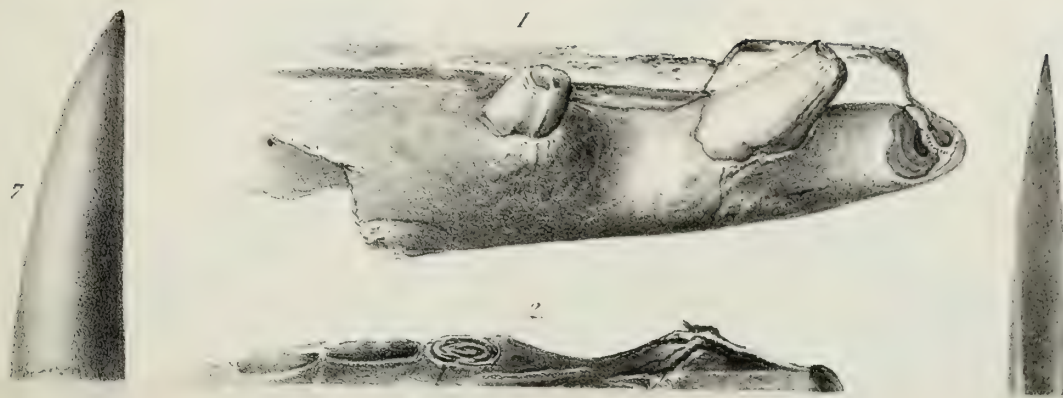
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ERRATA IN VOLUME I.

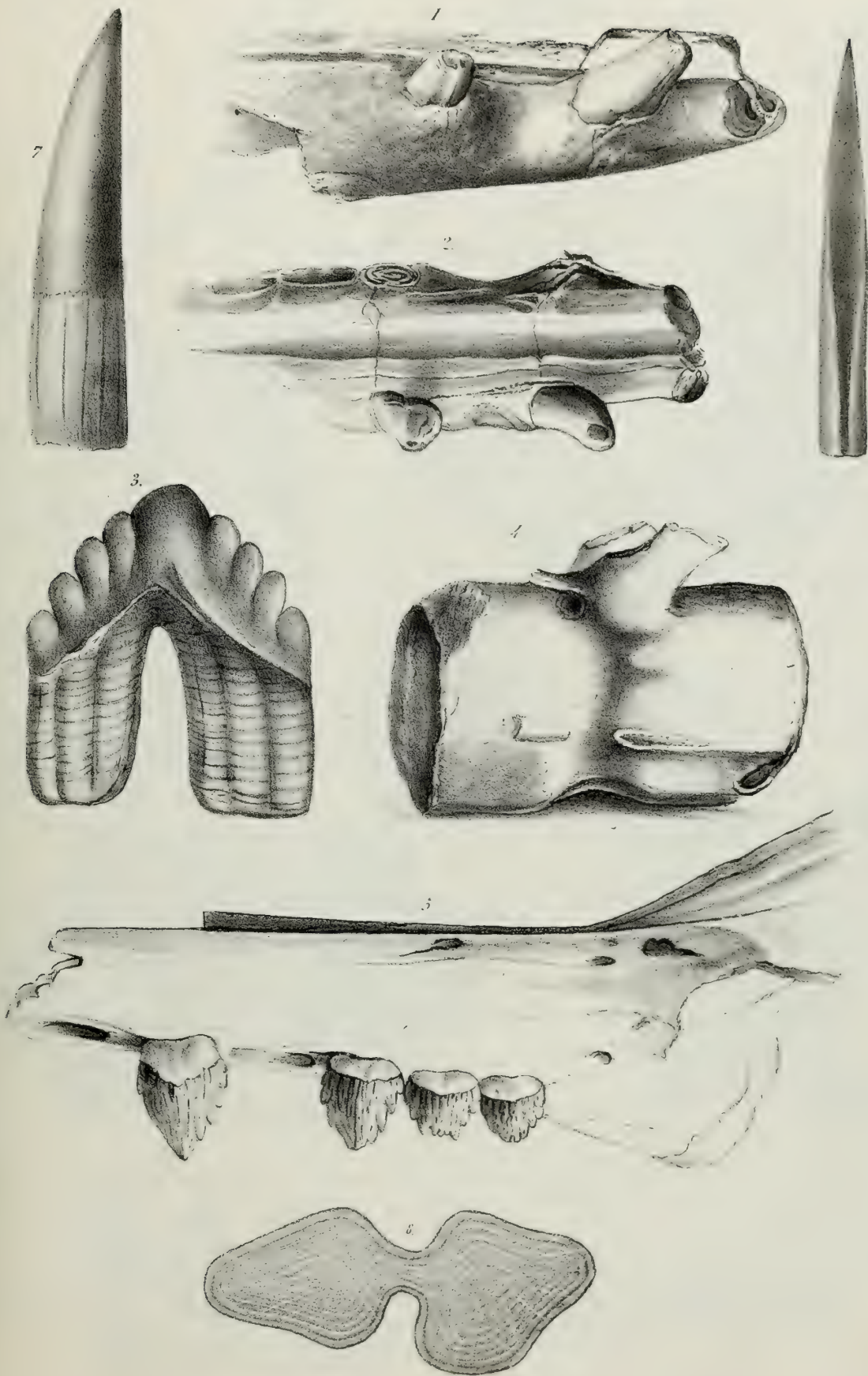
- Page 11. For "monitaur," read "Monitor."  
 Page 14. Line next the last and the last, for "we," read "I."  
 Plate XIX. Three figures are marked "10," the two outer of which should be "9."  
 Page 198. Line 9, read 119 *a*.  
 Plate XXVI. Of the figures marked 119 the lower should be 119 *a*.  
 Page 66. Ninth line from bottom, for *e*. ligula; *f*. oral setæ; read Fig. 2. *a*. ligula; *b*. oral setæ, and in all the succeeding numbers of figures, for 2 read 3, 3—4, 4—5, &c.  
 Page 67. For Fig. 7 read Fig. 8, Fig. 8. read Fig. 9, &c.  
 Page. 214. After PHOLADOMYA insert the following line, PHOLADOMYA ABRUPTA, *Con*.  
 Page 282. Line fifth, for *sphenoidal teeth absent*, read *sphenoidal teeth present*.  
 Page 301. Sixteenth line from bottom, for ecto-vitality read ento-vitality.  
 Plates 28, 29. No plates corresponding to these numbers are to be found in this volume. They have been omitted because the text was never received by the Publication Committee.



- 12.3.4. BASILOS AURUS CETOIDES. *Owen*.  
 5. BASILOS AURUS SQUALODON. *Gratdoup*.  
 6.7. PRISTIS AGASSIZI *Gibbes*.



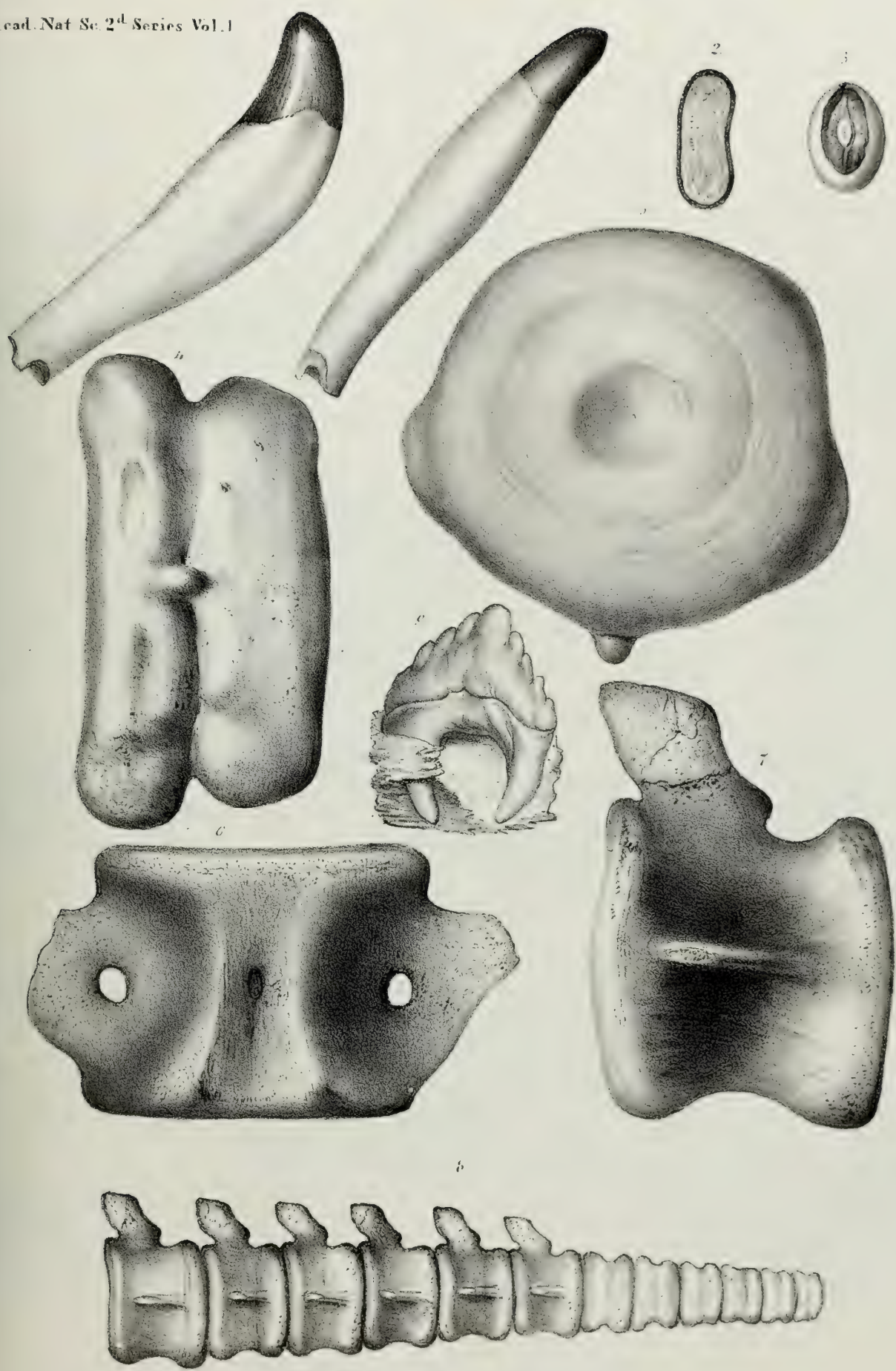
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1.2.3.4. *BASILOSaurus CETOIDES*. Owen.  
5. *BASILOSaurus SQUALODON*. Graciloup.  
6.7. *PRISTIS AGASSIZI* Gibbs.





