INDEX.

INDEX

TO

PROCEEDINGS OF BIOLOGICAL DEPARTMENT

For 1858.

DIRECTIONS TO THE BINDER.

Geographical Map of Kansas and Nebraska, to face page 156.

Plate 1, to face page 178.

Plate 2, to face page 180.

Biological Department,—the three plates to face page 4.

Map of Haddonfield, N. J., to face page 213.

Pages 117 and 118, in the April and May Nos., to be cancelled, and pages 117 and 118 at the close of the June No., substituted for them.

Pages xi. and xii. of Donations to the Library are at the close of Dr. Meig's circular. Donations to the Museum will be bound immediately after the correspondence, followed by Donations to Library, and the Proceedings of the Biological Department.

Errata to Notes on American Land Shells, No. 4.

Page 198, No. 41, Dr. Gould suggests for B. vesicalis, the name sufflatus.

Page 198, after No. 48, add 48ª T. gracilenta.

Page 200, after No. 84, read 84ª H. Berlandcriana, Mor., Desh. in Lam., Chemn., Pf. in vol. iii, nec in vol. i, Rve., Binn.

H. pachyloma, Mke., Pf. ?

H. virginalis, Pf. ? Chemn. ?

Page 200, after No. 86, read 86ª H. caduca, Pf. ?

Page 201, line 8, add *H. dissidens*, Desh.

Page 201, line 31, add *H. dissidens*, Desh.,=H. concava.

PROCEEDINGS

OF THE

ACADEMY OF NATURAL SCIENCES

OF PHILADELPHIA.

1858.

January 5, 1858.

Dr. Ruschenberger, in the Chair.

Thirty-two members present.

Mr. Slack presented for publication in the Proceedings a paper entitled "Catalogue and Notes on the Egyptian Antiquities in the collection of the Academy of Natural Sciences of Philadelphia, by J. H. Slack," which was referred to a committee.

Dr. Uhler exhibited a specimen of nitre which had occurred spontaneously in large quantity, upon the wall of a dwelling formerly used as a stable. It was remarkable for its purity, being free from lime, ammonia, magnesia and nitrate of soda.

Mr. Cassin called attention to the specimen of Falco polyagrus, presented this evening by Mr. J. D. Sergeant, who had obtained it east of the Mississippi. Mr. Cassin had described the species from a specimen brought from Oregon by Mr. Townsend, but the present specimen was the first he had known to be found east of the Rocky Mountains.

January 12*th.*

Vice-President Lea in the Chair.

Thirty-four members present.

Dr. Leidy exhibited two plates of *Urnatella gracilis*, formerly described by him in the Proceedings. He said the stomachs of these animals contained certain voluntarily moving bodies which he had supposed to be parasites, but which might prove to be generative bodies. Mr. Lea had recently given him a *Unio* from the Scioto, upon which this species of *Urnatella* had been detected—the former specimens were from the Schuylkill.

Dr. Leidy announced the return from Nebraska Territory of Dr. F. V. Hayden, bringing an important collection of fossils, among which were a number of mammalian remains from a supposed pliocene deposit, of the Niobrara River, (L'eau-qui-court.)

January 19*th.*

Vice-President Bridges in the Chair.

Forty-three members present.

Dr. Leidy called the attention of the members to some remains of a Camel in the collection recently obtained by Dr. Hayden, from the Niobrara River, Nebraska. He exhibited the back portion of the lower jaw of the animal, which contains the true molar teeth, and possesses a hook-like process on the posterior border, as in the recent Camel; in comparison with which the extinct species appears to have been about two-third sthe size. He also exhibited, from the same collection, the fragment of a lower jaw of a species of Wolf, larger than any heretofore described.

Dr. Uhler exhibited specimens of crystallized lead, produced by withdrawing the fused interior of a cooling mass. The crystals were arranged upon rhombic bases. He also exhibited specimens of apparently fibrous or columnar lead, produced by exposing a mass when on the point of fusion, to a sudden shock. He had failed to develop any appearance of fibrous or crystalline structure upon the sawn end of a specimen by etching.

Prof. Booth remarked the resemblance of the crystals to the skeleton character seen in gold, from California and Australia. He thought the fibrous or columnar appearance not attributable to crystallization, the sides being of variable number, but due merely to cooling, or similar causes. He had observed a structure resembling this in pigs of Lake Superior copper, in nickel commercially pure, and in an alloy of nickel and copper.

Mr. Aubrey H. Smith, referring to some figures from Siam, presented by him this evening, said the stone head was from the ruined city of Juthia; the bronze figure, apparently ancient, presented still existing characteristics of the people.

January 26th.

Vice-President Bridges in the Chair.

Forty-five members present.

Dr. Ruschenberger read the following:—

Hall of the Academy, January 26th, 1858.

Report of the Committee of the Academy, appointed to confer with a committee of the Biological Society, on a proposed junction of the two Societies.

Your Committee "appointed to confer with the Committee of the Biological Society of Philadelphia, with respect to the union of labors proposed in the letter of said Committee, and to report to the Academy the terms of the proposal, and also the reasons which shall appear to the Committee for or against such union," has frequently met the Committee of the Biological Society of Philadelphia, and, after free and full discussion of all the points involved, reports as follows:

The third section of the Charter of the Academy provides, that "the Society shall consist of members and correspondents," and indicates that they shall be elected individually, each being balloted for, separately. The practice of the Society since its institution in the year 1812 has been in conformity to this provision.

For this reason your Committee is of opinion that the Academy cannot, consistently with the spirit if not the letter of its Charter and By-Laws, accept any terms of union with the Biological Society, or annex any other society, or absorb any other body of men associated for analogous or identical objects, whatever might be the advantages of such union.

Your Committee might, under a literal construction of the resolution by which it was created, properly conclude this report with a recommendation that the proposition to unite the two societies be rejected. But sensible of the meritorious objects of the Biological Society, it begs the indulgence of the

Academy to submit briefly its views in connection with the subject, and to ask the adoption of a measure in relation to it, which, it is hoped, will be entirely acceptable to a large majority of members of both institutions.

In the language of its Charter, the Academy was instituted "for the encouragement and cultivation of the Sciences," and is "devoted entirely to the advancement of useful learning."

Nearly a half century has passed since its institution. During nearly all of this period, the cultivation of the natural sciences has been pursued objectively. It has been limited almost exclusively to the investigation of specific differences and resemblances of forms, with a view to portraying those which are new and distinguishing them from those previously described, for the purpose of appropriately classing them. The field of cultivation includes the geographical distribution of the fauna and flora of the earth, whether living or fossil; and the habits, habitat and uses of the various organisms, as well as the regular and irregular forms and chemical composition of inorganic matter. The results of the labors of the members of the Academy in this wide field, are recorded in its Proceedings and Journals.

But with the lapse of time and advancement of knowledge new fields of inquiry have been opened. To study natural sciences objectively only, no longer satisfies the disposition of man to pry into the secrets of creation. He now anxiously seeks to discover and expose the laws of organic life. He earnestly desires to distinguish primary organic cells, and to ascertain the forces and laws which bring them together, and combine them in aggregate existences, from the lowest microscopic infusoria up through the zoophytes and acalephs to the most perfect form of organization. He labors industriously to recognize the normal as well as the abnormal conditions of organic structures, wherever met on the face of the earth.

The task is Herculean, and to accomplish it in any degree worthy of consideration, the laborer requires all the sympathy and facilities which only those interested in kindred pursuits know how to accord. He needs the encouragement which flows from association with congenial spirits. He needs must be free from the disturbing influences of those who cannot or will not appreciate the objects of his researches. Such motives induce him to seek fellowship and alliance with those who are animated by a zeal analogous to his own. Hence it is that many members of the Academy, regarding objective natural history, only as the basis of the pyramid of natural science, have been drawn together; they have joined others entertaining like views, who are not in fellowship with this institution, and organized the Biological Society of Philadelphia, which is yet in its earliest infancy. Its chief property consists in the acquirements and industry and scientific zeal of its members; qualities which we should seek to retain and accumulate within the walls of this Institution.

The extensive library, and collections which are daily augmenting, are of inestimable value in facilitating the pursuits of the biologist. The Academy is pledged to assist "the advancement of useful learning" in all the departments of the natural sciences.

For the reasons alluded to, your Committee has labored assiduously to devise a measure consistent with the Charter and increasing prosperity of the Academy, which shall place all the facilities in its possession within the easy reach not only of those devoted especially to biology, but also of those who may hereafter dedicate their time and labors, particularly, to other branches, and at the same time bind together by bonds of common interest, in one harmonious union, all who are interested either partially or generally in the cultivation of the natural sciences.

For this purpose, and to meet the demands which labor is daily making for division and subdivision, in every branch of human pursuit, your Committee respectfully urges the addition of a chapter to the By-Laws, which shall provide for the creation and government of Classes or Departments, composed of members, with authority to hold meetings separately from the common meetings of the Institution, and with all the privileges necessary for the successful prosecution of their studies; but at the same time entirely subordinate to its Charter and By-Laws.

Under a belief that pure scientific zeal is never pretentious, and to avoid the confusion which might possibly arise from identity of appellations of different officers in the same organization, names and titles for the officers of the departments proposed have been selected with a view to practical, rather than to merely honorary distinction, which titles should be clearly indicative of subordination.

Your Committee has never been unmindful of the interests of the Academy, nor of the grave influence which the measure now recommended is calculated to exert on the prosperity of the Academy; which is regarded to be inseparable from the advancement of science. After patiently viewing the subject in all its various aspects, it is sincerely believed that only good can accrue from amending the By-Laws as proposed. But, even should experience prove that expectation has been disappointed, the Academy may be brought back to its present organization, by repealing the By-Laws which it is now solicited to enact.

The provisions herewith submitted, it is supposed, will meet all the practical wants of scientific men devoted to the cultivation of special departments of natural history, and in this way remove every necessity for forming new societies, and in a great degree, if not entirely, annul the allurements which may be held out to members of the Academy, to labor under the fostering care of newly established organizations.

It is designed that the proceedings of the Departments shall be laid before the Academy at every meeting for business, in order that the results of their investigation may be communicated to each other, and particular information acquired by one may be made common to all. Natural history is not to be abandoned, because biologists prefer to investigate the laws of genesis and vitality, and physicists delight to examine the properties, the influences and motions of the atmosphere and of inorganic matter. The fields of entomology, ornithology, mammalogy, &c., are neither invaded nor diminished by the contemplated creation of Departments. A profitable emulation may be provoked among the members of the Academy, by the feature of the proposed organization. Therefore the interest of the ordinary meetings of the Academy may be enhanced, and the meeting for business will become more generally attractive.

The whole is respectfully submitted.

Thomas B. Wilson,
Robert Bridges,
Samuel Powel,
E. Durand,
Isaac Lea,
W. S. W. Ruschenberger.

Whereupon the amendments to the By-Laws proposed were read, considered and passed to a second reading.

The following paper was read:—

Hall of the Academy of Natural Sciences,
January 26th, 1858.

In the event of the proposed additions and alterations of the By-Laws being agreed to by the Academy, the undersigned members request that they may be constituted the Biological Department of the Academy of Natural Sciences of Philadelphia.

Joseph Leidy, M. D.,
William A. Hammond, M. D.,
Charles F. Beck, M. D.,
J. Cheston Morris, M. D.,
James M. Corse, M. D.,
J. H. Slack, A. B.,
William Camac, M. D.,
C. S. Boker, M. D.,
S. Weir Mitchell, M. D.,
Walter T. Atlee, M. D.,

Edward Minturn, M. D.,
Edward Hartshorne, M. D.,
James Aitken Meigs, M. D.,
Francis G. Smith, Jr., M. D.,
Isaac Hays, M. D.,
J. J. Woodward, M. D.,
George R. Moorehouse, M. D.,
Benjamin H. Coates, M. D.,
James Page, M. D.,
B. Howard Rand, M. D.,
Wm. Parker Foulke,
R. Eglesfield Griffith, M. D.,
Charles Stuart Wurts, M. D.

Which was passed to a second reading.

The election of Standing Committees for 1858 was then held, with the following result:

1. *Ethnology*, J. A. Meigs, S. S. Haldeman, T. G. Morton. 2. *Comparative Anatomy and General Zoology*, Joseph Leidy, Jas. M. Corse, Wm. H. Gobrecht. 3. *Mammalogy*, John LeConte, George A. McCall, Wm. M. Camac. 4. *Ornithology*, John Cassin, George A. McCall, S. W. Woodhouse. 5. *Herpetology and Ichthyology*, Edward Hallowell, Robert Bridges, J. C. Morris. 6. *Conchology*, T. A. Conrad, W. G. Binney, Thomas B. Wilson. 7. *Entomology and Crustacea*, Robert Bridges, F. Schafhirt, James Paul. 8. *Botany*, Elias Durand, Amable J. Brazier, S. S. Garrigues. 9. *Geology*, Isaac Lea, Charles E. Smith, John L. LeConte. 10. *Mineralogy*, Wm. S. Vaux, Samuel Ashmead, James C. Booth. 11. *Palæontology*, Thomas B. Wilson, Joseph Leidy, T. A. Conrad. 12. *Physics*, B. Howard Rand, Wm. M. Uhler, Fairman Rogers. 13. *Library*, William S. Vaux, Joseph Jeanes, Thos. B. Wilson. 14. *Proceedings*, Samuel Powel, Gideon D. Scull, J. Cheston Morris.

Catalogue and Notes of the Collection of Egyptian Antiquities in the Collection of the Academy of Natural Sciences.

BY J. H. SLACK.

No. 1. Human mummy, adult male, with sarcophagus, from Thebes. Deposited by J. L. Hodge. A remarkably fine specimen in perfect preservation.

No. 2. Mummied child from Thebes, (very rare.) J. H. Slack. "It has been a general and a just remark, that few mummies of children have been discovered —a singular fact, and one not easily accounted for, since the practice of embalming those of the earliest age was common in Egypt." Wilkinson's ancient Egyptians.

Nos. 3—14. Eleven specimens of the mummied sacred Ibis, (Ibis religiosa, Cuv.) from Thebes. G. R. Gliddon.