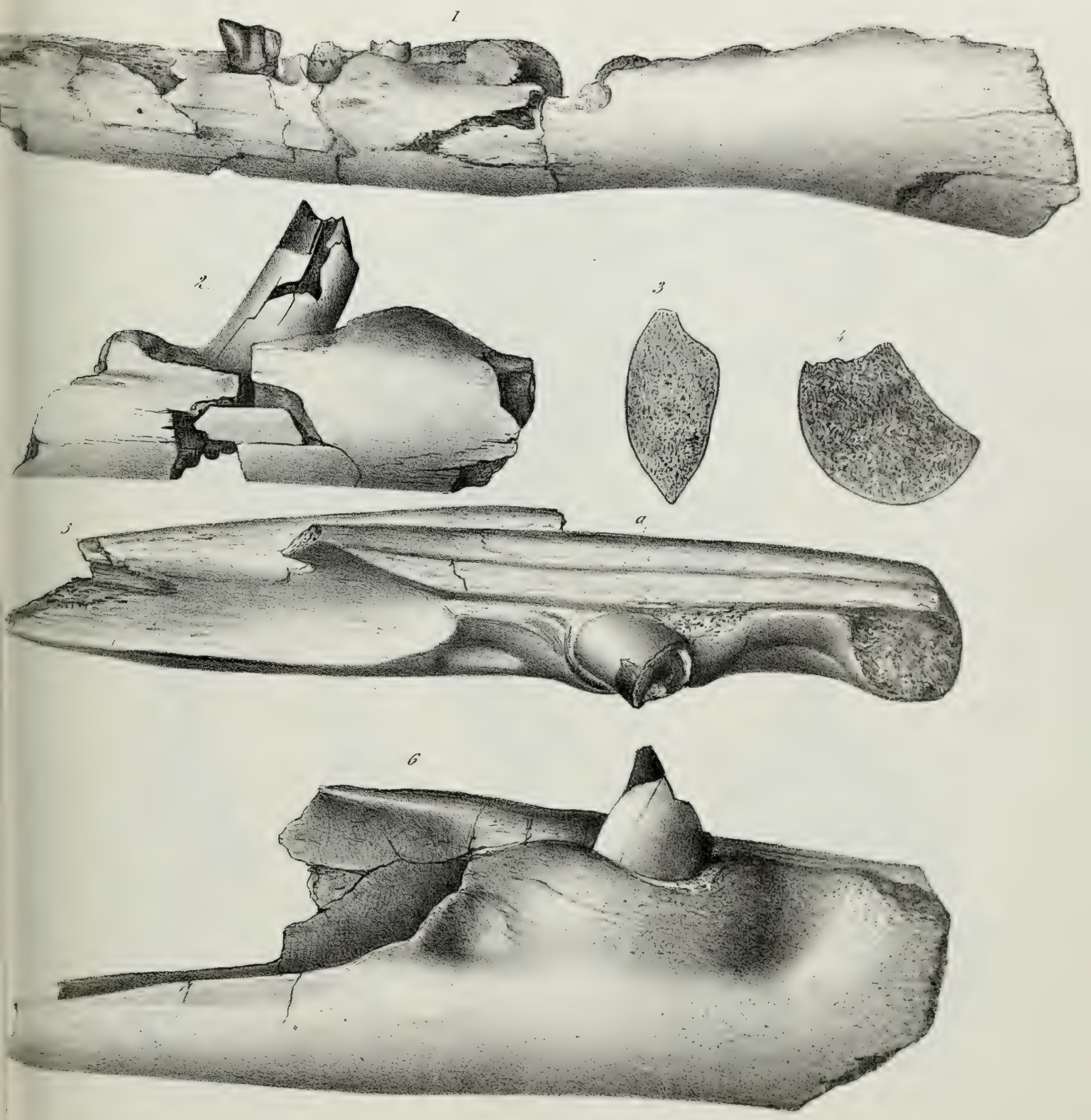


BASILOSARUS CETOIDES *Owen*

*From Nature by Smith*





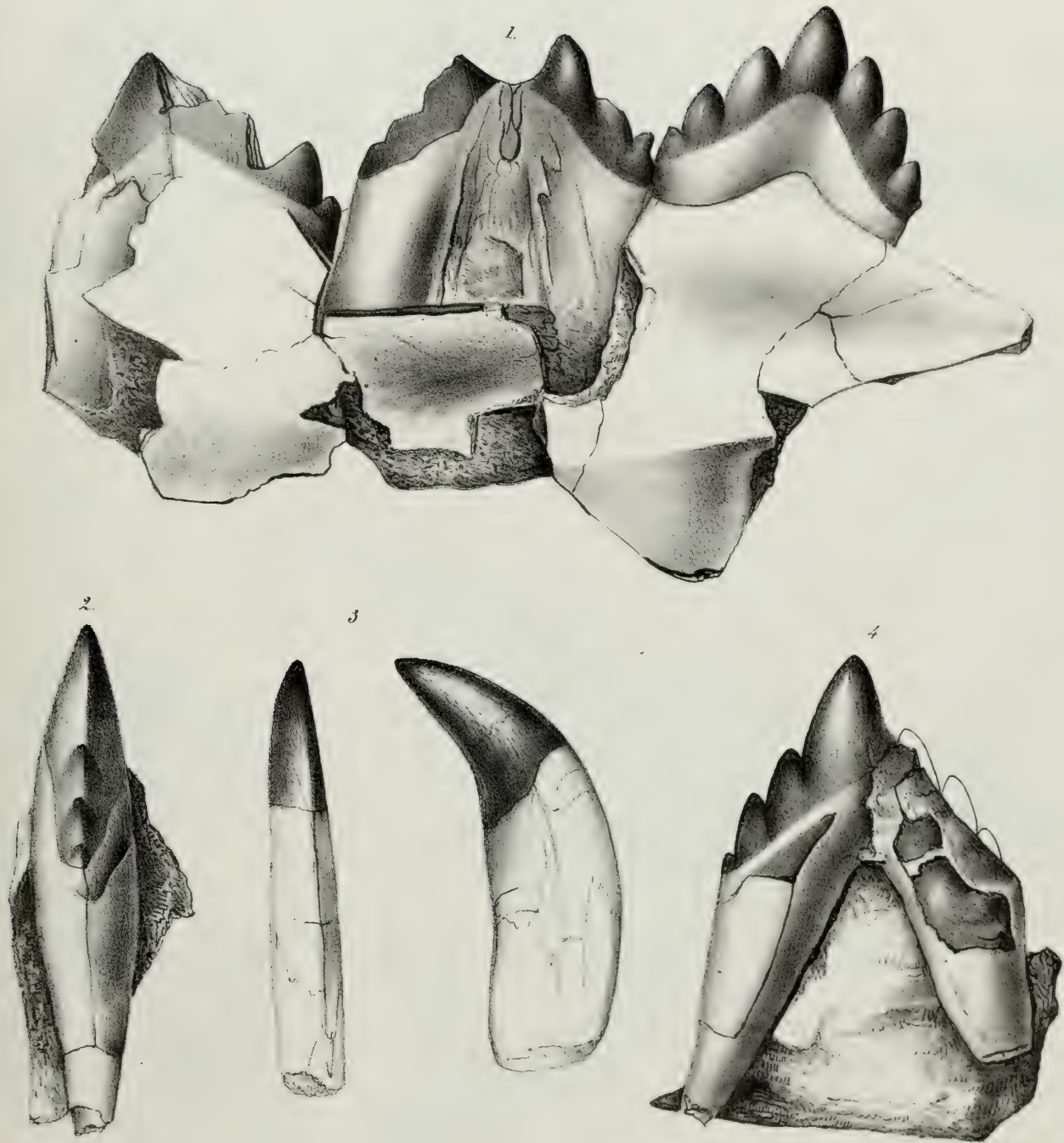


123 *BASILOSaurus SERRATUS*. *Gibbes*  
 456 *BASILOSaurus CETOIDES*. *Owen*

*From Nature by French*





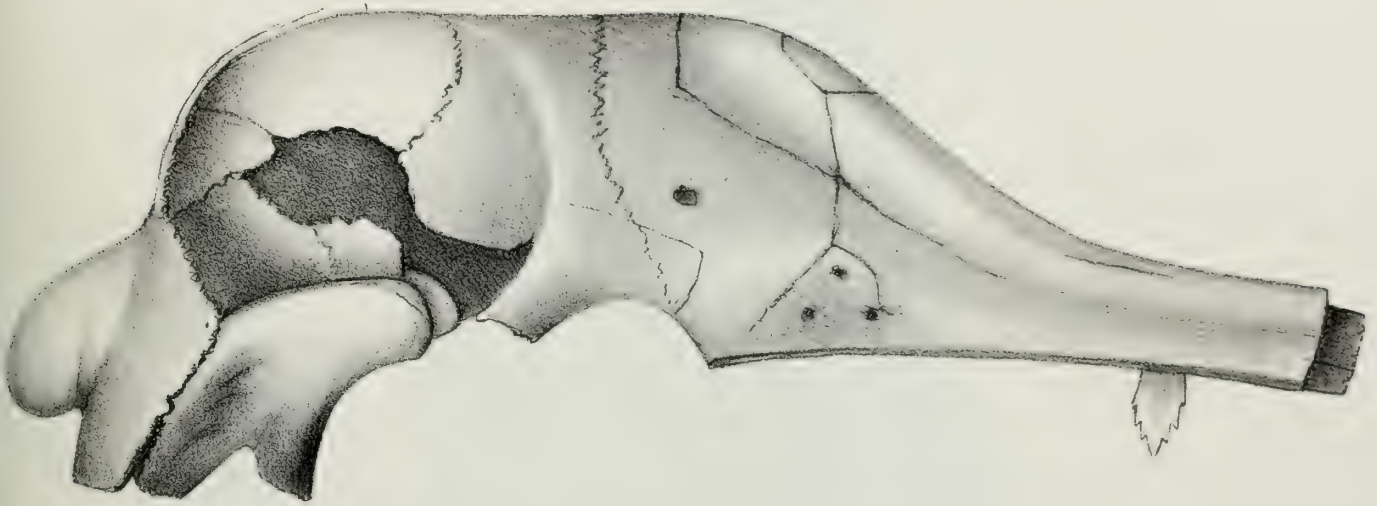


BASILOSAURUS SERRATUS, *Gibbs*.

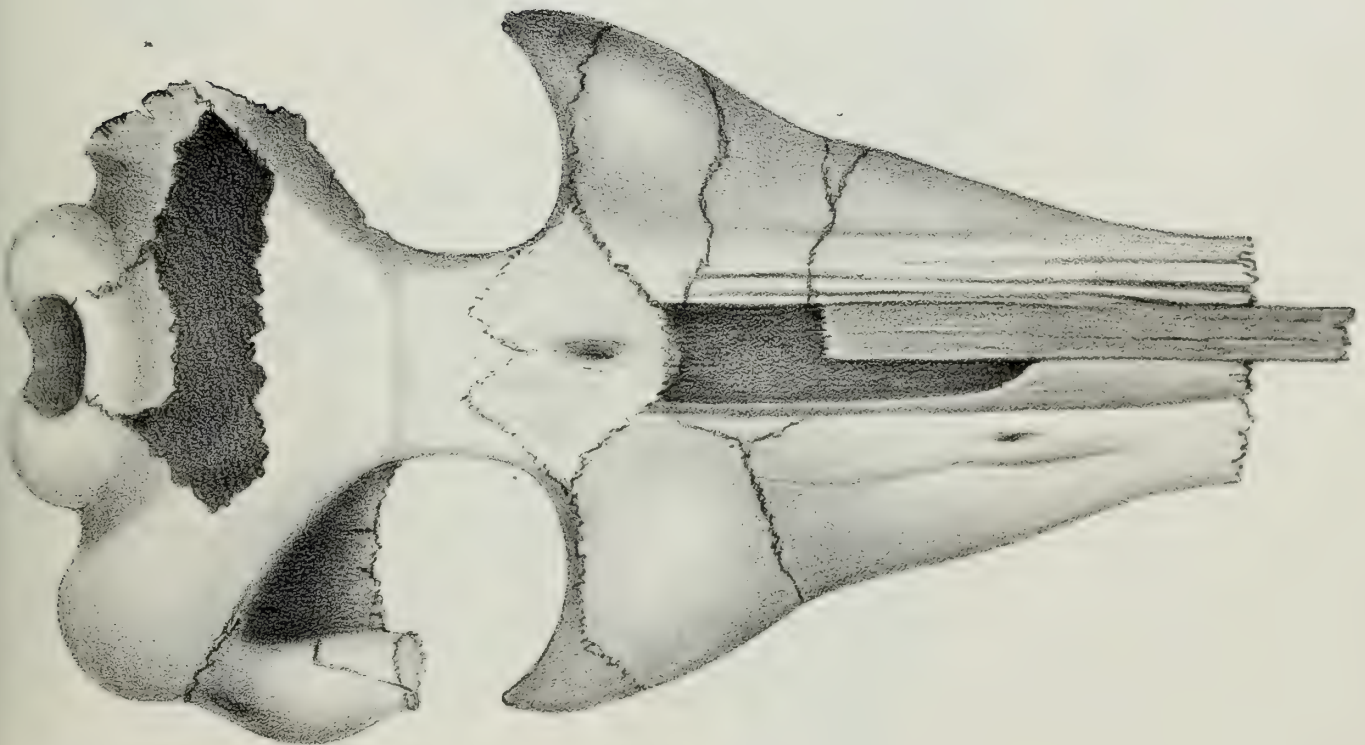




1.



2.

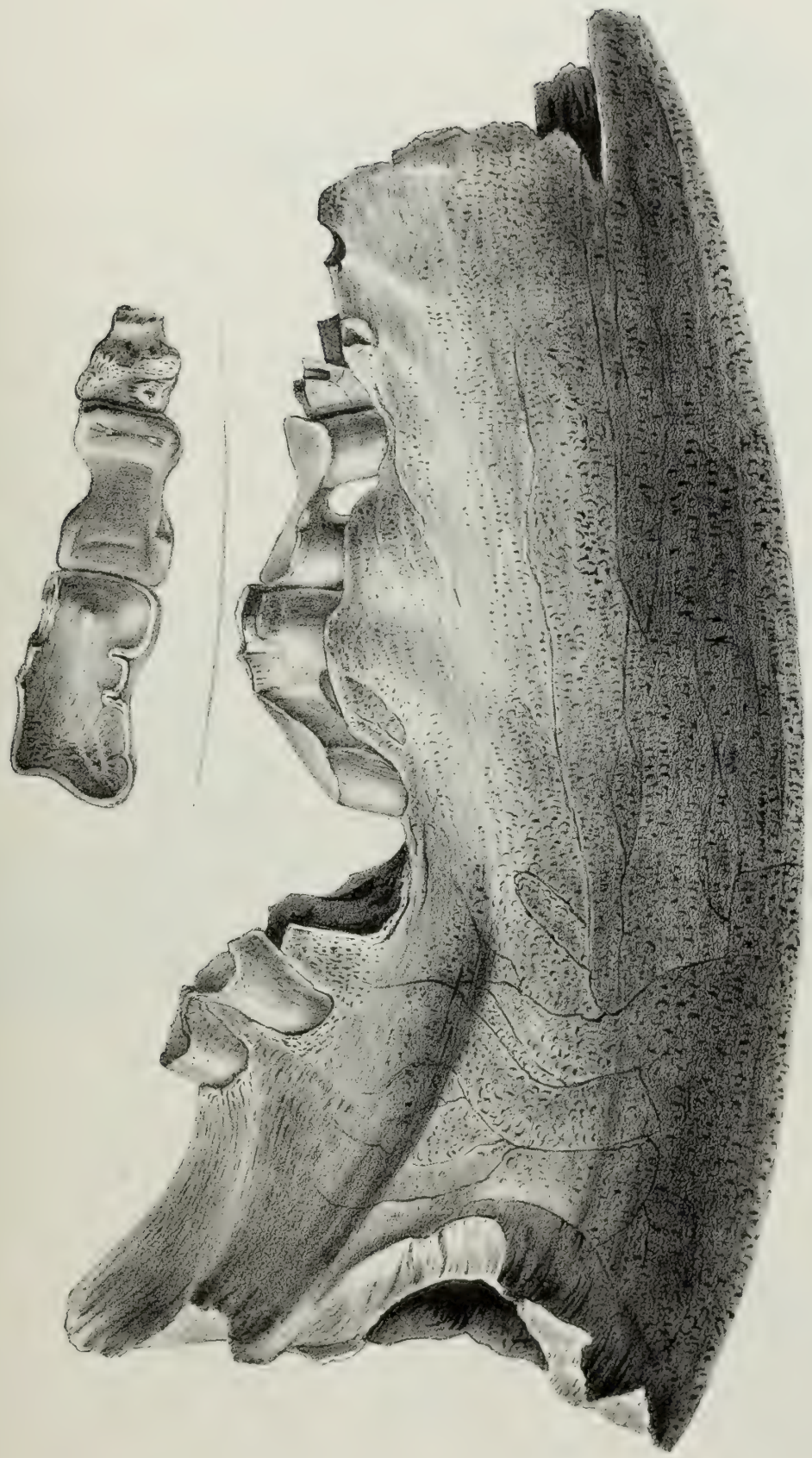


CRANIUM OF BASILOSaurus.

*Lith. of T. Sinclair*



2.



HARLANUS AMERICANUS *Orin*

*See Dunkel's list*

*Exhib. of the Sinclair*







CYMBIDIS WILSONII CASSIN







R. P. Smith Lith. del. Chesnut St. Plate

1. *Parus montanus* 2. *Parus inornatus*  
 3. *Chamaea fasciata*





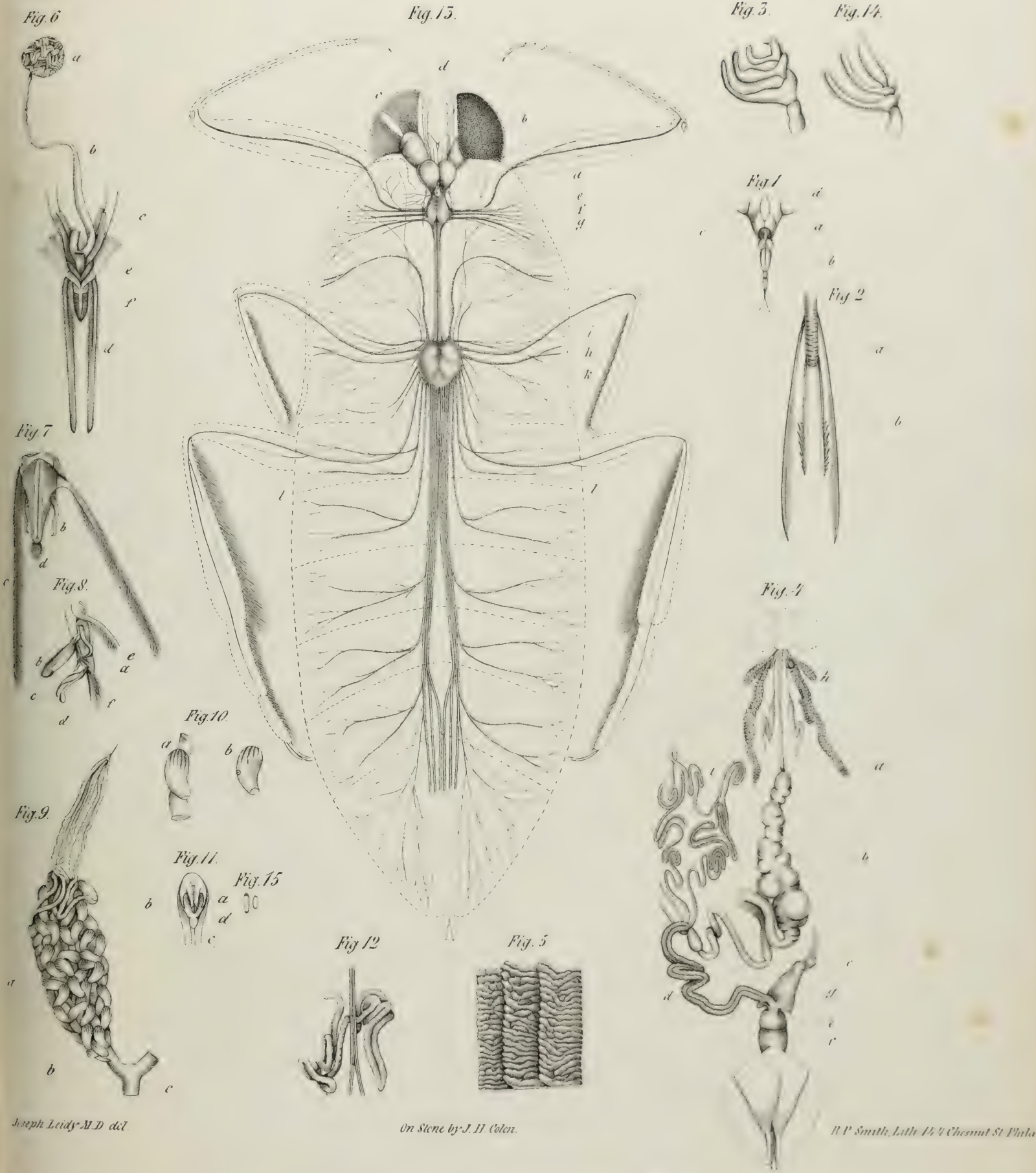


W. P. Smith Lith. 422. Crescent St. Phila.

1. *Zonotrichia chlorura* 2. *Picus scalaris* male 3. *P. f. male*







Joseph Leidy M.D. del.

On Stone by J. H. Cole.