No. 15. Mummied sacred Ibis, from Sakkara. J. H. Slack. The Ibis was the most sacred bird of the Egyptians, being dedicated to Thoth, the Egyptian Mercury.

No. 16. Forty-eight specimens of mummied young crocodiles, from Thebes, (very rare.) G. R. Gliddon. The crocodile was sacred to Savak.

Nos. 17—22. Mummied serpents, from Thebes. G. R. Gliddon.

Nos. 23, 24. Mummied serpents, from Thebes. J. L Hodge. Among the ancient Egyptians the serpent was sacred to Nuph or Chnubis, the Divine Spirit.

Nos. 25, 26. Mummied hawks, from Thebes. G. R. Gliddon. Sacred to Ré.

Nos. 27, 28. Mummies, contents unknown, from Thebes. G. R. Gliddon.

No. 29 Mummied cat, from Thebes. J. H. Slack. The cat was esteemed sacred to Pasht, the Egyptian Venus.

No. 30. Mummied calf, from Thebes, (very rare.) G. R. Gliddon. Curious from the locality, the burial place of the god Apis, and others of the Bovine species being at Sakkara. Sacred to Osiris.

No. 31. Shawl of fine linen, such as were used to envelope the mummies of the higher classes of Egyptians, from Thebes. J. H. Slack. There has been lately discovered at Thebes an undertaker's shop, situated among the tombs on the western side of the Nile, containing over a thousand shawls, such as were used to envelope the dead, each having the price marked in one corner apparently with some indelible ink, probably the nitrate of silver: the above is one of these.

No. 32. Net work of beads and Scarabæus, from Thebes. J. L. Hodge.

No. 33. String of beads, from Thebes. Mr. T. Ryan. A net work of beads was frequently spread over the breast, and even the whole body of the mummy worked in rich and elegant devices. The winged scarabæus was placed over the breast, emblematic of the protecting influence of the Deity. (Wilkinson.)

No. 34. Fragment of bread from a mummy, (rare,) from Thebes. Mr. T. Ryan.

No. 35. Child's doll, (very rare,) from Thebes. Mr. T. Ryan. Most probably the favorite plaything of an Egyptian child.

No. 36. Ancient Egyptian ring, from Thebes. Mr. Ryan.

No. 37. Ornaments and charms, from Thebes. Mr. Ryan.

No. 38. Chess or checker-man, (very rare,) from Thebes. Mr. Ryan. In the collection of Dr. Abbott, now at New York, are two boards, with men, evidently used in playing a game similar to our checkers. This stone, resembling, in every respect, the men of the sets, doubtless belonged to a similar set. A representation of Rameses III. engaged in a game with similar pieces, is still to be seen on the wall of the palace temple of Medemet Haboo, in the Thebiad.

No. 39. Seal of a tomb, from Thebes. J. H. Slack. "Each tomb and sometimes each apartment had a wooden door, either of a single or double valve, turning on pins and secured by bolts and bars, or a lock; which last was protected by a seal of clay, upon which the impress of a signet was impressed when the party retired. Remains of the clay seal have even been found adhering to the stone jambs of the doorways at Thebes, and the numerous stamps found buried near them were most probably used on these occasions."—*Wilkinson.*

No. 40. Fragment of sculptured marble, from Thebes. Mr. T. Ryan.

No. 41. Fragment of sculptured limestone, from Karnak. J. H. Slack.

No. 42. Ancient vase, (rare) from Sakkara. J. H. Slack. This vase was found by the donor in the tomb of the God Apis near the pyramids of Sakkara.

No. 43. Ancient Egyptian sandal, from Thebes. Mr. T. Ryan.

No. 44. Offering to the manes of the dead, made in the form of some vegetable production.

No. 45. Human-headed hawk, probably from the top of a papyrus case.

No. 46. Fragment of mummy case, from Thebes. G. R. Gliddon.

No. 47. Fragment of mummy case, from Thebes. G. R. Gliddon. The God Rê is here represented seated probably in his capacity of one of the judges of the dead.

Nos. 48, 49, 50. Plaster casts, from Thebes. G. R. Gliddon. These casts were most probably taken from the walls of the tombs of Thebes; they represent offerings to the god Osiris.

No. 51. Fragment of a papyrus scroll in the demœtic characters.

No. 52. A roll of papyrus in hieroglyphics, with seal attached.

No. 53. Two scarabæi, from Thebes. Mr. Ryan. The scarabæus was the most sacred emblem of the ancient Egyptians, being regarded by them as the cross is at present by some denominations of Christians.

No. 54. Figure deceased under the form of Osiris in blue glazed pottery from the Pyramids. J. H. Slack. "Small figures of wood or vitrified earthenware were common to all classes, except the poorest of the community. They usually present a hieroglyphical inscription, either in a vertical line down the centre, or in horizontal bands around the body, containing the name and quality of the deceased, with the customary presentation or offerings for his soul to Osiris, a chapter from the ritual or some other funeral formula. In the hands of these figures are a hoe and a bag of seeds. Their arms are crossed in imitation of certain forms of Osiris, whose name and form the dead assumed, and the form of their beard indicates the return of the human soul, which once animated their body, to the deity from whom it emanated."—*Wilkinson.*

February 2d.

Vice President Bridges in the Chair.

Forty-four members present.

Dr. Leidy made some further general remarks upon the fossil mammalia obtained by Dr. Hayden from the Niobrara river (L'eau-qui-court), duringthe recent expedition of Lieut. G. K. Warren to explore the Black Hills of Nebraska. Dr. Hayden suspects the formation in which he discovered the fossils to be of pliocene age. The specimens belong to some twenty or more species of animals, all of which are distinct from those found in the miocene deposit of the Mauvaises Terres; and are also distinct from those of a subsequent age. The forms are, moreover, of more recent character than those of the Mauvaises Terres deposit. An interesting and remarkable fact, in connection with these remains, is that they indicate a fauna more nearly like the recent fauna of the old world, than of this country. Thus, among the remains, are those of a species of Rhinoceros, almost the same size, and having the same dental formula as the *R. indicus* There are remains of several species of Horse, and of several new genera of ruminants; among which are those of a genus allied to the Musks, and also those of a genus closely allied to the Camel. There are, further, remains of a Porcupine, resembling the genus *Hystrix*, and those of a small species of Beaver. The collection likewise contains remains of three species of Wolf, the lower jaw of the feline genus *Pseudalurus*, fragments of several other carnivorous genera, and portions of the skeleton of the Mastodon and Elephant.

Dr. LeConte said that while he was recently in Honduras, he had examined the Mastodon bed at the village of Tambla, in one of the passes leading from the plain of Comayagua to the Pacific. He was satisfied of the identity of the remains with *M. giganteus.* He had found there a molar of Bos and two or three teeth of Equus.

On motion of Dr. Leidy, by special resolution, the thanks of the Academy were presented to Mrs. R. Pierpont, for the donation of a valuable collection of shells.

February 9th.

Dr. Isaac Hays in the Chair.

Thirty-three members present.

Dr. Leidy made some further general remarks upon the pliocene fossils from Nebraska; he exhibited many bones, among them the foot of a horse. He observed, that among all the mammalian remains brought by Dr. Hayden from the Niobrara river, none were more remarkable than those which he now exhibited. They belong to an equine animal which has the temporary teeth of *Anchitherium*, and the permanent teeth of *Equus.* In both these genera, the permanent and deciduous teeth are alike, but the new genus in early life is an *Anchitherium*, and later in life a true Horse.

He also exhibited the jaws, with the teeth, of a new genus allied to Oreodon, partaking, like this, of suiline and ruminant characters. The specimens were discovered by Dr. Hayden on the Niobrara, opposite Fort Laramie, and indicate a larger animal than any of the species of Oreodon described by him.

February 16*th*.

Vice President Bridges in the Chair.

Thirty-nine members present.

Mr. Ashmead called the attention of members to a Marine Alga which he had discovered about three years since at Beesley's Point. From the microscopic structure of the frond, he supposed it to be a Callithamnion, and not finding it described in Nereis Boreali-Americana, he concluded it was a new species. He had referred it to the late Prof. Bailey, of West Point, who returned it with the remark, "I cannot make this agree with any Callithamnion known to me; if it were truly dichotomous, I should refer it to *Griffithsia setacea,* but without its fruit I cannot decide what it is. It is an interesting plant, and ought to be watched for, at different times in the year, so as to secure its fruit."

During the past summer, I collected, at Beesley's Point, quite a number of specimens of this plant; I found them growing in shallow water, attached to old shells and other submerged substances; but I found none in fruit. Upon the examination of a number of specimens, I formed the conclusion that the plant belongs to the genus Griffithsia, and is a new species. Under this impression, I sent specimens to Prof. Harvey, of Trinity College, Dublin, for examination. I recently received a letter from that distinguished Algologist, and though not with a view to publication, I presume an extract may be presented without impropriety. Dr. Harvey says: "The supposed new Griffithsia, sent in one of your parcels, is *Griffithsia tenuis,* J. Ag., identical with the specimens in my herbarium, from Agardh himself. The American plant is a little stronger in growth than the European, but I see no character to separate it. The fruit is unknown. Your specimens are not in fruit. The genus to which it belongs is therefore doubtful; and I am therefore disposed to think that it will turn out to be a Callithamnion—an opinion I arrived at, because it is very closely allied to *Callithamnion thysigerum,* of Australia and Ceylon, the fruit of which is known to me. Indeed, it is possible that Callithamnion thysigerum itself may be only a variety of *Griffithsia tenuis.*" This alga is interesting as an addition to the marine flora of the American coast.

Mr. Lesley described a curious reverse drainage of the uplands bordering the Ohio river on each side, near Ironton, and within the limits of the coal region of southern Ohio and Kentucky. On climbing the river cliffs about 300 feet, the summit is found to be formed by a stratum of conglomerate about fifty feet thick, and one looks over into bowl-shaped heads of small valleys, delivering their waters backward, and only reaching the river by circuits more or less extensive. These valley heads are so close to the great river valley, that short tunnels driven along in the *almost* horizontal coal-beds would suffice to bring out the ores which crop around them. The barriers are lofty knife edges or thin walls, or strips of horizontal conglomerate, the place of which in the coal measures is about 500 feet from the bottom. The dip of the strata is only about thirty feet to the mile, and contrary to the current of the river. It would be difficult, he thought, to explain this structure by the popular theories of denudation, or any hypothethis, unless subærial deluges.

Mr. Powel protested against the too constant recourse to immediate volcanic agency in explaining geological phenomena. In the Pottsville region the strata were often folded and contorted by side pressure from various causes, with no close or immediate local evidence of volcanic agency, it being often seen only far off. The structure of the Ohio valley now mentioned, might have occurred originally as a mere crack in the conglomerate, perhaps caused by a very trifling local upheaval, or a slight shrinkage, or even a subsidence at a distance, this would determine the original line of drainage, and attrition might, in time, produce such a valley as Mr. Lesley had described.

Mr. Lesley thought the valley could not have suffered from volcanic force, for it was tortuous like the suture of a skull, not straight like the profound lines of fault in the Appalachians of Pennsylvania, Virginia and Tennessee."

Mr. Foulke described the Deep River country as one of straight valleys walled in by vertical cliffs two or three hundred feet high, which he thought were evidently fractures of the crust.

Mr. Lesley described the Kanawha country to show that, if so, then the crust must be looked upon as having suffered a shivering rupture with open and profound cracks running irregularly or aborescently. But such fissures could not have been filled up, and their sides sloped off to form a country like western Virginia.

Dr. Woodhouse described the canons of the Pacific side, as sometimes sedimentary on one side, and volcanic or metamorphic on the other, and sometimes having lava streams in the middle.

February 23d.

Vice President Lea in the Chair.

Sixty-six members present.

The amendments to the By-Laws offered at the previous meeting for business, were read a second time and unanimously passed to a third reading.

The Auditors reported they had examined the Annual Report of the Treasurer, and compared it with the vouchers, and that they had found it correct; which report was adopted.

March 2nd.

Vice President Lea in the Chair.

Forty-eight members present.

Dr. Wilcocks read a paper entitled "Remarks on an Optical Illusion, by Alexander Wilcocks, M. D."

A paper was presented, entitled "Descriptions of new Organic Remains, collected in Nebraska Territory, by Dr. F. V. Hayden and others, under the direction of Lieut. G. K. Warren, U. S. Topographical Engineers, with some remarks on the Geology of the Black Hills, and portions of the surrounding country, by F. B. Meek and F. V. Hayden, M. D." which was referred to a committee.

Dr. Leidy read a letter from Mr. F. B. Meek and Dr. F. V. Hayden, dated Albany, Feb. 16th, 1858, indicating the probable existence of Permian Rocks in Kansas Territory, from which, at the request of the authors, the following extract is published.

"Some six months since, Major F. Hawn, of Weston, Missouri, to whom we are under many obligations for interesting information respecting the geology of Kansas Territory, sent on to one of us* a small collection of fossils from a locality near the junction of Solomon's and Smoky Hill forks of Kansas River. A portion of these fossils were at once recognized as being types common in the coal measures of the west. Along with these, however, there were several masses

(*Mr. Meek.)

of a yellowish magnesian limestone containing numerous casts of a very peculiar group of fossils. On examining these, it was soon observed that they are quite unlike any forms known to us in the carboniferous system, and very nearly allied to types considered characteristic of the Permian, of the old world. Major Hawn was at once apprised of this fact, and he has since informed us of several facts in relation to this formation, which rather go to confirm the view that it may prove to be of Permian age, rather than otherwise. In the first place, he informs us that the bed from which the fossils were obtained, hold a position above the well marked coal measures, and seems to have been deposited upon an uneven surface, as though the coal measures had been worn into hills and valleys previous to the deposition of the rock of which we speak." [Signed, MEEK and HAYDEN.]