H. P. Smith, Lith. 14 1/2 Chestnut St. Phila.



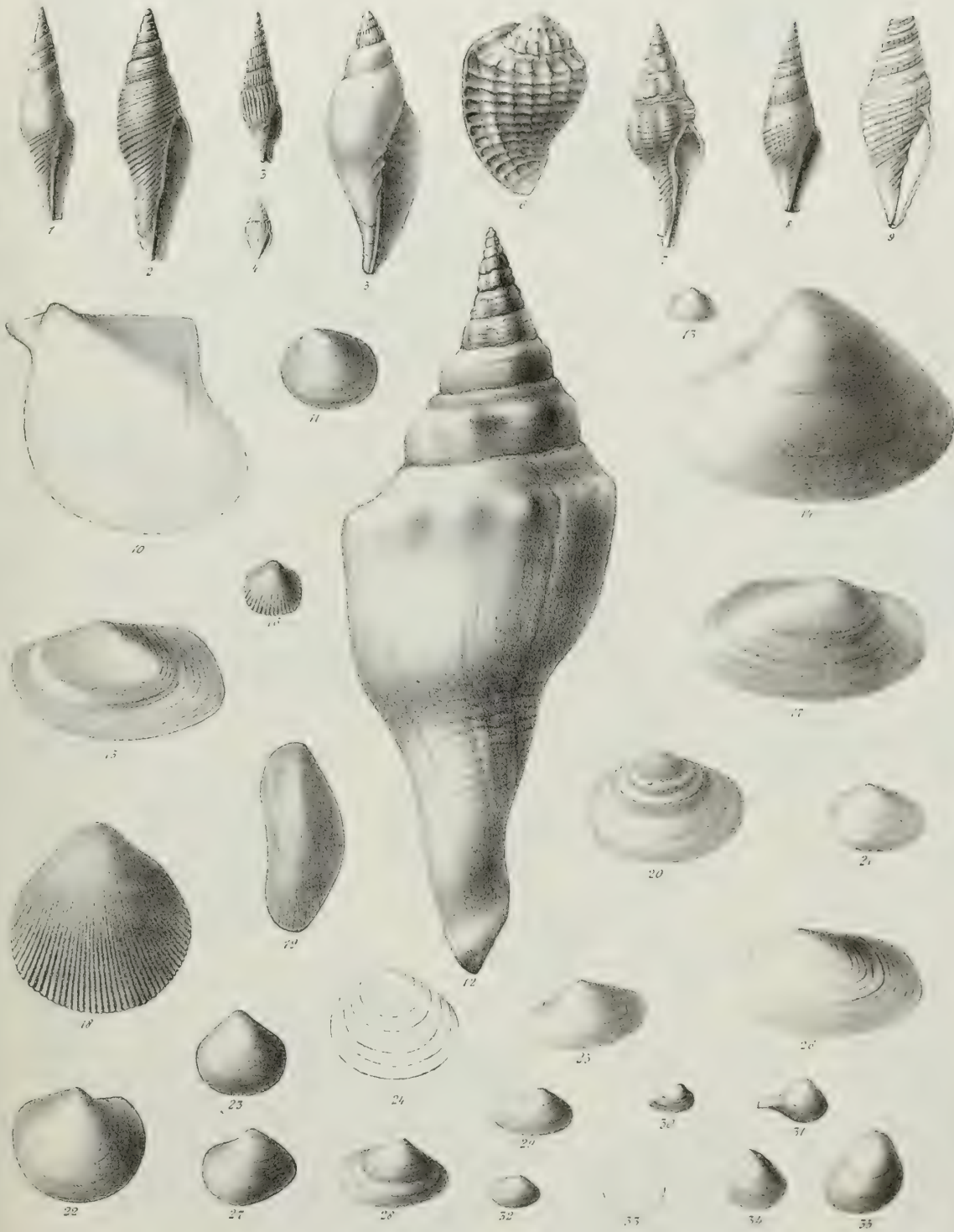


UPPER EOCENE





UPPER EOCENE







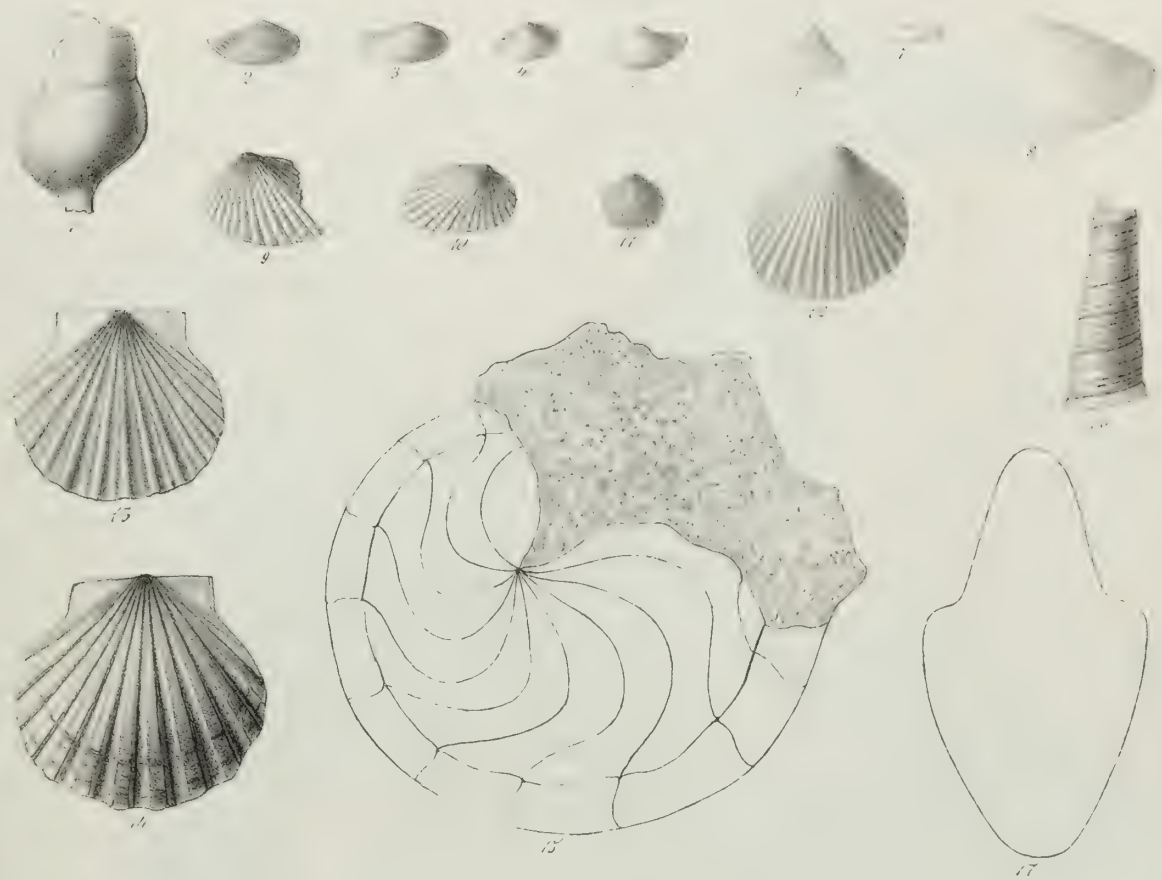
UPPER EOCENE







EOCENE



LOWER EOCENE



From Nature by J. T. Fermé





Peale del.

F. Kuhl's lithog. Press.

P. Kraemer sculp.

*Buceros albos cristatus*, Cassin.







1

2

o/o

Peale del.

F. Kuhl's lib. Pr.

F. Koenig del.

*Icterus* 1. *maculatus*. Cassin. 2. *auricapillus*. Cassin.







00

Wash. Peale del.

F. Kuhl's lithog. Proc. Ph.

P. 1

*Icterus Giraudii*. Cassin.







FOSSIL TEETH OF THE GENUS CHARCHARODON.

*Figs 1 to 6 Charcharodon Megalodon*

*From Nature on Stone by J. Hensel*







FOSSIL TEETH OF THE GENUS *MEGALODON*

Figs. 8, to 9. *C. Megalodon*  
Figs. 10 to 18. *C. Angustidens*

T. Snelcars Lith. Phil.

Drawn nature by J. Trench





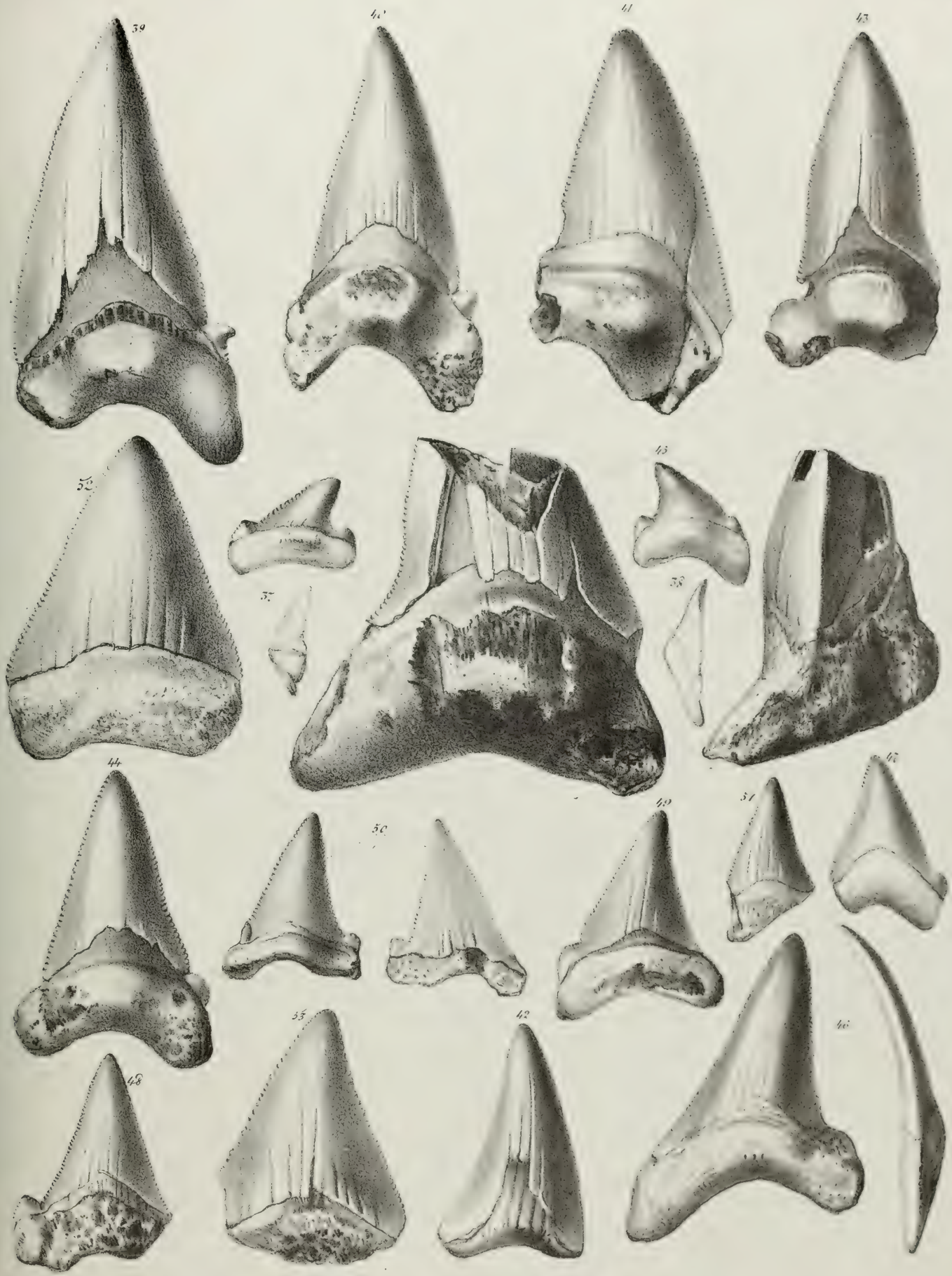


FOSSIL TEETH OF THE GENUS *CHARCHARODON*

Figs 19 to 36. *Angustidens*.







FOSSIL TEETH OF THE GENUS *CHARCHIRODON*.

*Figs. 37, to 38. C. Angustidens.*  
*Figs. 39 to 44. C. Acutidens.*

*Figs. 45. C. Morteni.*  
*Figs. 46 to 51. C. Lancidensis.*

*Figs. 52 to 53. C. Sulcidens.*



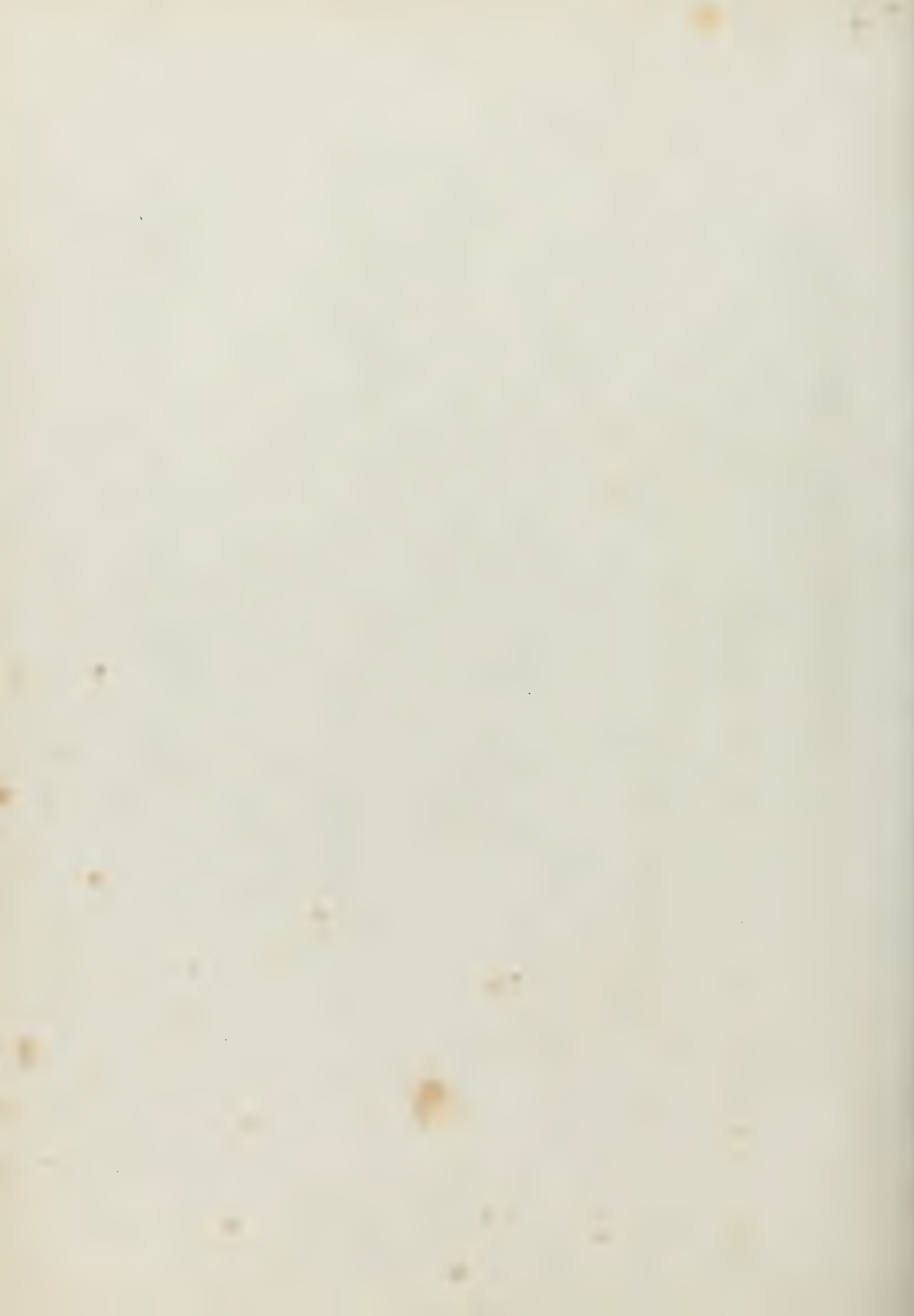




H. Harris del.

*Gambelia speciosa*

*Gleditsia acuta*







H. Harris del.

*Trifolium ciliatum*

*Cressoma Californica*





Miss M. Morris del

*Triphelium denudatum*

*Eucrypsa foliosa*







TEETH OF FOSSIL SQUALIDÆ

*Galeocerdo aduncus.* 54 to 58.  
*latidens.* 59 - 62.  
*minor.* 63 - 65.  
*Egertoni.* 66. 69.  
*pristodentus.* 70

*Galeocerdo contortus.* 71 to 74  
*Hemipristis serra.* 75 - 83.  
*Glyphis subulata.* 86 - 87  
*Sphyrna prisca.* 88 90  
*lata.* 91. 95  
*denticulata.* 94.

*Notidanus primigenius.* 93  
*Lamna elegans.* 96 to 102  
*cuspidata?* 103 106  
*compressa.* 107 112.  
*acuminata.* 113 115







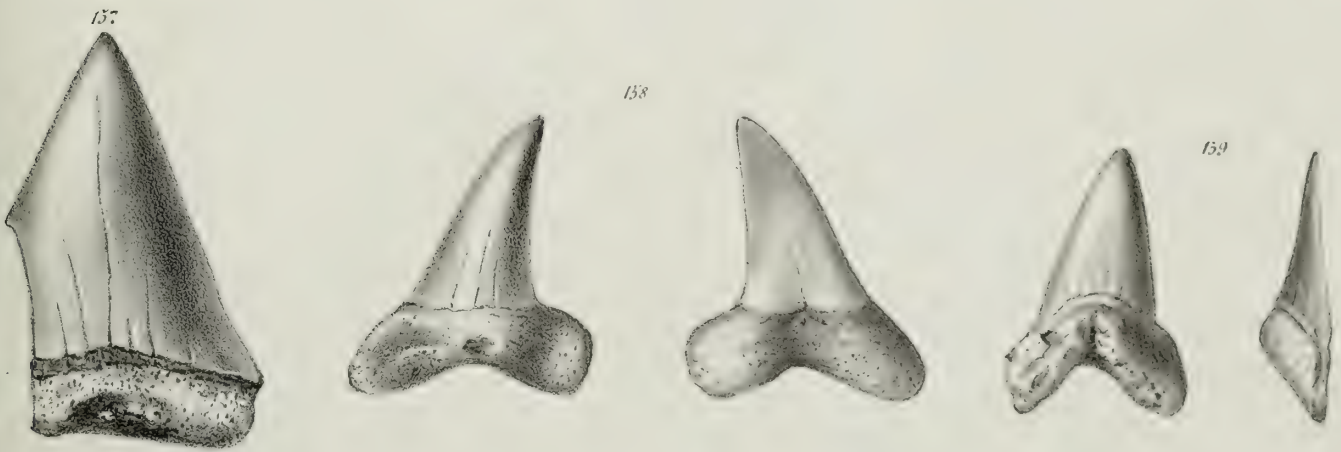
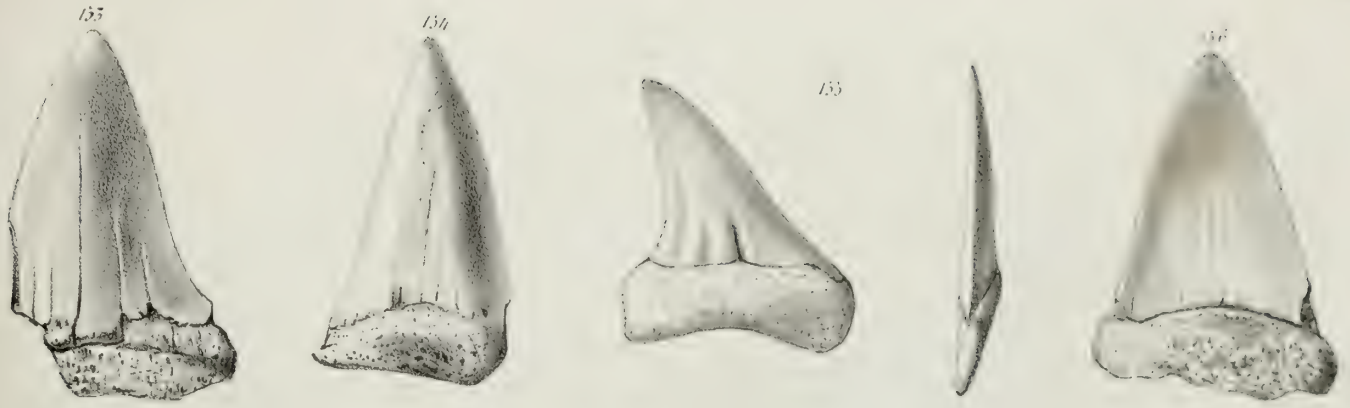
TEETH OF FOSSIL SQUALIDÆ

*Lamna crassidens*. 116 to 118  
*contortidens*. 119  
*Hopci*. 120 to 125  
*verticalis*. 124 to 127

*Lamna gracilis*. 128 to 150  
*Otodus obliquus*. 151, 152  
*appendiculatus* 153, 140  
*levis* 141  
*crassus*. 142

*Otodus macrotus* 143 to 144  
*trigonatus*. 145 to 146  
*apiculatus*. 147  
*Oxyrhina hastalis*. 148 to 158





TEETH OF FOSSIL SQUALIDÆ.