Dr. Leidy directed the attention of the members to some fossils on the table, being part of the collection obtained by Dr. F. V. Hayden, in the valley of the Niobrara river, Nebraska. One of the specimens was the lower jaw of a new species of Mastodon. It belonged to an old individual, as the last molar tooth occupies its functional position and is considerably worn. The jaw indicates a smaller animal than the common Mastodon (*M. Ohioticus.*) The tooth resembles the corresponding one of *M. sivalensis*, or of *M. angustidens*, much more nearly than that of the common Mastodon. The crown has a much greater antero-posterior diameter in relation to its transverse diameter, than in the latter, and it has six transverse rows of tubercles, together with a feeble tarsus. The tubercles are crowded instead of being separated by wide angular valleys as in the common Mastodon. The tooth was compared with that from an unknown locality, characterized by Dr. Hays under the name of *M. Chapmani;* but this more nearly resembles the South American species *M. Humboldti.* In advance of the tooth, there are no traces of an alveolus for the preceding tooth, but a sharp ridge proceeds from the last molar to the anterior extremity of the jaw. Dr. Leidy observed he had never seen the jaw of the common Mastodon in the same condition, as the oldest individuals always presented the fifth alveolus filled up, and not completely obliterated. The species he named *Mastodon mirificus.*

Dr. Leidy next exhibited part of an upper molar tooth of an Elephant from the Niobrara; which he suspected to be a species distinct from those previously indicated, though it does not present sufficient characters to establish the opinion. It is the broadest tooth he had ever seen, being almost five inches, and it has fewer plates of enamel than in any variety of teeth of *Elephas Americanus* that had come under his inspection. The species he proposed to distinguish by the name *Elephas imperator.*

Dr. Hays called attention to the fact that the tooth of the new Mastodon had protruded more obliquely forward and upward than in the common species, indicating a nearer alliance to the Elephant.

Dr. Leidy thought Dr. Hays quite correct, and that the last molar in protruding forward and upward had gradually displaced two preceding teeth, whose position it now occupied. He then described the mode of development and succession of the teeth in the Elephant; and he showed, as observed by Dr. Hays in the new Mastodon, that we have a closer approximation to the same process than in the common species.

On leave granted, Dr. Camac offered the following special resolution:

Resolved, That a committee of three be appointed to obtain and stock a marine aquarium to be placed in the Hall of the Academy, provided that the necessary amount be raised by subscription—which was adopted, and the committee appointed to consist of Drs. Camac and Rand, and Mr. J. D. Sergeant.

March 9th.

Vice President Lea in the Chair.

Twenty-eight members present.

The following papers were presented for publication in the Proceedings. "Prodromus Descriptionis Animalium Invertebratorum quæ in Expeditione ad Oceanum Pacificum Septentrionalem a Republicâ Federatâ missâ, Cadwalladaro Ringgold et Johanne Rodgers ducibus, observavit et descripsit W. Stimpson. Pars IV. Crustacea, Cancroidea et Corystoidea."

"Notice of Remains of Extinct Vertebrata, from the valley of the Niobrara River, collected during an expedition under the command of Lieut. G. K. Warren, U. S. Topographical Engineers, to explore the region of the Black Hills, by Dr. F. V. Hayden, Geologist to the Expedition, by Joseph Leidy, M. D."

Which were referred to committees.

Dr. Leidy, in presenting his paper intended for publication in the Proceedings, observed that it contained characteristic descriptions of twenty-eight species of extinct vertebrates, among which are six carnivora of the canine and feline families, two rodents, eight ruminants, eight solipeds, three large pachyderms, and one turtle. In relation to the eight solipeds, he stated they belonged to six genera: *Equus*, *Hipparion*, *Protohippus*, *Merychippus*, *Hypohippus*, and *Parahippus*. The two latter constitute with *Anchitherium* a distinct group; the three former constitute another group; and the fourth one is an intermediate form. The remains of *Equus*, indicating one species, are undistinguishable from the corresponding parts of the domestic horse.

Dr. L. further remarked, since he had had the opportunity of inspecting the numerous equine remains from the Niobrara, he was inclined to believe that the remains of the horse found in the post-pliocene deposits of the United States, indicate two species. Of these the remains of one are undistinguishable from corresponding parts of the recent horse, and are the representative of the *E. primigenius* of Europe, and may be distinguished by the name of *E. fraternus*. The other species relates to the *E. plicidens* of Europe, and like it is characterized by the comparatively complex arrangement of the enamel folding in the upper molar teeth. He had formerly named it *E. americanus*, but as this name had been previously applied to a South American species, he would now propose for it that of *E. complicatus*. The equine remains referred to, together with those of a small species of *Hipparion* from the post pliocene deposit near Charleston, S. C., and those of a species of *Anchitherium* from the miocene deposit of the Mauvaises Terres, Nebraska, appear to indicate the former existence of twelve species of seven genera of the family of solipeds in this country. From these facts it would appear as if the equine family was becoming extinct, as it is now represented by the sole genus *Equus*.

Dr. Hammond said the sections of jet he presented this evening were from a vein eighteen inches in thickness, at Cevolleta. Under the microscope they exhibited the woody structure very beautifully.

Mr. Lesley exhibited fragments of conglomerate, from under the coal, from the top of Blossburg Mountain, showing apparently the impression of a Calamite, which seemed to have marked or moulded even the pebbles themselves.

Mr. Lea was inclined to ascribe the marks upon the fragments exhibited, rather to the groving or scratching of one rock by another after fracture, as seen in the slickensides.

Mr. Lesley had examined the locality for scratches, but had found no such fissure as that suggested by Mr. Lea, besides the beds at the spot are nearly horizontal.

March 16.

Vice-President Bridges in the Chair.

Thirty-two members present.

The following papers were presented for publication in the Proceedings: "Descriptions of New Species of Coleoptera, chiefly collected by the U. S. and Mexican Boundary Commission, under Major W. H. Emory, by John L. LeConte, M. D."

"Descriptions of New Species of Neuropterous Insects, collected by the North Pacific Exploring Expedition under Captain J. Rodgers, by P. R. Uhler."

Dr. Leidy called the attention of the members to a cast of a Mastodon tooth from the collection of Dr. Harlan, which collection had for many years been stowed away in a ware-house in this city, and had recently been presented to the Academy by the son of Dr. Harlan. The cast is labelled in the hand-writing of the latter, "*Mastodon longirostris* Miocene, Maryland." The original specimen is said to have been found in a miocene deposit, near Greensburgh, Caroline county, Md. For some time it was in the possession of Dr. Ducatel, of Baltimore, and subsequently was deposited in the Museum of that city. Mr. Charlesworth, Sir Charles Lyell, Dr. Harlan and Dr. Hays, who had seen the specimen, considered it as having belonged to the *M. longirostris* or *M. augustidens.* When Dr. Warren was preparing his book on the american Mastodon, he was desirous of inspecting this tooth, but learned that it was lost. Subsequently, a tooth, in the cabinet of the Academy, which had been purchased in London as an american fossil, was suspected to be the missing Baltimore specimen, and as such is described and figured in Dr. Warren's work, (The Mastodon giganteus of North America, p. 92, pl. xxvi.) This tooth, now on the table, by comparison with the cast, proves not to be the so-called Baltimore tooth, though approaching it in a remarkable manner, in size, general form, and in being fractured at the anterior extremity.

Dr. Leidy next exhibited a tooth from the collection of Dr. Harlan, which Dr. Hays says is the original specimen on which the *Tapirus mastodontoides* was founded. The specimen corresponds in size and form very nearly with the description given by Dr. Harlan in his account of *T. mastodontoides* (Fauna Americana, p. 224; Medical and Physical Researches, p. 265.) Dr. L. added, he confirmed the views of Mr. Cooper (American Monthly Journal of Geology, p. 163,) and Dr. Hays, that the specimen was a first milk molar of the Mastodon.

March 23d, 1858.

Vice-President Bridges in the Chair.

Forty-eight members present.

The Rev. Dr. Morris, on the part of the local committee of the American Association for the advancement of Science, extended to all the members of the Academy, an invitation to be present at the next meeting about to be held in Baltimore, to which he added the promise of the cordial hospitality of the citizens.

The following papers were presented for publication in the Proceedings:

Descriptions of a New Helix and two new Planorbes, by Isaac Lea."

"Descriptions of eight new species of Unio, by Isaac Lea."

Which were referred to committees.

135

Mr. Lea remarked, that he had received from Dr. Hayden, so well known for his interesting discoveries of the fossil *Fauna*, of Nebraska Territory, &c., all the fresh water molluscs which he had procured during his journey into those distant and little known Indian countries. Mr. R. Kennicott, a young and ardent student of Natural History, whose letter Mr. Lea read, had also submitted to him a collection of molluscs made by him for the Northwestern University of Evanston, Illinois, from a part of North America rarely visited by the investigator of Natural History, the Red River of the North, which having its source near the head waters of the Mississippi, runs due north into Lake Winnepeg, which Lake discharges its waters through Nelson's River into Hudson's Bay.

It is not to be understood that either of these collections, made under many adverse circumstances, and at times, of great personal danger, should be full representations of this branch of the *Fauna* of these countries. But they are sufficient to prove that zoological life, so far as represented by *Molluscs*, is nearly, if not quite the same, as that of the Ohio River Basin, as well as that of the Missouri River, and a part of that of the Lower Mississippi and Red River of the South. The knowledge of a part of the species from these remote districts, proves to us the wide-spread distribution of the same species, as we find every one of them in the Ohio River at Cincinnati, Marietta and Pittsburg, and this is the more remarkable, as the waters of the Red River of the North are embraced in a different system of drainage, flowing as they do into Hudson's Bay at about 52° North lat. Thus is seen an immense area of country producing in its waters nearly the same life, as regards the *Molluscs;* a fact highly interesting to the Zoologist.

The following species were brought by Dr. Hayden from the mouths of the Rivers Big Sioux and James' River, 43° north, and 97° west,

Unio asperrimus, Lea. U. elegans, Lea. U. alatus, Say. U. lacrimosus, Lea. U. lævissimus, Lea. U. luteolus, Lam. U. rectus, Lam. U. anodontoides, Lea. Margaritana complanata, Lea.

And from the Upper Missouri at Fort Clark, Unio luteolus, Lam., and Margaritana complanata, Lea.

From the Red River of the North, 50° north, Mr. Kennicott procured the following:

Unio asperrimus, Lea. U. alatus, Say. U. luteolus, Lam. U. rectus, Lam. U. rubiginosus, Lea. U. occidens, Lea. U. undulatus, Bar. Anodonta Ferussaciana, Lea. A. decora, Lea.

Every species from these two habitats is found in the vicinity of Cincinnati, and several of them, viz: *Unio asperrimus*, *anodontoides*, *rubiginosus*, and *Anodonta Ferussaciana* are found in the waters of Louisiana. Even in Georgia there are two of them, viz: *Unio anodontoides* and *Unio alatus.*

Mr. Lea did not wish to be understood that he believed all the species of the *Unionidæ*, which were common in one part of this great area, were the same which inhabited the waters of other parts. On the contrary, they differed much in the lower Mississippi, but still there are some species which are common in the Ohio, as high up as Pittsburg, which are found in Moose River, of Hudson's Bay, 52° North, in Red River of the north, 50° North, in Upper Missouri, 47° North, and in the Big Sioux, 43° North. There are also some others which are common at Pittsburg, which are found as far south as Louisiana, 30° North, and in Georgia, 34° North.

These facts Mr. Lea believed to be important in regard to the geographical distribution of the species, some of which are found to be so extensively distributed, while it is well known that some few are restricted, so far as our present knowledge extends, to points embraced within very short distances in a single river. As an illustration of this, the *Unio spinosus, Unio Shepardianus, Margaritana arcula*, &c., may be cited.

	Moose River, Hudson's Bay, 52° N.	Red River of the North, 50° N.	St. Lawrence River and Genesse River.	Bad Lands in Nebraska.	James' River, and Big Sioux, 43° N.	Up. Missouri, Fort Clark, 47° N.	Cincinnati, 39° N.	Georgia, 34° N.	Alexandria or New Orleans, La., 30° N	Florence or Tennessee River, Ala.
Unio rubiginosus, Lea.		1					1		1	
" luteolus, Lam.	1	1	1		1	1	1			
" lævissimus, Lea.					1		1			
" occidens, Lea.		1					1			
" anodontoides, Lea.					1		1	1	1	
" asperrimus, Lea.		1		1	1		1		1	
" elegans, Lea.				1	1		1			
" rectus, Lam.		1	1		1		1			1
" zig-zag, Lea.				1			1			
" alatus, Say.		1	1		1		1	1	1	1
" undulatus, Bar.		1					1			
Anodonta Ferussaciana, Lea.		1		1			1			
" decora, Lea.		1					1			
Margaritana complanata, Lea.					1	1	1			

Dr. Leidy read the following letter :

Saint Louis, March 16, 1858.

My Dear Sir,—I have the pleasure of announcing to you, that I have just completed an examination of some fossils, collected by Dr. G. S. Shumard from the White Limestone of the Guadalupe Mountains, New Mexico, while he was connected with the expedition of Capt. John Page, and I am fully convinced that these fossils are Permian, The collection contains about forty species, a number of which are identical with species of the Permian system of Russia and England.

We have specimens which agree perfectly with Verneuil's descriptions and figures of *Camaraphoria Schlotheimi* and *C. Geinitziana* from the Permian System of Russia. We have also an *Aulosteges* which resembles *A. Wangenheimi* (Verneuil,) though it is doubtless a distinct species. This genus has not, I believe, been found lower than the Permian.

The *Productus Leplayi* is represented, and there is another *Productus* which is very analogous to *P. cancrini*, (Vern.) The *Spirigera pectinifera*, (Vern. sp.) *Terebratula superstes*, (Verneuil,) *Spirifer cristata* and *S. permiana*, of King, are undoubtedly in our collection, and also *Acanthocladia anceps*, (King) and *Synocladia virgulacea*, (King,) all of which are species of the Permian of Russia and England. Besides, there is a *Monotis* which resembles *M. speluncaria.* We also recognized several species that are in Professor Swallow's collection from the Permian Rocks of Kansas. According to measurements made by my brother, these Permian Rocks attain a thickness of more than a thousand feet in the Guadalupe Mountains. The rock is a remarkably pure white limestone, and portions of the mass abounds in fossils. It is underlaid by sandstones and limestones of the coal measures, containing the same fossils as characterized this formation in Missouri, Iowa and Illinois, but in New Mexico scarcely a single species ranges from the Coal Measures into the Permian.