<i>Oxyrhina riphoden</i>	153 to 154	<i>Oxyrhina Mantillii</i>	158	<i>Oxyrhina Deserii</i>	169 to 171
<i>    plicatilis.</i>	155 - 157.	<i>    crassa</i>	159, 160	<i>    Wilsonii</i>	172 - 173
		<i>    minuta</i>	161 to 164		
		<i>    Silliman</i>	165 - 168		







1. *Vidua concolor*, Cassin  
2. *Vidua albonotata*, Cassin

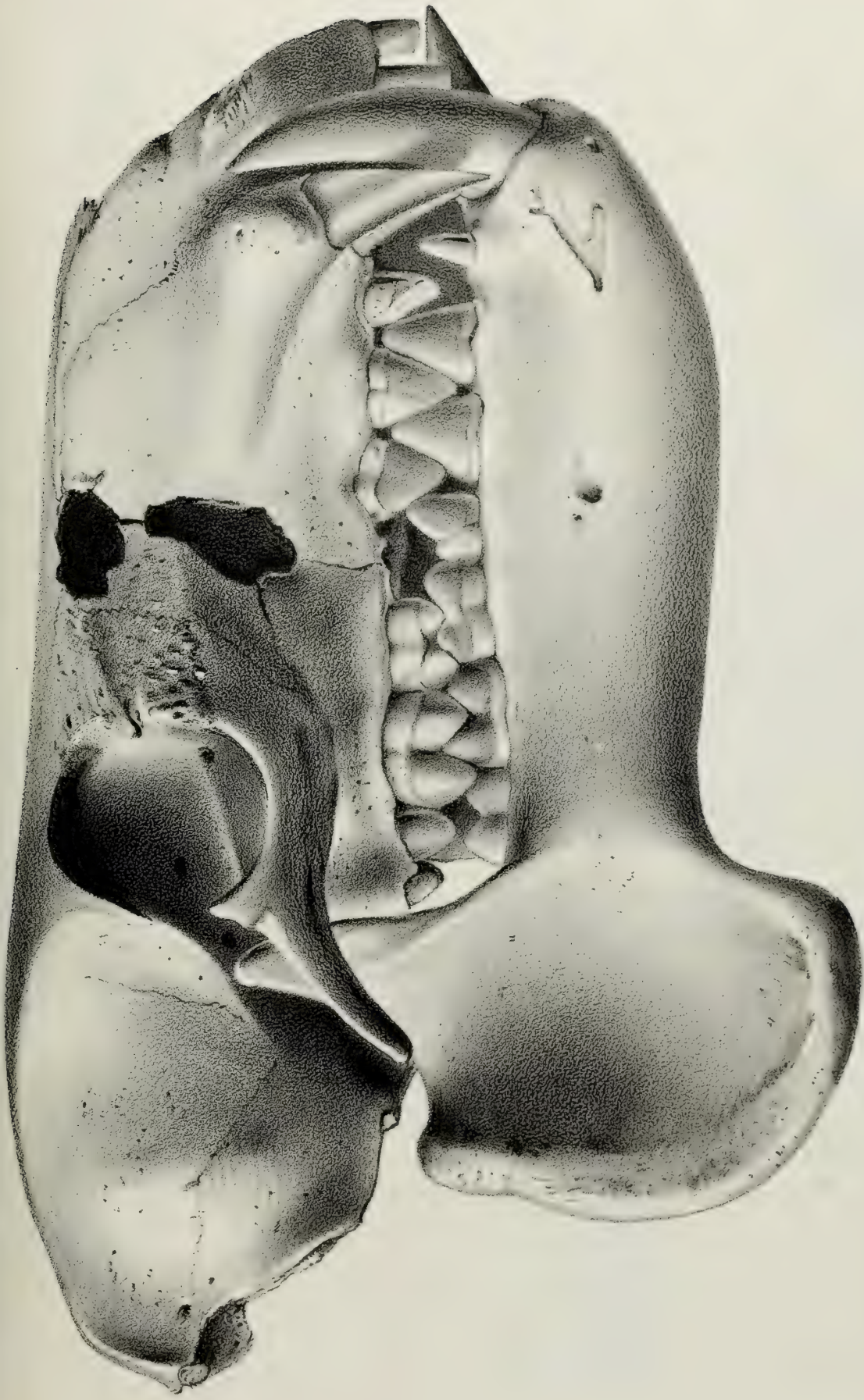






1. *Euplectes nigroventris*, Cassin  
2. *Pyrenestes coccineus*, Cassin



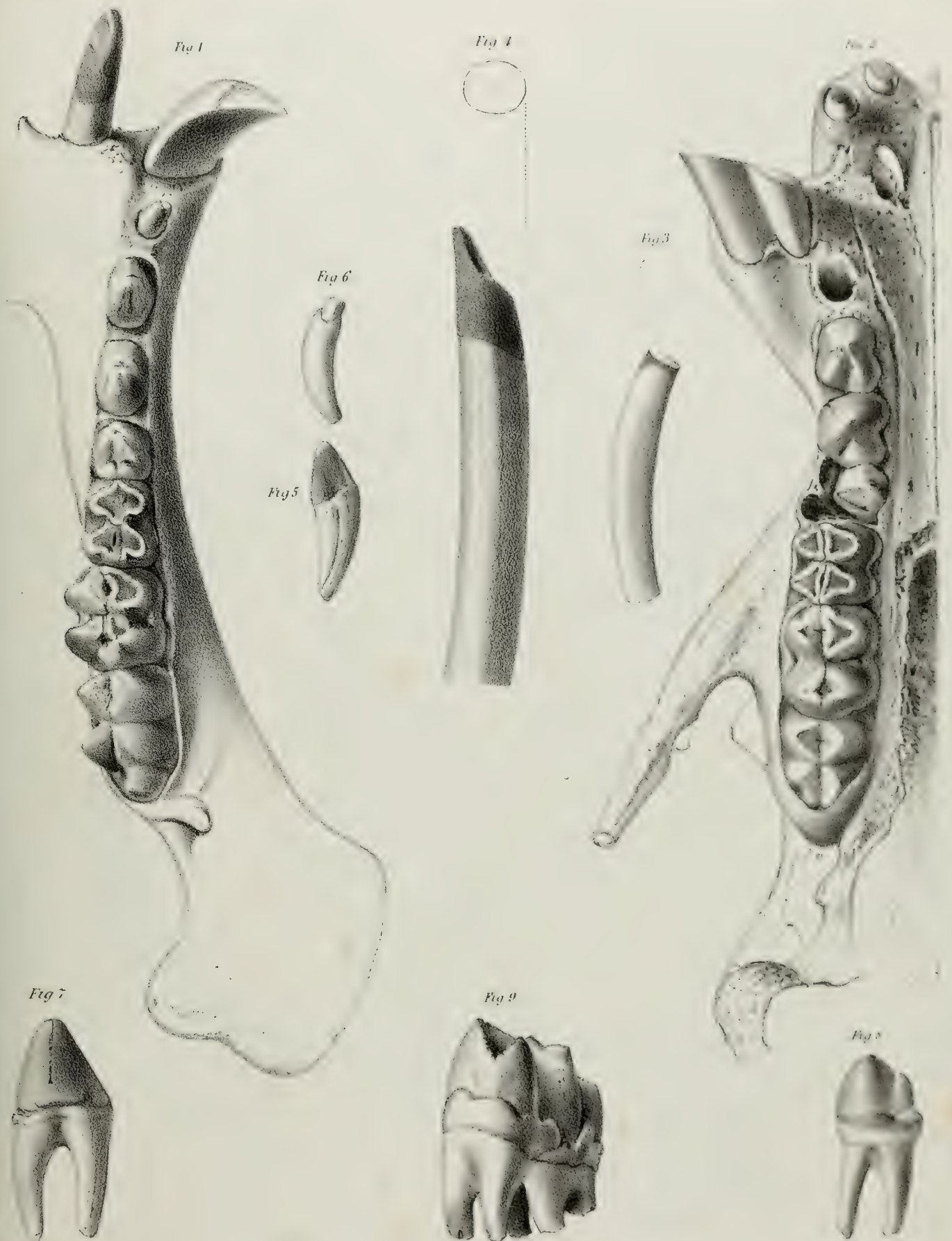


HIPPOPOTAMUS (TETRAPROTODON) LIBERIENSIS. MORTON.

PLATE XXXII.







HIPPOPOTAMUS (TETRAPROTODON) LIBERIENSIS. MORTON.