I am now engaged in preparing descriptions of the new Permian Fossils. Will you be kind enough to announce this discovery at the next meeting of the Philadelphia Academy. Sincerely yours,

B. F. Shumard.

Mr. Lesley exhibited a specimen of lignite from the Upper Wachita River, Louisiana, received through Mr. Perry, of New Orleans. It is remarkable for containing rosin in quite visible masses. Sometimes the rosin is found in masses as large as a nut, sometimes in veins. It is from a tertiary formation.

Mr. Lea has a specimen of rosin which Sir Henry De La Beche had sent him, it was found with coal in Borneo, and is as large as a hickory nut.

March 30.

Vice-President Bridges in the Chair.

Fifty-eight members present.

The committees on Dr. Wilcocks' paper, on Messrs. Meek and Hayden's paper, read March 2nd; on Mr. Stimpson's paper, on Dr. Leidy's paper read March 9th, on Dr. LeConte's paper, on Mr. Uhler's paper read March 16th; on two papers by Mr. Lea, read March 23d; severally reported in favor of their publication in the Proceedings, and the reports were adopted.

The amendments to the By-laws proposed January 26, and successively passed to second and third reading, were unanimously adopted as follows:

CHAPTER XIII.

ON THE CREATION AND GOVERNMENT OF DEPARTMENTS.

Art. I. To facilitate and encourage the special investigation of certain branches of natural science, the members of the Academy may form Departments, and hold meetings in the Hall, distinct and separate from the general meetings of the Academy. The Departments shall be A, B, C, D, E, &c., and may be constituted and designated in the manner herein provided. The Department earliest established, shall have precedence of every one subsequently formed.

Art. II. Any twelve or greater number of members of this Academy, may be constituted a division or department, which shall be called the   Department of the Academy of Natural Sciences of Philadelphia, as provided in the third article of this chapter.

Art. III. Whenever members associate to form a department or branch, written application shall be made to the Academy, at a meeting for business, in the following words: The undersigned members request that they may be constituted the   Department of the Academy of Natural Sciences of Philadelphia. [Note.—The blank is to be filled with the name of the branch of natural sciences to which the petitioners propose to devote themselves.]

Upon such application being made, the Academy may establish the Department by the enactment of a clause additional to Article XXI. of this chapter, designating the name of the Department. If the Department be thus created the names of the petitioners shall be entered on the record of Proceedings as its founders.

Art. IV. The officers of each Department shall be a Director, a Vice Director, a Recorder, a Treasurer, and a Conservator, who shall be elected at the first meeting of the department, and subsequently at the first meeting in December of every year.

Art. V. None others than members of the Academy shall be members of any one of its Departments.

Art. VI. Each Department, formed as herein provided, shall elect its own officers and members.

Art. VII. Every candidate for admission into a Department shall be proposed, in writing, by two of its members at one meeting, and be balloted for at the meeting next succeeding. The affirmative vote of three-fourths shall be necessary to elect a candidate, but no election of members or of officers of a Department shall be valid, unless there be present at the meeting at least six legal voters.

Art. VIII. Every member elect shall pay to the Treasurer of the Department an initiation fee and a semi-annual contribution, the amount of which shall be determined by the members of the Department, provided that a Department shall not assess its members at a rate exceeding two dollars initiation and two dollars semi-annual contribution. In other respects, the By-Laws, (Chapter II.) which govern the "election of members and correspondents" of the Academy, shall apply also to the election of members of any of its Departments.

Art. IX. Members of a Department may resign or be expelled from it, in conformity to the By-Laws of the Academy, (Chapter IV.)

Art. X. The By-Laws (Chapter V.) which apply to the officers of the Academy, shall apply also to analogous officers of each Department, except the Treasurer of a Department, who shall collect and have charge of its funds, but shall disburse no money or monies except by the affirmative votes of the Department, vouched for by the signature of its Director and Recorder;

and shall submit a detailed statement of his accounts to the Department at the first meeting in December of each year.

ART. XI. Each Department shall defray the expenses which are peculiar to it. The Academy will not be responsible for debts contracted by any Department, or by any officer or member thereof.

ART. XII. Members and correspondents of the Academy are entitled to attend the meetings of any of its Departments, but shall have such privileges only in a Department as those granted by the Academy to its correspondents. (Chapter I. Art. iii.)

ART. XIII. Each Department may appoint such special and standing committees as may be considered necessary for its scientific objects.

ART. XIV. The Committees of each Department shall be governed by the same rules (Chapter VI.) which govern the Committees of the Academy, as far as they are applicable.

ART. XV. The collections and books of each Department are the common property of the Academy; nevertheless, whenever it may be deemed advantageous to the interests of the Institution, the Curators of the Academy may permit the collections of a Department to be arranged in accordance with the written request of its Conservator. Donations addressed to or for any Department, shall be received as donations to the Academy for the use of that Department.

ART. XVI. Each Department, at the first meeting after the election of its officers, shall determine, subject to the approval of the Academy, the evenings of its stated meetings, provided that no Department shall select a time of meeting previously occupied by the Academy, or any of its established Departments.

ART. XVII. The order of business at the meetings of each Department shall be in accordance with the provisions of these By-Laws, as far as applicable. (Chapter XI., Art. vii.)

ART. XVIII. Each Department shall submit to the Academy, at every meeting for business, the record of its procedings for the month, or in lieu of it, at the option of the Academy, a written summary thereof.

Art. XIX. Papers from any Department designed for publication in the Proceedings or in the Journal of the Academy, shall take the course provided in these By-Laws (Chapter X.), except that each Department may refer papers read before it to a special committee, which shall report to the Academy at the meeting for business next succeeding its appointment, which report shall be treated as if it emanated from a special committee of the Academy.

The papers of each Department shall be paged and entitled in such manner as to permit the Proceedings, as well as the Journal, of each Department, to be bound in separate volumes and appropriately labelled.

Art. XX. On all points not provided for in this Chapter, each Department shall be governed by the Charter, By-Laws and usages of the Academy.

Art. XXI. The Department A. shall be denominated the Biological Department of the Academy of Natural Sciences of Philadelphia.

Chapter XI. Art. viii. shall be amended so as to insert

2. Proceedings and Reports from Departments in their order of precedence,

next after the line

"1. Minutes of the last meeting for business shall be read."

And also so as to change the numbers 2, 3, 4, 5, 6, 7, 8, 9 to read 3, 4, 5, 6, 7, 8, 9, 10.

Dr. Hammond offered the following:

Resolved, That those members of the Academy who have signed the memorial offered January 26th, since the record, be added to those already recorded as founders of the Biological Department; which was adopted.

Dr. LeConte moved that a committee be appointed for the purpose of drafting a series of By-laws for the government of the Committee on Proceedings, which was appointed—to consist of Drs. LeConte, Ruschenberger and Wilson.

Mr. Vaux offered the following:

Resolved, That the Library Committee be authorized to dispose of the French Historical Documents, at such price as they deem proper, if opportunity offer; which was adopted.

Remarks on an Optical Illusion.

BY ALEXANDER WILCOCKS, M. D.

I desire to draw the attention of the Academy to one of the phenomena of sight, which is interesting, because I conceive that it has led some zealous investigators of the mysteries of nature into error.

I allude to that power of the retina, by which an impression made upon it by a luminous object is retained, during an appreciable time.

The most familiar illustration of this law, is in the whirling of a piece of lighted charcoal in the dark. The result is the formation of a luminous ring, more or less perfect, according to the rapidity of the motion of the hand.

Experience has not only abundantly proved the existence of this peculiarity of the retina; but it has also determined the duration of the impressions. It has been found to be from one tenth, to one eighth of a second.

Such at least is true of persons in good health: but there is reason to believe that there are cases where the duration of impressions is much longer.

If when under suitable circumstances, a luminous body is moved before the eye at rest, we perceive a line of light, we may naturally expect, that when the converse condition obtains, we shall witness a similar phenomenon.

By the converse condition, I mean that wherein the luminous object is at rest, and the eye in motion about one of its own axes.

Requirements so simple are easily obtained; the most convenient object upon which to make the experiment is the star Sirius. The precautions to be observed, are to choose a time when the moon does not shine, and the star is high above the horizon; and a place where the eye will not be dazzled by any artificial light. The observer must be free from all sense of fatigue, because the eye sympathizes readily with the condition of the body, and any cause that interferes with the rapidity of the motions of the organ, would endanger the success of the experiment.

Experiment 1st. Let the observer turn his face toward the star, but fix his eyes upon a point about ten degrees to the east of that object, then suddenly placing his eyes upon the star, he will perceive a ray or flash of light reaching from the star to a point ten degrees to the west.

Experiment 2nd. Keeping his eyes for a moment upon the star, let the observer return them to their first position, and he will perceive that the flash of light will extend from the star to that position.

Any one who will trace in his mind the course pursued by the image of the star upon the retinæ, during this motion of the eyes, will ascertain that these results are precisely what *à priori* reasoning should lead us to expect.

In the experiments just described, the flashes of light are straight. If instead of the star Sirius, we choose for our experiment, the planet Jupiter, at a time when that body is within twenty-five degrees of the zenith, we shall discover that the flashes of light are curved, and the convexity of the curve invariably toward the earth.

It must be noticed in connection with this peculiarity, that any observations upon an object at such an altitude as the one proposed, viz. sixty-five degrees, would require that the eyes should be much raised above their usual plane of motion. The physiologist may find much difficulty in explaining why the elevation of the eyes in their orbits should cause the flash of light to be curved; and why the convexity should be toward the earth; but, that the facts exist, others may verify for themselves.

The particular interest which attaches to this experiment is from the light which it throws upon the results of some observations upon meteors, the explanation of which has baffled the ingenuity of astronomers.

In the year 1798, Brandes, of Leipsig and Benzenberg, of Dusseldorf, undertook to measure the height and velocities of meteors. Having established a base line of 46,200 feet, and provided themselves with chronometers, they stationed themselves at the ends of the line, and watched for meteors, carefully noting the times of their appearance, and their courses. By these means, the observers were enabled to identify twenty-two of these objects; and the data thus derived, yielded satisfactory results as to height and velocity.

The most remarkable feature of their observations, was, that one of the meteors instead of falling, *moved in a direction away from the earth.*

A curve in the train of a meteor with the convexity downward, would indicate a motion from the earth.

Nearly all the phenomena of meteors have been accounted for by theories which men of science regard, if not as satisfactory, at least as plausible; but I believe no astronomer has yet had the hardihood to attempt to explain, how a meteor can approach near enough to our planet to be inflamed by its atmosphere, and become visible to its inhabitants, and then move off in defiance of the law of gravitation.

I have detailed experiments which show that stationary objects in the heavens, under certain circumstances, appear associated with flashes of light which are curved with their convexity towards the earth; and I trust that what I have said will convince the Academy that there is the greatest probability that the anomalous appearance described by Messrs. Brandes and Benzenberg, was only an example of the optical illusion which it is the purpose of this paper to explain.

Notice of Remains of Extinct Vertebrata, from the Valley of the Niobrara River, collected during the Exploring Expedition of 1857, in Nebraska, under the command of Lieut. G. K. Warren, U. S. Top. Eng., by Dr. F. V. Hayden, Geologist to the Expedition.*

BY JOSEPH LEIDY, M. D.

During the Exploring Expedition of the last year in Nebraska, under the command of Lieut. G. K. Warren, the Geologist of the Expedition, Dr. F. V. Hayden collected a number of remains of mammals and turtles, from a deposit, in the valley of the Niobrara River (Swift-running-water; L'eau-qui-court), which he suspects to be of pliocene age. The collection is an exceedingly interesting and important one; and the anatomical characters of the specimens support the opinion of their discoverer, that the formation, from which they were obtained, belongs to the later tertiary period.

The extinct fauna of the Niobrara is especially rich in remains of ruminating and equine animals. Among the former are several peculiar genera, of which two are closely allied to *Oreodon* and *Leptauchenia*, of the miocene deposit of the Mauvaises Terres: one is allied to the Musk-deer, and another closely approaches the Camel. Besides the remains of a true species of *Equus*, the col-

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*WASHINGTON, (D. C.) March 8, 1858.

Capt. A. A. Humphreys, T. E., Ch'ge Off. Expl. and Surveys.

SIR: Professor Joseph Leidy has prepared a "Notice of Remains of Extinct Vertebrates," constituting twenty-eight new species, collected by Dr. Hayden along the Niobrara River, on the Expedition placed under my command by the War Department, during the past summer, which, it is desirable, should be published at once in the Proceedings of the Academy of Natural Sciences of Philadelphia. The permission of the Honorable Secretary of War, to make the publication, is requested.

Very respectfully, sir, your obedient servant,
G. K. WARREN,
Lieut. Top. Eng'rs.

Submitted to the Secretary of War. The publication is approved by him.
A. A. HUMPHREYS,
Capt. Top. Eng'rs. in Charge.

lection contains those of two species of *Hipparion*, and several peculiar genera of the equine family. There are also remains of several species of canine and feline animals, of a small species of Beaver, and of a species of Porcupine more nearly allied to that of the old world than to our own recent one. The collection further contains remains of a Rhinoceros, resembling that of India, those of a new species of Mastodon, and those of a large Elephant.

One of the most remarkable circumstances, in relation with this extinct fauna, is that it is more nearly allied to the present recent one of the old world than to that of our own continent. From a comparison of our recent fauna and flora with that of the eastern continent, the deduction has been made, that the western continent is the older of the two, geologically speaking, whereas, the Niobrara fauna would indicate just the reverse relationship of age. A number of similar instances show that totally different faunæ and floræ may be cotemporaneous, and do not necessarily indicate different periods of existence.

CARNIVORA.

Canis saevus, Leidy.

Several much mutilated fragments of two lower jaws indicate a species of Wolf, about the size of the *Canis occidentalis.*

Height of fragments of lower jaws below the sectorial tooth,	14 lines and $15\frac{1}{2}$ lines.
Antero-posterior diameter of the lower sectorial tooth,	13 lines and $13\frac{1}{2}$ lines.

The present extinct species is not so large as the one whose remains have been discovered in association with those of the *Megalonyx*, *Tapirus*, *Equus*, &c., on the banks of the Ohio River, Indiana, to which the name of *Canis primævus* was inadvertently applied (Proc. Acad. Nat. Sci. vii. 200; Journal A. N. S. iii. 167), and which may now be distinguished by that of Canis dirus.

Canis temerarius, Leidy.

A second species of Wolf is inferred to have existed, from two small fragments of an upper and a lower jaw, containing the sectorial teeth, and the first upper tubercular tooth, about the size of the corresponding parts of the Red Fox, *Canis fulvus*.

Height of fragment of lower jaw below the sectorial tooth,	8 lines.
Antero-posterior diameter of lower sectorial tooth,	$7\frac{1}{2}$ "
Antero-posterior diameter of upper sectorial tooth	7 "
Transverse diameter of first upper tubercular tooth,	$6\frac{1}{2}$ "

Canis vafer, Leidy.

A third species of *Canis*, of small size, is indicated by the greater portions of both sides of a lower jaw, containing nearly all the teeth, which do not differ in form from those of the Red Fox.

Depth of lower jaw at the sectorial tooth,	6 lines.
Length of entire molar series,	$21\frac{1}{2}$ "
Antero-posterior diameter of sectorial tooth,	$5\frac{1}{2}$ "
Length of crown of canine tooth,	$5\frac{1}{4}$ "

Canis (Epicyon) Haydeni, Leidy.

Since the preceding descriptions of wolves were written, Dr. Hayden has sent to me for examination a specimen belonging to the Niobrara collection, consisting of a much mutilated fragment of a lower jaw of a huge wolf.

The fragment contains the sectorial molar, the two preceding premolars, and the sockets for the tubercular molars. The teeth preserved in the specimen are much worn, indicating an old individual, but they have the form of the corresponding teeth in the recent Wolf. The tubercular molars have occupied more than an inch of space, though more crowded in position than in recent wolves. The last, as well as the first, was inserted by widely separated fangs and was implanted almost directly backward in the ascending border of the ramus, above the level of the heel of the sectorial molar.

The portion of jaw is remarkable for its robustness; the thickness of the anterior border of the ramus an inch above the ordinary line of the teeth being eight lines.

The species is respectfully dedicated to Dr. F. V. Hayden, the untiring geological explorer of the region of the Upper Missouri.

Depth of jaw at sectorial molar,	21 lines.
Thickness of jaw below sectorial molar,	9 "
Extent of space occupied by the sectorial and preceding two premolars,	34 "
Antero-posterior diameter of sectorial molar,	17 "
Transverse diameter of sectorial molar,	7½ "
Space occupied by the tubercular molars,	14 "

Felis (Pseudælurus) intrepidus, Leidy.

An extinct species of the cat tribe is indicated by a well preserved specimen of the lower jaw of an animal intermediate in size to the Panther (*Felix concolor*) and the Lynx (*Felix canadensis*). The jaw together with the teeth present a repetition of form of the corresponding parts in known species of cats, except that in the middle of the hiatus behind the canine tooth there is a smaller socket for a rudimental premolar, as in the extinct *Felis* (*Pseudœlurus*) *quadridentatus* of Europe, and the sectorial molar has a basal heel and tubercle about half as well developed as in the preceding teeth.

Length of the lower jaw from the condyle	58 lines.
Height of the lower jaw at coronoid process	27 "
Height of the lower jaw below middle molar	11 "
Length of molar series (3)	21 "
Antero-posterior diameter of sectorial molar	7 "
Height at posterior cusp of sectorial molar	5½ "

Aelurodon ferox, Leidy.

The only specimen upon which this name is proposed, consists of an isolated, unworn, upper sectorial molar tooth, which has about the size and proportionate form of that of the common Wolf of this country or Europe, but has a tubercle or lobe in advance of the principal cusp nearly as well developed as that occupying the same position in the cats.

Breadth of crown antero-posteriorly and externally	13 lines.
Length of crown at principal cusp	8½ "
Thickness of crown at base anteriorly	7 "
Thickness at base of principal cusp	5½ "

RODENTIA.

Hystrix (Hystricops) venustus, Leidy.

Two isolated molar teeth, probably both referable to the same animal, have about the same size and nearly the same constitution as those of the Crested Porcupine (*Hystrix cristata,*) of Europe. One of the teeth appears to correspond with the first upper molar of the right side of the latter animal. It has a single deep fold on the inner side, and a less extensive one on the outer side. The crown, about one-fourth worn, presents on the triturating surface the fold extending from the inner and outer side, and in advance a bow-like enamel islet, and behind a transverse boot-like islet and a small circular one. The second specimen, viewed as an upper left tooth, has a deep fold on the inner side, in advance of which on the triturating surface is an oblique enamel islet, and behind, two similar ones.

Antero-posterior diameter of the first molar	5½ lines.
Transverse diameter of the first molar	4 "
Antero-posterior diameter of the second molar	3 "
Transverse diameter of the second molar	3½ "

CASTOR (EUCASTOR) TORTUS, Leidy.

The greater part of an upper jaw, consisting of the upper maxillæ and intermaxillæ containing the greater portion of the incisors, together with the anterior three molars of both sides, indicates an old individual of a small Beaver. The jaw and incisor teeth have the same form as the corresponding part of the recent Beaver. The first molars present nearly the same arrangement as in the latter. The succeeding two molars are nearly worn to the base of their crown; and they have the enamel folds on the triturating surface directed much more obliquely from the outer side inward and backward than they would ever appear to do in the same condition in the recent Beaver. The size of the species was about half that of the latter animal.

Length of space occupied by the series of four molars	6	lines.
Length of space from first molar to the inter-incisive crest	14	"
Breadth of face outside of second molars	7	"
Diameter of incisors	2	"
Diameter of first molar	2½	"

RUMINANTIA.

CERVUS WARRENI, Leidy.

This species of deer is indicated by a fragment of a lower jaw containing the posterior four molar teeth, portions of two last inferior molars, a small antler, and a small fragment of a second. The form of the teeth is the same as in *Cervus virginianus*, and their size accords with that in full grown and robust individuals of this species. The antler is perhaps that of a young animal. The frontal process supporting it is half an inch in length and thickness. A little less than an inch above the ring of the antler it divides into two diverging prongs, of which one is broken off, and the remaining one is two and a quarter inches long.

Length of series of the posterior four lower molars 30 lines.

The species is respectfully dedicated to Lieut. G. K. Warren, U. S. A., commander of the expedition, during which the remains were collected forming the subjects of the present communication.

MERYCODUS NECATUS, Leidy.

Proc. Acad. Nat. Sci. vii. 90; ibid. viii. 89.

This genus and species were originally proposed on a small fragment of a lower jaw of a ruminating animal, belonging to the collection of Prof. Hall, of Albany, and discovered by Messrs. Meek and Hayden on Bijou Hill, Nebraska, in the summer of 1853.

The collection from the Niobrara contains the greater portion of four halves of lower jaws, together exhibiting a full series of molar teeth.

The form of the jaw supporting the teeth is much like that of the Deer, except that its base turns up posteriorly as in the Musks.

The inferior true molars have much more nearly the form of those of the Sheep than of those of the Deer or Musk. The posterior two premolars have crowns very much like that of the second premolar of the Deer, and the first is like the corresponding one in the same animal.

Depth of lower jaw at first premolar	6	lines.
Depth of lower jaw at last true molar	8½	"
Length of series of six molars	26	"
Length of series of true molars	17	"

PROCAMELUS OCCIDENTALIS, Leidy.

This genus and species are founded on several fragments of jaws, with teeth of several individuals of an animal allied to the Camel, and about two thirds its size.

The posterior fragment of a lower jaw presents the same general form as in the corresponding part of the Camel, but is broader at the ramus in relation with its height than in the latter. The posterior coronoid process is well developed; and the upper part of the ramus is more strongly depressed externally than in the Lama (*Auchenia*). The body of the lower jaw is relatively deeper than in the Camel, though not so robust; and the two sides are cöossified by a comparatively short symphysis.

Six molar teeth form a closed row in the lower jaw, being two additional to the number in the Camel and Lama. The true molars and the last premolar have nearly the same form as the corresponding teeth of the Camel. The second premolar is a reduced one from that behind it; and the first premolar has a laterally compressed ovate crown implanted by two fangs.

In a small fragment of a lower jaw, in the middle of the hiatus, in advance of the closed row of molars, there is the fang of a tooth, which appears to have been a caniniform premolar. The mental foramen is just in advance and below the position of this tooth. A foramen likewise exists below the third premolar of the closed row of teeth, corresponding to that more posteriorly situated in the Camel and Lama.

Two mutilated but connecting fragments of an upper jaw present the hard palate more deeply arched than in the Camel or Lama; and the face narrows in advance of the molar teeth as in the latter. A palatine foramen exists opposite the interval of the second and third premolars. The infra-orbital foramen occupies the same relative position as in the Camel.

As in the lower jaw, six molar teeth form a closed row in the upper jaw. The true molars, though much mutilated in the specimens under examination, appear to possess the same form as those of the Camel. The last premolar is also like the corresponding tooth of the latter. The second premolar is like the first one of the Camel, with the exception that it has the antero-internal fold of its crown as well developed as the posterior fold, which it joins at the base. The first premolar is like the first one of the series in the Lama, having a trilobate, flattened, oval crown.

Height of the ramus of the lower jaw, from its base to its condyle,	4 inches	10 lines.
Depth of lower jaw below last molar,	2 "	
Distance from last molar to the end of the posterior coronoid process,	4 "	
Depth of lower jaw at middle of the hiatus of the teeth,		10 "
Breadth of face in advance of upper molars,	1 "	6 "
Breadth of face at back molars,	4 "	
Length of upper molar series,	4 "	8 "
Length of lower molar series	4 "	10 "
Length of upper true molar series,	3 "	
Length of lower true molar series	3 "	5 "

Megalomeryx niobrarensis, Leidy.

This genus and species are proposed on two lower molar teeth, in the Niobrara collection, which indicate a ruminating animal of the largest size. One of the specimens is apparently a first true molar, and is inserted into a fragment of the jaw by a pair of strong fangs. The crown is two-thirds worn away, and presents the same form as the corresponding tooth of the Sheep in the same condition. The antero-postero diameter of the crown is 21 lines; the transverse diameter $11\frac{1}{2}$ lines.

The second specimen is an isolated, nearly unworn, first or second true molar, with the form nearly the same as in the corresponding teeth of the Sheep. Its length is three and one-third inches; its antero-posterior diameter, at the triturating surface, is two inches, and just above the developing fangs an inch and a half; the transverse diameter, in the former position, is seven lines, and in the latter nine and a half lines.

Merycochoerus proprius, Leidy.

The genus and species are based on several halves of upper and lower jaws of a large animal, discovered by Dr. Hayden in the red grit bed of Niobrara, near Fort Laramie, Nebraska. The formula of dentition and relative position of the teeth with one another are the same as in *Oreodon.* The true molars present a repetition of the form and structure of those of the latter genus, and the premolars nearly so. The upper anterior two premolars have a greater breadth in relation with their length and thickness than in *Oreodon;* and the anterior two lower ones are more crowded in position.

The side of the face turns rather abruptly outward and backward from above the position of the true molars, more even than in the Hog, whereas, in the three described species of *Oreodon*, it slopes gradually backward aud outward, more as the Wolf. The infra-orbital foramen is above the interval of the first and second true molars, while in *Oreodon* it is above the third premolar. The malar bone below the orbit is, relatively to the size of the animal, deeper than in the Hog, but in *Oreodon* it is not more so than in the Wolf.

Length of upper series of molars,	74 lines.
Length of lower series of molars	69 "
Length of upper series of true molars,	43 "
Length of lower series of true molars.	45 "

MERYCHYUS, Leidy.

The formula of dentition, and the relative position, structure, and form of the teeth are nearly the same as in LEPTAUCHENIA. In this genus, of which the remains of two species, *L. decora* and *L. major*, were discovered by Dr. Hayden in the upper miocene beds of White River, near Eagle Nest Butte, Nebraska, the formula of dentition and relative position of the teeth with one another are the same as in OREODON. The crowns of the molars are relatively much longer, and at their outer part are more vertical than in the latter, differing in these respects very much as the molars of the Ox and the Deer. The outer lobes of the upper true molars are separated quite to the fangs by narrow, deep, vertical folds inclining forward. The inner lobes of the lower true molars are separated by narrow, overlapping folds, and present internal plane surfaces, while those of *Oreodon* are folded as in the Deer. The premolars are more crowded than in *Oreodon;* and in the case of the upper ones, the most elevated point of the triturating surface is much more anterior than in the latter. The enamel pits of the triturating surfaces of the true molars are very narrow in comparison with those of *Oreodon*, and in the lower teeth are quickly obliterated. The canines are relatively small in comparison with those of the latter genus.

In *Merychyus*, of which there appear to be three species, as indicated by the remains discovered by Dr. Hayden in the pliocene deposit of Niobrara, the folds separating the outer lobes of the upper true molars have the same form as in *Leptauchenia*, but are not so deep, do not incline forward, and do not divide the crown through its base. The lower true molars have their inner surfaces as plane as in the Camel, and have their lobes but feebly separated in comparison with the condition in *Leptauchenia.* The canines are as well developed as in *Oreodon.*

MERYCHYUS ELEGANS, Leidy.

This species is founded on several halves of upper and lower jaws, containing admirably preserved series of teeth. The animal was nearly the same size as *Leptauchenia major.*

Length of the upper jaw, from the back molar tooth to the front of the incisors,	43 lines.
Length of upper series of seven molars,	37 "
Length of lower series of six molars	34 "
Length of upper series of true molars,	22 "
Length of lower series of true molars	23 "
Depth of lower jaw at first true molar,	11 "
Depth of lower jaw at last true molar	15 "

Merychyus medius, Leidy.