T. Snelairs Lith. Phila.

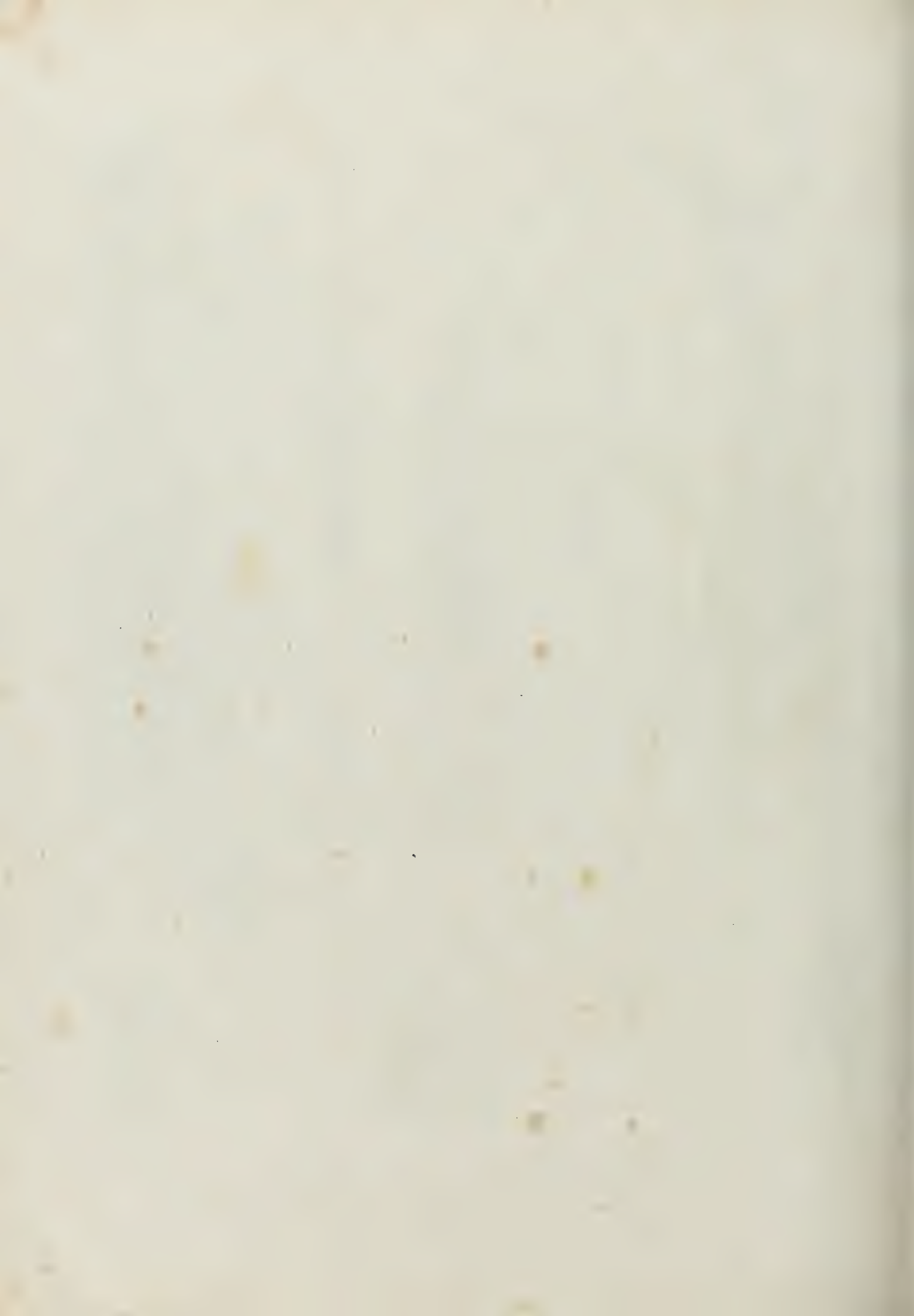




Fig. 4

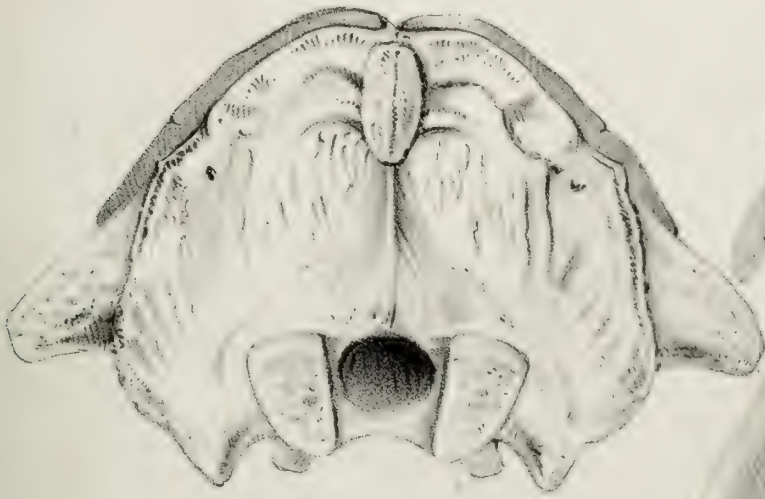


Fig. 3

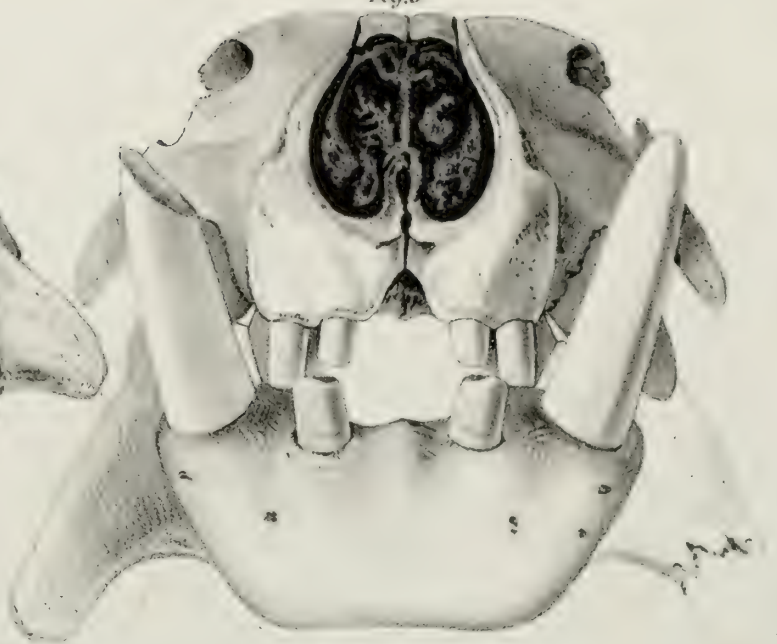


Fig. 1

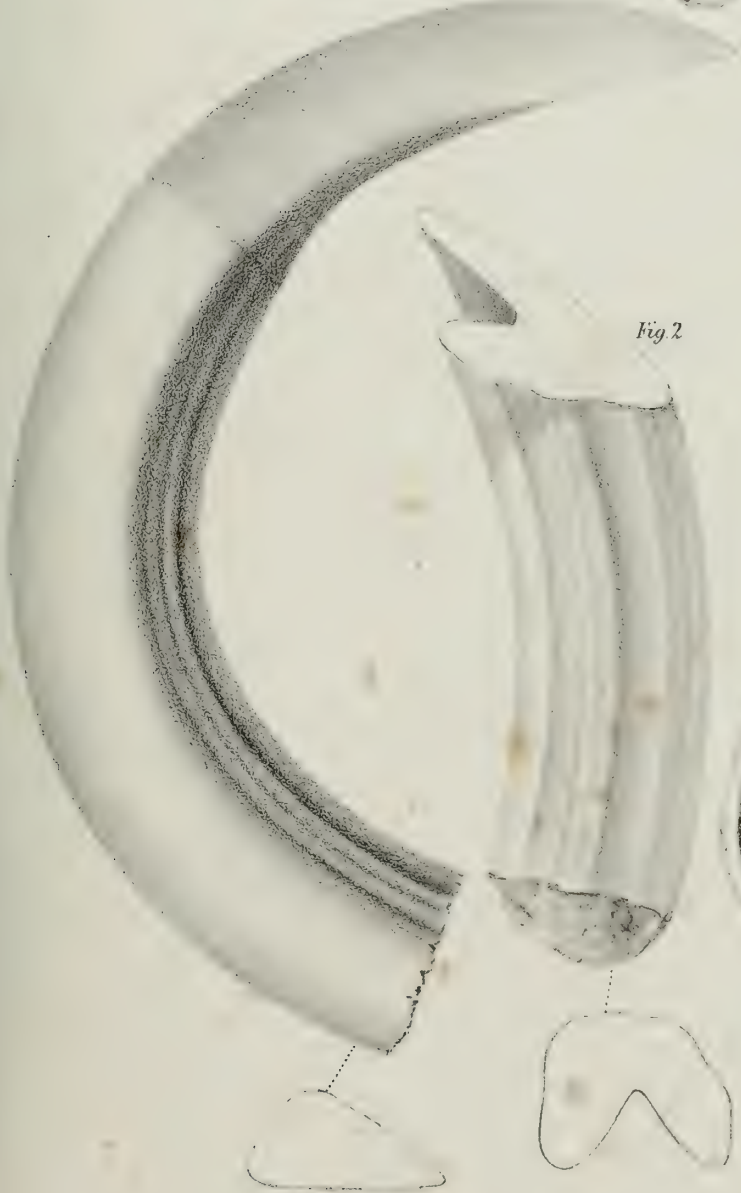


Fig. 2

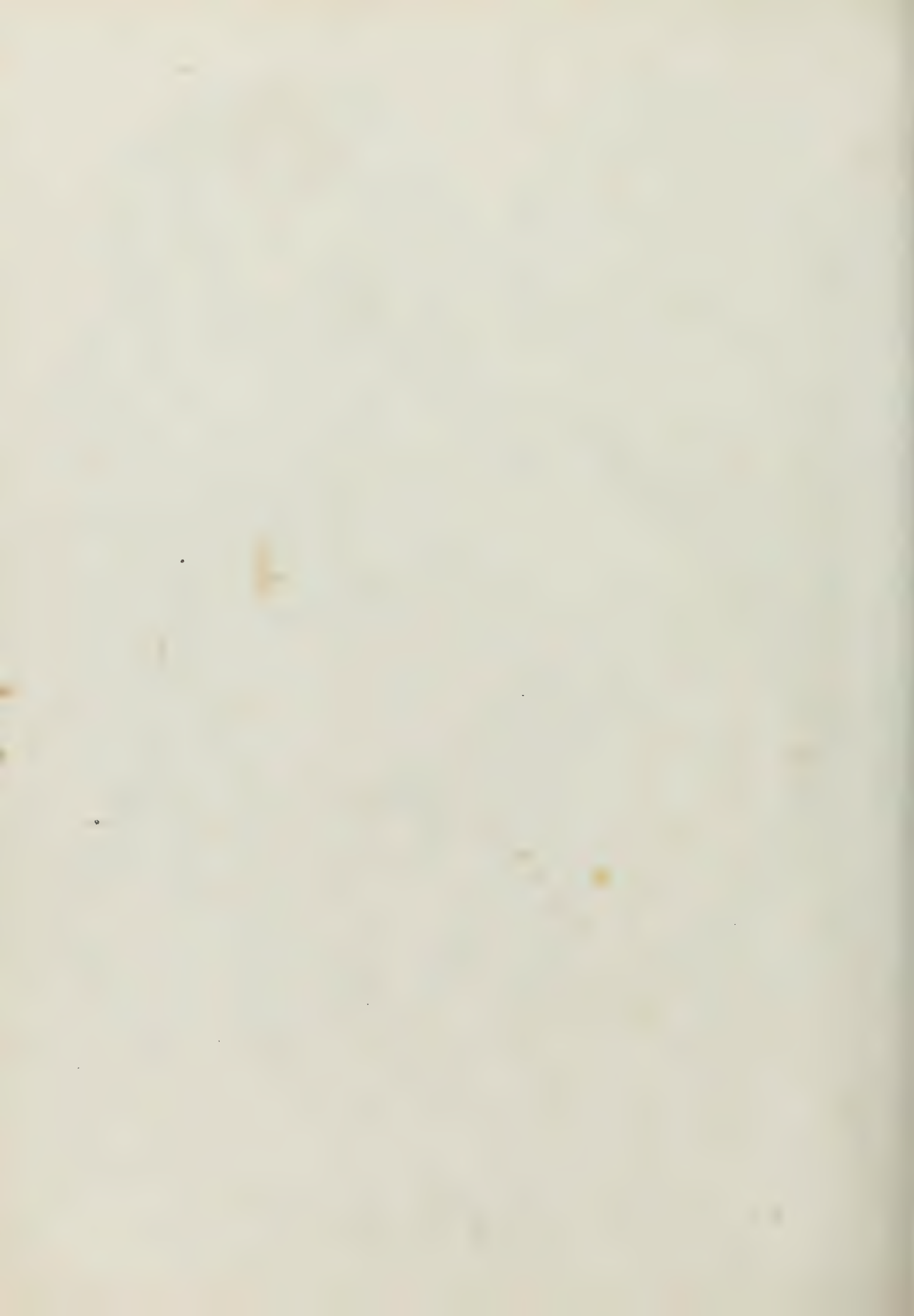


Fig. 5



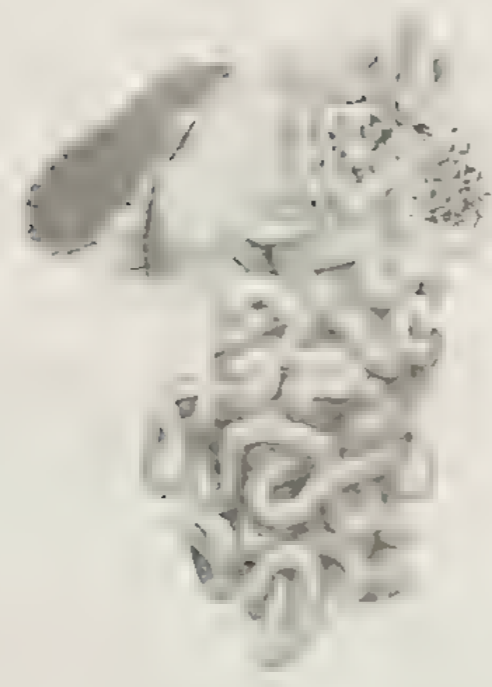
HIPPOTAMUS (TETRAPROTODON) LIBERIENSIS MORTON.