The second species is founded upon a fragment of the lower jaw, containing the true molars, an isolated upper last true molar, and an isolated upper canine tooth.

Length of series of lower true molars,	34 lines.
Antero-posterior diameter of the upper last true molar,	14½ "

Merychyus major, Leidy.

This species is proposed upon a fragment of the upper jaw containing the last pair of premolars and the succeeding pair of true molars. The latter teeth differ from the isolated upper molar of the preceding species in possessing a well defined basal ridge, of which the faintest traces only exist in *M. elegans* and *M. medius.*

Length of space occupied by the two premolars and succeeding two true molars,	44 lines.
Antero-posterior diameter of second true molar,	16 "

SOLIPEDIA.

Anchitherium (Hypohippus) affinis, Leidy.

A single specimen consisting of the crown of an upper molar tooth, in Dr. Hayden's collection, has the same form as the corresponding teeth of *Anchitherium,* except that the outer surfaces of its external lobes present no trace of median rising. It indicates an animal larger than *A. aurelianense* and about the size of *Palæotherium crassum.*

Antero-posterior diameter externally	14 lines.
Transverse diameter anteriorly	13½ "

Anchitherium (Parahippus) cognatus, Leidy.

The Niobrara collection contains three isolated unworn crowns of upper molar teeth, which have the same form as the upper deciduous molars of *Anchitherium Bairdi* or *A. aurelianense,* except that the outer extremity of the prolongation of the postero-internal lobe branches into several short folds. These latter have the same arrangement as similar but more numerous folds in the same position in *Merychippus.*

Length of the series of three molars,	31 lines.
Antero-posterior diameter of the first molar,	12 "
Transverse diameter of the first molar	8 "
Antero-posterior and transverse diameters of the third molar,	9 "

Independent of the remains of the anchitherioid genera *Parahippus* and *Hypohippus,* the collection made by Dr. Hayden contains numerous fragments of the skeleton of apparently six different equine animals, which, however, exhibit such an interchange of characters, that at present it appears impossible to specify the isolated teeth and bones. The following genera and species appear to be indicated by the more characteristic specimens of the collection.

Equus excelsus, Leidy.

This species is about the size of the largest variety of the recent Horse, as indicated by molar teeth and bones of the limbs. The teeth do not differ in constitution from those of the recent Horse; and none of them present a greater degree of complication of the enamel folds on their triturating surface.

Equus (Protohippus) perditus, Leidy.

A second species of Horse, of small size, is especially indicated in the Niobrara collection, by a fragment of an upper jaw containing the posterior four molars. The portion of jaw is like the corresponding part in the recent Horse. The molar teeth have their crowns about one-fourth worn. The enamel folds on the triturating surfaces are even less complex than in the recent Horse, and the antero-internal fold or column has the same form, direction and mode of continuation as the postero-internal one. The space occupied by the four teeth is about three inches in length, and about ten lines in breadth. Dr. Hayden's collection also contains bones of the limbs which correspond in relative size with the jaw and teeth above noticed.

Figure 1, plate 7, of M. Gervais, Rech. s. l. Mammiferes Fossiles de l'Amérique méridionale, apparently represents a species of the same equine subgenus as the above. No extent of attrition of the corresponding teeth of the domestic Horse will produce the same appearance indicated in this figure.

MERYCHIPPUS, Leidy.

This genus is a much more remarkable one than could have been anticipated from an examination of the specimen alone from which it was first characterized. The specimen alluded to consists of the anterior upper two large molars, contained in a small fragment of the jaw, and was obtained by Dr. Hayden, at Bijou Hill. The two teeth are intermediate in form to the corresponding ones of *Anchitherium*, and the upper true molars of the Deer, and they bear a strong resemblance to those referred above to the anchitherioid genus *Parahippus*. From the teeth of the latter, they differ only in having their intermediate lobes prolonged posteriorly past the inner conical lobes, so as to make them assume the appearance of the inner lobes of the upper true molars of ruminants.

In a fragment of the upper jaw of a young animal, in the Niobrara collection, apparently belonging to a second species of *Merychippus*, the second and third temporary molars and their permanent successors are contained. The temporary molars have the same form as the teeth from which the genus was first characterized would have, in a more worn condition. They are invested with cementum, though in less quantity than is usual in the Horse, and it is more readily detached, which appears to have been the case in the two teeth from Bijou Hill. The crowns of the permanent teeth contained within the fragment of jaw under examination have the same form as the corresponding teeth of the recent Horse, with the modifications above noticed characterizing the subgenus *Protohippus*.

MERYCHIPPUS INSIGNIS, Leidy.

Proc. A. N. S. viii. 311; 1857, 89.

This species was characterized from the fragment of jaw containing what now appear to me to be the upper anterior two temporary molars, from Bijou Hill. The Niobrara collection contains a portion of the upper jaw, which appears to belong to this species, having an entire series of permanent molars, (exclusive of the small one,) so far worn as to be inserted by fangs. The series of teeth occupy a space of almost four inches in length and ten lines in breadth.

MERYCHIPPUS MIRABILIS, Leidy.

Appears to be a distinct species from the former, of larger size. It is indicated in the Niobrara collection, by a specimen previously noticed, consisting of a fragment of the upper jaw, containing the second and third temporary molars and their permanent successors. Another specimen, in the same collection, belonging apparently to this species, consists of a fragment of the upper jaw of an adult individual, containing the back four molars, which are so far worn as to be inserted by fangs. The four teeth occupy a space of three and one-third inches in length and an inch in breadth.

The two fragments of jaws, above mentioned, have a deep depression or lachrymal fossa in advance of the orbit, as in the Deer, Oreodon, &c.

HIPPARION S. HIPPOTHERIUM OCCIDENTALE, Leidy.

Hipparion occidentale: Pr. A. N. S. vii. 59; 1857, 89.

The remains of this species were originally discovered by Dr. Hayden in a superficial deposit at White River, Nebraska. A number of molar teeth in the Niobrara collection appear to belong to the same species.

HIPPARION S. HIPPOTHERIUM SPECIOSUM, Leidy.

Hipparion speciosum: Pr. A. N. S. viii. 311; 1857, 89.

The remains of a smaller species of *Hipparion* than the preceding, were originally discovered by Dr. Hayden on Bijou Hill. Numerous teeth of the species are contained also in the Niobrara collection.

PACHYDERMATA.

RHINOCEROS CRASSUS, Leidy.

The Niobrara collection contains small fragments of two lower jaws of young animals, a much worn upper incisor, a last upper molar, and an upper premolar, apparently of the deciduous series, of a species of Rhinoceros, which appears to have had almost the same size and formula of dentition as the recent Indian Rhinoceros, (*R. indicus.*)

One of the fragments of lower jaws, consisting of the symphysial portion with sockets for four incisors, indicates these to have had the same relation of size and form as in *R. indicus.*

The upper lateral incisor has nearly the form and size of the corresponding tooth of *R. indicus.* The antero-posterior diameter of its crown is two and one-third inches, and its transverse diameter three-fourths of an inch.

The last upper molar, which belonged to an old individual as indicated by its worn condition, is of the form usual in most species of living Rhinoceros. Its antero-posterior diameter internally is two inches, and its oblique diameter posteriorly about half an inch more.

The upper deciduous premolar has the narrower portion of its crown anteriorly. The triturating surface of the specimen presents a tract of dentine on the outer wall and summits of the inner lobes of the tooth. The outer wall has a median ridge externally, corresponding to the most elevated point of its triturating surface. The anterior border of the outer wall has the same form as the posterior one, but is shorter and more prominent. The inner lobes are embraced by a strong basal ridge, as in *R. occidentalis* and *Aceratherium incisivum.* The antero-internal lobe curves inward and backward, and the succeeding lobe is transverse. Three conspicuous vallies bound the lobes, of which the middle one is deepest and the anterior one least so. From the outer wall of the tooth two folds project into the middle valley, and the posterior of these join one springing from the anterior face of the postero-internal lobe, thus isolating a deep pit from the valley. If the fossil tooth were worn away to a level with its basal ridge it would exhibit four distinct enamel pits; one corresponding to the outer end of the anterior valley, two for the middle valley, and one for the posterior valley.

Antero-posterior diameter of the tooth externally,	19 lines.
Transverse diameter of the tooth posteriorly,	19 "
Transverse diameter of the tooth anteriorly,	16 "

MASTODON (TETRALOPHODON) MIRIFICUS, Leidy.

One of the most interesting discoveries of Dr. Hayden in the pliocene deposit of the valley of the Niobrara, is the greater portion of the lower jaw of a Mastodon, most undoubtedly distinct from that species whose remains are so abundantly found in later deposits in the United States. The specimen belonged to an old individual, as the last molar tooth had protruded and is considerably worn off at its anterior two-thirds; and it indicates a much smaller animal than the *M. ohioticus.* The form of the jaw is like that of the existing Elephant of India. A single tooth, the last molar, occupies each side of it, and resembles the corresponding one of *M. angustidens,* of Europe, or of *M. sivalensis,* of the Sivalic Hills, of India. The crown measures nine inches antero-posteriorly, and three and a half inches transversely, and possesses six transverse rows of conical lobes closely crowded. In advance of the sixth molars, preserved in the specimen, no traces of alveoli are left for preceding teeth, but a sharp sigmoid ridge extends to the front of the jaw.

The greatest breadth of the jaw outside the position of the molars is	15 inches.
Length from back of last molar to anterior end of the jaw,	16 "
Length of the sigmoid ridge in advance of the molars,	9 "

Elephas (Euelephas) imperator, Leidy.

The Niobrara collection also contains the anterior portion of an upper molar tooth of an Elephant of larger proportions than any which are known to us The triturating surface is within a line or two of five inches in breadth, and within a space of seven inches only eight enamel folds or double plates exist. In the most thick plated variety of teeth of the *Elephas americanus* which we have seen, in the same space ten folds were counted. As in the latter, *E. primigenius*, and the recent Elephant of India, the enamel plates become worn on the triturating surface into transverse, strongly crenulated ellipses.

The fragment of the tooth has been assumed to belong to an unnamed species from the fact that it was found in association with a fauna very distinct from any previously noticed.

CHELONIA.

Testudo (Stylemys) niobrarensis, Leidy.

The Niobrara collection contains numerous fragments of bones of the shell of a species of emydiform, Land Turtle, from individuals of different ages. The fragments do not permit the restoration of any extent of either the carapace or sternum, but they are sufficient to indicate that the species grow to the size of the *Testudo nebrascensis*, which it also resembled in structure and form, except that the anterior and posterior marginal plates are strongly everted, while they are only slightly so in the species just named.

Descriptions of new species of Neuropterous Insects, collected by the North Pacific Exploring Expedition under Capt. John Rodgers.

BY P. R. UHLER.

Libellula Linn.

1. *L. Japonica.* ♂ Fuscous, pubescent; labium at base, spot and lower margin of the labrum, superior portion of the sides of the front, line between the antennæ, vertex, posterior lobe of the eyes and pubescence of the entire head black; labial palpi, labrum and spots upon the posterior lobe of the eyes yellowish; front subbilobate, and together with the stemmata testaceous; eyes and occiput brownish, the latter with long black pubescence: thorax fulvous, with a middle longitudinal black line, and a humeral and pleural oblique one, both of which are double, the humeral one confluent at the origin of the wing, the other hardly so; a pale testaceous spot occupies the surface between the two pairs of double lines, and a trigonal one behind the posterior line, surface between the pairs of wings pale, posterior lateral edge of the pectus black; wings hyaline, sub-infuscate at their origin, pterostigma yellowish-fuscous, narrow, margined anteriorly and posteriorly with a black nervule, costal nervule pale fulvous in the middle, blackish at each end: abdomen trigonal, sub-depressed, plumbeous, four basal segments fuscous, lateral and middle carina and transverse elevated edges of the segments black, a small lanceolate yellow spot upon the last segment, occupying its whole length, venter blackish, with a yellow spot upon each side of the segments, spots becoming gradually smaller as they advance posteriorly; caudal appendages black, sub-fusiform, acute, anal one broad, triangular, dilated in the middle, sub-truncate at tip, about one-fourth shorter than the caudal ones: legs blackish, coxæ and posterior surface of the anterior femoræ pale.

Hakodadi, Japan.

Length of posterior wing 15 lines. Pterostigma $1\frac{1}{2}$ lines. Total length 20 lines. Three rows of discoidal areolets, 12 antecubital cross-nervules.

2. *L. phalerata.* ♀ Slender, yellowish : labium, labrum, epistoma and front testaceous ; tips of mandibles, line dividing the epistoma from the front, upper excavated portion of the front, depressed surface around the vertex, antennæ, base of the vertex posteriorly, occiput and ground of the posterior eye-lobe black ; epistoma with an oblique depression each side, vertex slightly excavated and together with the eyes brownish, three yellow spots upon each posterior eye-lobe, ocelli reddish, middle one largest and tinged with brown ; face rough and pubescent ; thorax hairy, with black suture upon the pleura, and two lines upon each humerus running to the base of the head also black, elevated edges upon the origins of the wings, surface between the wings, and thoracic middle carina blackish ; wings hyaline, cellules large, bases of the posteriors tinged with fulvous, costal and subcostal nervules, and pterostigma dark brown, triangle crossed by a single nervule, having the sides a little sinuous, two rows of discoidal areolets, eight antecubital and five cubital cross-nervules, membranule small, a little dusky ; abdomen with a dorsal irregular line, dilating upon the sixth and seventh segments, entirely covering the three posterior ones, a lateral one, interrupted, dilating into a broader patch upon the apices of the fourth, fifth and sixth segments, and branching off running obliquely forward upon the third, an elevated, fine, transverse line upon the second and third segments, which curve upon the sides, run a little obliquely forward and join the line which occupies the transverse edge of the segment, another lateral carinate line commencing against the transverse line of the third segment and extending to the tip of the eighth ; venter with a black line in the middle ; caudal and anal appendages yellow, pubescent, the former cylindrical, acute, more than twice the length of the latter ; vulvar scale extending to the middle of the ninth segment, a little elevated and triangular ; legs yellow, internal and lateral surface of the femoræ and tibæ, spines upon the latter, and tarsi black.