T. Smeets lith Phil.











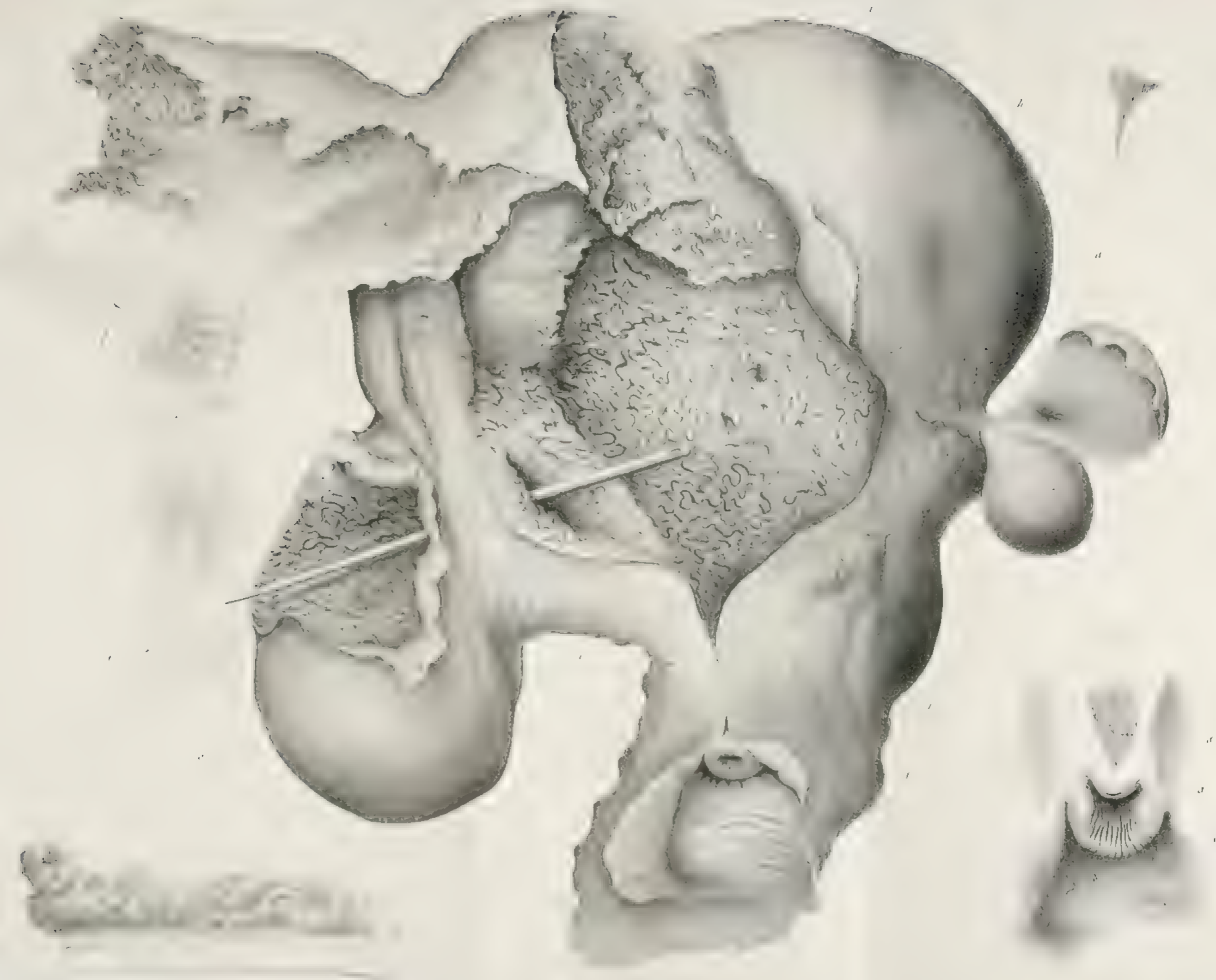
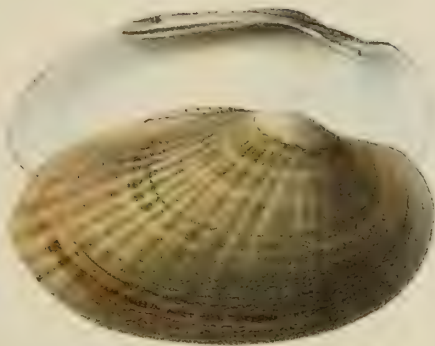
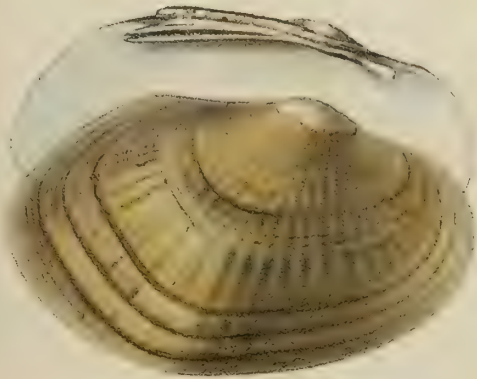


fig 4









From nature by J. E. Pench.

From nature by J. E. Pench.















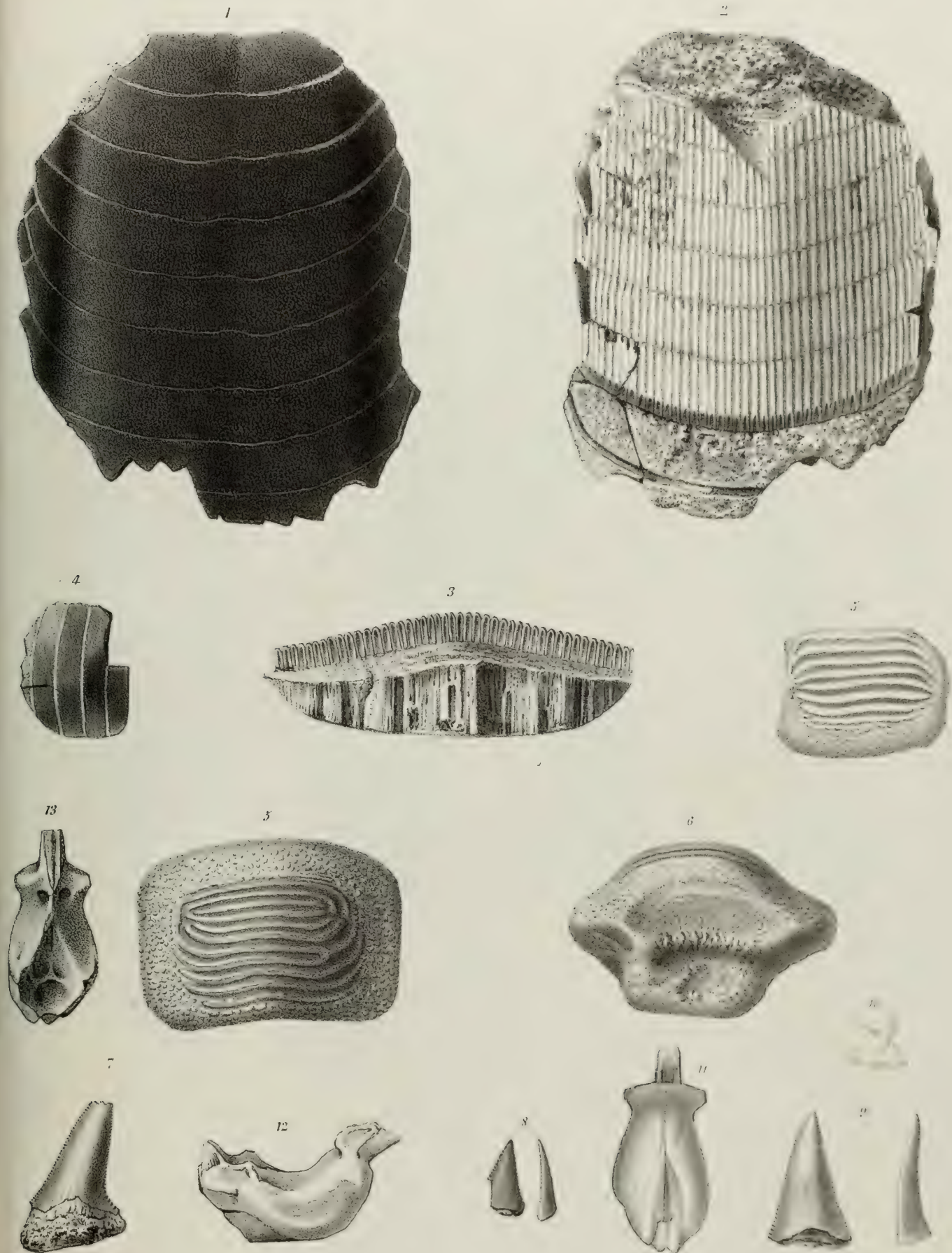
*Micrastur querilla*, Cassin







- 1. *Tyrannus Scutatus*, Cassin
- 2. ' d. d.
- 3. *Tanager nigroaurita*, Cassin



Figs. 1 2 3. *Myliobates Holmesii*. Gibbs  
 Fig. 4. " *transversalis* Gibbs  
 Figs. 5 6. *Ptychodus polygyrus*. Agassiz  
 Figs. 7 9. *Carcharodon Leptodon*. Agassiz  
 Fig. 10. *Galcoerdo*.  
 Figs. 11 12 13. *Platax*. Agassiz.

† See also Plate 43, Column 1, 14th









Fig 1 *Distoma herridum*  
Figs. 2-16 .. *vagans*

Jour. Acad. Nat. Sc.





