Takanosima, Japan.

Length of posterior wing 11 lines. Pterostigma $1\frac{3}{8}$ lines. Abdomen $9\frac{1}{2}$. Cerci $\frac{1}{2}$. Total length 14.

3. *L. speciosa.* ♀ Yellowish testaceous ; base of labium, tips of mandibles, line behind the front, antennæ, vertex in front and spots upon the posterior eye lobe black ; remaining portions of the head yellowish ; labrum, nasus, epistoma and front well defined, separated by sutures ; epistoma each side, inferiorly, and front with sharp, slightly elevated margins ; face clothed with blackish hairs, eyes touching in a very small part of their superior curvature, occiput yellow, hairy, with a black spot each side ; prothorax with the posterior lobe very prominent, slightly emarginate above, clothed with long hairs ; a double line upon the humerus, two lines upon the pleura and elevated edges between the wings black ; wings hyaline, narrowly tipped with brown, costal nervure and subcostal cross-veins pale-brown, pterostigma dark brown margined with a black nervule, triangle very acute, traversed by one nervule, three rows of discoidal areolets, thirteen cubital cross-nervules, sixteen costal ones, membrane large, blackish : abdomen yellowish with the three first segments a little dilated, second and third with a transverse elevated line, the latter connected with the transverse, elevated edge of the segment by another elevated, lateral line ; a black line each side dilating upon the apices of the posterior segments and almost covering the penultimate one, medial and lateral carinate edges deep black, antepenultimate segment a little dilated, ultimate segment and appendages yellow, vulvar margin small, deeply emarginate, cerci fusiform, acute : legs black, a yellow line above and beneath upon the anterior femoræ, coxæ and basal superior surface of the posterior femoræ also yellow, spines of all the legs long, black.

Takanosima and Simoda, Japan.

Length of posterior wing 19 lines. Pterostigma 2 lines. Total length 2 inches.

CORDULIA Leach.

C. viridi-ænea. ♀ Labium and rhinarium testaceous, face brassy-greenish, villous, front coarsely punctured, deeply emarginate, antennæ and eyes pale brown, vertex dark green, not greatly elevated; thorax brassy green with two oblique, white vittæ upon the pleura; wings with a slightly yellowish tint, nervures pale brown, pterostigma pale fulvous, triangles of all the wings crossed by one nervule, eight cross-veins to the costal, six between the point-cubital and the pterostigma; membranule white; abdomen depressed, segments brassy with a pale testaceous, interrupted stripe each side, beneath dull testaceous; caudal appendages long, hairy, sub-fusiform, acuminate; vulvar scale elongated, tapering, entire, extending as far as the inferior tip of the ninth segment.

Hakodadi, Japan.

Length of posterior wing 17½ lines. Pterostigma 1½ line. Abdomen 17. Cerci 2. Total length 25.

PANORPA, Linn.

P. leucoptera. ♀ Head black above, testaceous upon the antennal region, rostrum dark testaceous, with a black line each side, palpi testaceous with a piceous tip, antennæ dusky, eyes black, with the posterior lobe pale testaceous; thorax pale testaceous, a little blackish upon the prothorax, mesothorax with an irregular black superior margin, with which four spots of the same color are connected against the origin of the wings; wings lactaceous, costal nervule black, discoidal aud most of the transverse nervules whitish, apical longitudinal nervules brown; three pale brown spots upon the sub-costal areole, two of which are enclosed within it, one at the origin, the other in the middle, the third, runs from the parostigmal areole to the middle of the wing; several small, transverse spots are also found near the posterior margin and a large one near the apex; legs testaceous, origins of the tarsal joints and nails blackish; abdomen dull testaceous, the three basal articles and apices of the two next blackish, anal appendages dusky.

Hakodadi, Japan.

Length to tip of abdomen 7½ lines. Alar expanse 14½ lines.

Prodromus descriptionis animalium evertebratorum quæ in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit

W. STIMPSON.

PARS. IV. *CRUSTACEA CANCROIDEA ET CORYSTOIDEA.*

CANCRIDÆ.

41. CANCER ANTENNARIUS, Stimpson; Bost. Jour. Nat. Hist. vi., pl. xviii.—In portu "San Francisco."

42. CANCER GRACILIS, Dana; U. S. Expl. Exped., Crust. i. 153; pl. vii. f. 2. —California.

43. CANCER MAGISTER, Dana; U. S. Expl. Exped., Crust. i. 151, pl. vii. f. 1. —In portu "San Francisco."

44. CANCER PRODUCTUS, Randall; Jour. Acad. Nat. Sci., Philad. viii. 116.—In portu "San Francisco."

45. ETISUS CONVEXUS, nov. sp. Parvulus; carapax perconvexus; areolis fere ut in *E. levimano*, sed magis prominentibus; superficie mediana et postica lævi, antice et lateraliter partim rugosa. Frons convexa. Margo antero-lateralis quinque-dentata, angulo orbitæ incluso; dentibus sat prominentibus, apicibus parvis acutisque, interstitiis granulosis. Antennæ articulus basalis processu orbitam

attingente. Chelopoda mediocria, pæne levia; carpo manuque in fœminis supra paullo rugosis; carpo intus unidentato. Pedes ambulatorii compressi, supra infraque ciliati; dactylis subspinulosis. ♂ Carapacis long. 0·57; lat. 0·84 poll. *E. levimano* affinis, minor, carapace magis convexo.
Hab.—In portu "Simoda" Japoniæ; littoralis.

46. Carpilius maculatus, M. Edwards; Hist. Nat. des Crust. i. 382.—Tahiti.

47. Carpilius convexus, Ruppell; Krabben des rothen Meeres, 13; pl. iii. f. 2.—Loo Choo, Tahiti.

48. Liomera lata, Dana; U. S. Expl. Exped., Crust. i. 161, pl. vii. f. 6.—Ad insulas "Amakirrima," prope "Loo Choo."

49. Liomera obtusa. *Xantho obtusus*, De Haan; Fauna Japonica, Crust. p. 47, pl. xiii. f. 5.—Ad insulam "Ousima;" sublittoralis.

50. Liomera subacuta, nov. sp. Carapax ellipticus, leviter areolatus; superficie lævi, glabra, antice prope frontem et orbitas ruguloso-punctata. Margo antero-lateralis parte anteriori convexa, indistincte trilobata; et dentibus duobus posticis angularibus sat prominentibus, sulcis inter-jacentibus breviter in carapace productis. Frons vix prominens, profunde emarginata. Margo orbitalis inferior angulo interno dentiformi prominente. Chelopoda levia; carpo intus bidentato, dentibus parvis obtusisque; manu extus sulco submarginali; digitis sulcatis, apicibus acutis. Pedes ambulatorii glabri, pæne lævi, mero superne granulato. Carapacis long. 0·57; lat. 0·92 poll.
Hab.—Ad insulam "Loo Choo."

Lachnopodus, nov. gen. Carapax lævis, regione postica transversim convexa. Orbita margine externa trifissa v. trilobata, lobis parvis, obtusis. Antennæ ut in *Carpilio*. Gnathopoda intima lacinia ad apicem non furcata. Hectognathopoda ischio longitudinaliter sulcato; mero superficie versus angulum internum excavata, margine anteriore concava. Chelopoda manu facie externa sulcata. Pedes ambulatorii valde setosi, mero compresso, superne spinoso. *Liomeræ* affinis, sed carapace angustiore, pedibus setosis spinosisque.

51. Lachnopodus Rodgersii, sp. unica. Carapacis long. 1·04; lat. 1·55 poll.
Hab.—In freto "Gaspar."

52. Atergatis floridus, De Haan. Dana, loc. cit. pl. vii. f. 4. *Cancer ocyroe*, M. Edwards; Hist. Nat. des Crust. i. 375. In freto "Gaspar;" etiam ad insulam "Loo Choo."

53. Atergatis integerrimus, De Haan; Fauna Japonica, Crust. p. 45, pl. xiv. f. 1.—Prope portum "Hong Kong"; sublittoralis, in rupibus.

54. Daïra perlata, De Haan. *Cancer perlatus*, Herbst.—Ad insulas "Amakirrima."

55. Zozymus æneus, Leach; M. Edwards; Dana; loc. cit. i. 192, pl. x. f. 3. "Loo Choo" et "Tahiti."

56. Acteodes speciosus, Dana; loc. cit. i. 198; pl. xi. f. 4.—Ad insulam "Hawaii"; inter madreporas e prof. 3 org.

57. Acteodes bellus, Dana; loc. cit.; i. 196; pl. xi. f. 2.—Ad insulas "Bonin"; inter madeporas e profunditate parva.

58. Acteodes affinis, Dana; loc. cit. i. 198; pl. xi. f. 3.—Ad insulam "Ousima."

59. Acteodes tomentosus, Dana. *Zozymus tomentosus*, M. Edwards; *Hist. Nat. des Crust.* i. 385.—Ad insulas "Loo Choo," "Amakirrima," "Ousima" et "Hong Kong."

60. Actæa pura, nov. sp. Superficies superior corporis pedumque tota confertim tuberculata, pura, absque setis. Tubercula subæqualia, subconia, granu-

lata, quasi crystallina. Superficies inferior partim tuberculata, tuberculis depressis lævibus. Frons lobis medianis duabus prominentibus. Margo antero-lateralis valde convexa, quadrilobata, lobis prominulis, tuberculo mediano in utraque extante. Margo postero-lateralis brevis, concava. Oculi pedunculus margine anteriore granulatus. Hectognathopoda mero et margine interna ischii granulatis. Chelopoda grandia, digitis nigris sulcatis. Pedes ambulatorii dactylis spinulosis, spinis seriatis. ♂ Carapacis long. 0·61; lat. 0·78 poll.

Hab.—In portu Jacksoni Australiensi, et prope insulam "Hong Kong" Sinensem; in fundo limoso vel conchoso prof. 6–20 org.

61. ACTÆA SUBGLOBOSA, nov. sp. Corpus subglobosum, superficie superne tota villosa, subtus partim nuda. Carapax perconvexus, dorso æquali, sparsim granulato; areolis inconspicuis. Margo antero-lateralis regulariter curvata, quadrifissa, fissuris profundis. Margo postero-lateralis brevissima, profunde concava. Frons lobis medianis parvis, approximatis. Regio sub-hepatica lævis, nec granulata nec sulcata; porca pterygostomiana arcuata, lanosa. Sternum antice granulatum. Chelopoda brevia, robusta, granulata; digitis brevibus, ad apices decussantibus. Pedes ambulatorii vix granulosis. ♂ Carapacis long. 0·60; lat. 0·79.

Hab.—In mari Sinensi boreali; e prof. 24 org. Etiam in portu "Hong Kong."

62. ACTÆA PILOSA, nov. sp. Corpus et pedes ubique hirsuta, superne setis longioribus inter aliis sparsis. Carapax sat latus, antice regulariter arcuatus, distincte areolatus; areolis non valde prominentibus, granulatis. Margo antero-lateralis quadrilobatus. Margo postero-lateralis et posterior longitudine æquales. Frons deflexa; media prominente, bilobata. Regiones latero-inferiores granulosæ, non sulcatæ. Pedes granulosi. *A. hirtissimæ* affinis, sed carapace non profunde areolata et regione subhepatica subbranchialique non sulcatis. Carapacis long. 0·42; lat. 0·56 poll.

Hab.—In portu "Hong Kong."

63. XANTHO TRUNCATA, De Haan; Fauna Japonica, Crust. p. 66, pl. xviii. f. 4. In portu "Simoda" Japoniæ.

64. XANTHO PARVULA, M. Edwards; Hist. Nat. des Crust. i. 395. Ad insulam "St. Jago" archipelagi "Cape de Verdes."

65. XANTHODES ELEGANS, nov. sp. Carapax distincte areolatus, postice levior; superficie glabra, versus marginem anticum partim inequali. Margo antero-lateralis dentibus papilliformibus quatuor, angulo orbitæ non incluso. Orbita sat ampla, supra infraque dentibus parvis duobus. Regio latero-inferior convexa, lævis. Chelopoda carpo supra tuberculis scabriformibus ornato; manu extus sulcata, costis tuberculatis; digitis nigris. Pedes ambulatorii hirsuti. ♂ Carapacis long. 0·42; lat. 0·60 poll.

Hab.—In portu "Simoda" Japoniæ.

66. EUXANTHUS MELISSA. *Cancer melissa*, Herbst; Naturg. d. Krabben und Krebse, iii. 7. pl. li. f. 1. An *Euxanthus nitidus*, Dana; loc. cit. i. 174. pl. viii. f. 9, junior? In freto "Gaspar."

67. POLYCREMNUS VERRUCIFER, nov. sp. *P. ochtodæ* simillimus; differt magnitudine minore, carapace paullo augustiore, superficie antice leviore; verrucis chelopodorum minoribus, sat conicis et magis numerosis. ♂ Carapacis long. 0·63; lat. 0·76.

Hab.—In portu "Hong Kong"; vulgaris in fundo argillaceo, prof. 5 org.

68. HALIMEDE FRAGIFER, De Haan; loc. cit. p. 47. pl. xiii. f. 4. Prope "Hong Kong"; e fundo conchoso prof. 10 org.

69. CHLORODIUS CYTHEREA, Dana; loc. cit. i. 213. pl. xii. f. 2. Ad insulas Hawaienses; etiam "Ousima."

70. CHLORODIUS NIGER, Ruppell; Krabben des rothen Meeres, p. 20. pl. iv. f. 7. Dana; loc. cit. i. 216. pl. xii. f. 5. Ad insulas "Loo Choo" et "Tahiti."

71. Chlorodius monticulosus, Dana; loc. cit. i. 206. pl. xi. f. 9. Ad insulas "Loo Choo," "Bonin" et "Tahiti."

72. Chlorodius dentifrons, nov. sp. Carapax antice expansus, areolatus, sulcis longitudinalibus validis; linea transversa inter dentes laterales conspicua, ciliata. Areolæ partim granulatæ. Margo antero-lateralis quinque-dentata, angulo orbitæ incluso; dentibus parvis, acutis, æquidistantibus. Frons augustior, sat producta, quadridentata. Margo orbitalis fissuris conspicuis. Chelopoda superne rugulosa; carpo dentibus 2–3 parvis; manu superne dentibus 3–4 minutis, extus rugulosa. Pedes ambulatorii valde hirsuti, lateribus lævibus. ♂ Carapacis long. 0·33; lat. 0·445 poll. *C. electræ*, Herbst; pl. li. f. 6., affinis, sed fronte minus prominente, et dente antero-laterali quinto, quarto non superante.

Hab.—Ad insulam "Loo Choo."

73. Chlorodius exaratus, M. Edwards; Hist. Nat. des Crust. i. 402. Dana; loc. cit. i. 207. pl. xi. f. 11. = *C. sanguineus*, M. Edwards, Dana, etc. = *Cancer* (*Xantho*) *lividus*, De Haan; loc. cit. p. 48. pl. xiii. f. 6.+ *C.* (*Xantho*) *affinis*, ejusd. p. 48. pl. xiii. f. 8.—Species admodum variabilis; vulgaris in Oceano Pacifico. Ab Expeditione lecta in portu "Hong Kong" Sinensi, et "Simoda" Japoniæ; et ad insulas "Ousima" "Loo Choo" "Bonin" et "Hawaii."

74. Chlorodius distinguendus. *Cancer* (*Xantho*) *distinguendus*, De Haan; loc. cit. p. 48. pl. xiii. f. 7. Forsitan varietas præcedentis. In portu "Hong Kong."

75. Chlorodius gracilis, Dana; loc. cit. i. 210. pl. xi. f. 13. Ad oras Sinenses prope "Hong Kong;" quoque insulas "Ousima" et "Kikaisima"; littoralis et sublittoralis.

76. Chlorodius cavipes, Dana; loc. cit. i. 212. pl. xii. f. 1. Ad insulas "Bonin."

77. Pilodius nigrocrinitus, nov. sp. Carapax bene areolatus, sulcis profundis. Superficies scabrosa, setosa, setis nigris, vel longioribus et flavis. Frons minus prominens, non profunde emarginata. Chelopoda manu carpoque subspinulosis. Pedes ambulatorii mero superne serrato. ♀ Carapacis long. 0·28; lat. 0·41. *P. pilumnoidi* affinis, sed carapace latiore, margine antero-laterali convexa, dentibus obtusis.

Hab.—In portu "Simoda" Japoniæ.

78. Pilodius granulatus, nov. sp. Carapax latus, bene areolatus, areolis bene granulatis et pubescentibus. Margo antero-lateralis quam postero-lateralis parce brevior, dentibus parvis denticulatis, denticulo mediano prominente. Chelopoda tuberculata; tuberculis majoribus, carpo intus dentibus parvis acutissimis duobus; manu tuberculis parvis, sparsis, subseriatis; digitis sulcatis, costis versus basim tuberculatis. Pedes ambulatorii superne granulati et pubescentes. ♂ Carapacis long. 0·29; lat. 0.44 poll.

Hab.—Prope "Hong Kong"; inter madreporas e prof. 1–2 org.

79. Cymo melanodactylus, De Haan; Dana; loc. cit. i. 225. pl. xiii. f. 1. Ad insulas "Hong Kong" et "Bonin;" inter madreporas.

80. Cymo Andreossyi, De Haan; Dana; loc. cit. i. 225. pl. xiii. f. 2. *Pilumnus Andreossyi*, Savigny. Ad insulas "Bonin."

81. Ozius truncatus, M. Edwards; Hist. Nat. des Crust. i. 406. pl. xvi. f. 11. In portu Jacksoni Austr.; littoralis.

82. Ozius frontalis, M. Edwards; Hist. Nat. des Crust. i. 406 (?) In portu "Hong Kong"; quoque ad insulas "Ousima" et "Kikaisima"; littoralis.

83. Ozius rugulosus, nov. sp. Carapax sat convexus, antice rugosus et granulosus. Frons quadridentata, dentibus sat validis obtusis. Margo anterolateralis sexdentata, (angulo orbitæ incluso,) dente posteriore parvulo post

dentem lateralem; dentibus anticis amplis, vix prominentibus. Corpus subtus tomentosum. Regiones subhepaticæ et subbranchiales granulosæ. Hectognathopoda mero antice emarginato. Chelopoda inequales, superne rugulosa; manu majore extus lævi; manu minore extus rugosa et tomentosa. Pedes ambulatorii articulis tribus dense tomentosis. ♂ Carapacis long. 0·85; lat. 1·27 poll.

Hab.—Ad insulas "Bonin"; littoralis, inter lapides.

84. PSEUDOZIUS MICROPHTHALMUS, nov. sp. *P. plano* valde affinis, sed carapace magis planato, fronte angustiore, oculis minoribus. ♀ Carapacis long. 0·43; lat. 0·72 poll.

Hab.—Ad insulas "Bonin."

SPHÆROZIUS, nov. gen. *Ozio* offinis. Corpus subglobosum, carapace angustiore, margine postero-laterali longiore. Antenna hiatum internum orbitæ occupans, articulo basali frontem non attingente. Margo frontalis et supraorbitalis continuæ, nec sinu nec incisura separatæ. *Pseudozius dispar*, Dana, ad hoc genus pertinet.

85. SPHÆROZIUS NITIDUS, nov. sp. Corpus parvum, subglobosum. Carapax convexus, lævis, nitidus; regione gastrica sulco longitudinali inconspicuo. Frons emarginata, media sat prominente. Dentes antero-laterales parvi, acuti. Chelopoda robusta, inæqualia; carpo lævi; manu supra extusque subtiliter granulosa. ♂ Carapacis long. 0·235; lat. 0·290 poll. A *P. dispari* differt dentibus antero-lateralibus acutioribus, et manu non tuberculata.

Hab.—In sinu prope "Hong Kong;" in ramo *Spoggodiæ* e rupe ad prof. 1 org.

HETEROPANOPE, nov. gen. *Panopeo* affinis. Palatum colliculo instructo, ad marginem buccalem anticum sat prominente. Frons deflexa. Orbita hiatu externo minuto. Abdomen maris septem-articulatum. *Panopeus dentatus*, *P. caystrus* et *P. formio*, Ad. et White, hîc pertinent.

86. HETEROPANOPE GLABRA, nov. sp. Carapax sat transversus, lævis, glaber; fronte recta, declivi, media emarginata. Margo antero-lateralis quinque-dentata, angulo orbitæ non prominente incluso, dentibus duobus proximis late rotundatis, duobus posticis acutis. Oculi grandes. Orbita hiatu externo parvulo; margine superiore et inferiore integris. Regio latero-inferior granulata. Hectognathopoda, sternum, et abdomen pubescentia. Chelopoda lævia; digitis deflexis, ad apices decussantibus. Pedes ambulatorii graciles, parum pilosi. ♂ Carapacis long. 0.32; lat. 0.495 poll. *P. caystro* A. et W. affinis, sed margine antero-laterali profundius inciso.

Hab.—In portu "Hong Kong."

87. HETEROPANOPE AUSTRALIENSIS, nov. sp. Carapax convexus, partim areolatus; superficie postice lævi, versus margines anteriores sparsim granulata. Margo antero-lateralis dentibus acutis quatuor, angulo orbitæ non incluso. Regio subhepatica granulata, dente parvulo sub dentem post angulum orbitæ. Frons media prominente bilobata, margine serrulata. Orbita hiatu externo distincto, angusto; margine inferiore denticulato, dente interno prominente. Chelopoda robusta; carpo granulato, intus unidentato; manu lævi. Abdomen et sternum pubescentia. ♂ Carapacis long. 0·40; lat. 0·525 poll.

Hab. In portu Jacksoni, Austr.; littoralis inter lapides limosos.

88.—HETEROPANOPE EUCRATOIDES, nov. sp. Carapax angustus, partim inæqualis, antice irregulariter et distante transversim lineolatus, lineis elevatis pubescentibus. Margo antero-lateralis quam postero-lateralis multo brevior, quadridentata; dente anterior (cum angulo orbitæ coalescente,) parvulo; dentibus tribus posticis validis, acutis, mediano minore. Frons profunde emarginata, ad finem sulci longitudinalis in regione frontali; media lobis duobus minutis. Orbita marginibus lævibus, hiatu vix conspicuo. Hectognathopoda sat hiantia, lævia. Regiones latero-inferiores læves. Chelopoda grandia, forma ut in *Eucrate;* mero dente prope extremitatem superiorem; carpo lævi; manu lævi, digitis deflexis. Pedes ambulatorii graciles, secundi paris longiores.

Sterni dimidia posterior et abdomen pubescentia. Abdomen maris angustum. Carapacis long. 0·32 ; lat. 0·40 poll.

Hab.—In portu "Hong Kong."

89. PILUMNUS MUS, Dana ; loc. cit. i. 240. (An = *P. vespertilio* Leach ?) In freto "Gaspar" et ad insulas "Loo Choo" et "Ousima."

90. PILUMNUS RUFOPUNCTATUS. nov. sp. Corpus et chelopoda superne tomentosa; pedes hirsuti. Carapax latus, postice lævis; antice areolatus et tuberculis parvis subspiniformibus coccineis ad 20 ornatus, tribus approximatis in linea mediana. Margo antero-lateralis dentibus quinque; primo (v. angulo orbitæ) inconspicuo; secundo inferiore in regione subhepatica; tertio ab angulo orbitæ distante; tribus posterioribus sat conspicuis. Frons sat augusta, margine denticulata, in media vix emarginata. Orbita margine superiore 3–4 dentata; inferiore sex-dentata. Chelopoda robusta; carpo et manu superne extusque sparsim granulatis, granulis prominentibus; manu majore subtus lævi. ♂ Carapacis long. 0·43; lat. 0·50 poll.

Hab.—In portu Jacksoni; sublittoralis in locis limosis algosisque.

91. PILUMNUS FISSIFRONS, nov. sp. Corpus pedesque dense et breviter pubescentia. Carapax convexiusculus, antice areolatus, utrinque bituberculatus; areolis bene pubescentibus distinctis; sulcis lævibus. Superficies sub tomentum lævi. Margo antero-lateralis dentibus normalibus; secundo subhepatico; tribus posterioribus prominentibus acutis. Frons profunde emarginata vel bilobata, lobis prominentibus. Orbita margine superiore bi-emarginata; margine inferiore crenulata, angulo interno dentiformi prominente. Chelopoda inæqualia, supra minute tuberculata; manu subtus lævi. ♂ Carapacis long. 0·32; lat. 0·465 poll.

Hab.—In portu Jacksoni, Australiensi.

92. PILUMNUS VERRUCOSIPES, nov. sp. Corpus et pedes superne breviter tomentosa, setis longis clavatis sparsis. Carapax latus, antice paullo areolatus, utrinque prominentia valida prope dentem antero-lateralem medianum. Dentes antero-laterales normales; secundus subhepaticus; tres posteriores validi, obtusi. Frons nuda, emarginata. Margo orbitalis inferior crassa, angulo interno prominente. Pedes toti superne verrucosi. Chelopodorum carpus verrucis novem, manus quinque ornata; manus extus sparsim granulata. Pedes ambulatorii articulo penultimo et antepenultimo prominentiis magnis, utroque duabus. ♂ Carapacis long. 0·30; lat. 0·412 poll.

Hab.—In sinu "Simon's Bay" ad Promontorium Bonæ Spei; in fundo arenoso prof. 11 org.

93. PILUMNUS FORFICIGERUS, nov. sp. Carapax lævis, tomentosus. Margo antero-lateralis dentibus tribus posterioribus minutis; tertio e angulo orbitæ remoto. Frons lata, emarginata, media parum prominente. Margo postero-lateralis concava. Regiones latero-inferiores et hectognathopoda superficie lævi, glabra. Chelopoda mediocria, superne tomentoso; carpo lævi; manu tuberculata, tuberculis sat parvis prominentibus, albis, sparsis in manu minore. Manus major subtus glabra, subtiliter granulata. Manus minor digitis compressis, forficiformibus, marginibus internis acutis, pæne rectis, non dentatis. Pedes ambulatorû graciles. ♂ Carapacis long. 0·27; lat. 0.36 poll.

Hab.—Prope oras insulæ "Ousima"; inter Sertularias et Botryllos e prof. 30 org.

94. PILUMNUS LAPILLIMANUS, nov. sp. Carapax tomentosus, superne et postice subplanatus;—areolatus, areolis numerosis, sub tomentum partem celatis. Dentes antero-laterales normales, secundus subhepaticus, tres posteriores parvi. Margo supra-orbitalis denticula. Frons sat lata, margine denticulata, lobis medianis late rotundatis deflexis. Chelopoda robusta, carpo superne pubescente, ad angulum internum papilloso; manu nuda, papillis conicis lapidescentibus v. subcrystallinis roseis confertis ornata; digitis brevi-

bus; digito immobili triangulari. Manus sinistra digitis forficiformibus ut in *P. forficigerus*. Pedes ambulatorii tomentosi et partim setosi. Abdomen tomentosum. ♂ Carapacis long. 0·50; lat. 0·65 poll.

Hab.—In mari Sinensi Boreali, lat. bor. 23°; in fundo arenoso et conchoso prof. 25 org.

95. Pilumnus hirsutus, nov. sp. Carapax et pedes hirsuti, setis longitudine variabilibus. Carapax latus, sat inflatus, vix areolatus, pæne lævi. Margo antero-lateralis brevis, quadridentata, (angulo orbita incluso,) dentibus acutis. Frons emarginata; serie setarum longarum submarginali. Margo orbitalis inferior denticulata. Chelopoda sat brevia; manu majore superne irregulariter tuberculata, subtus lævi; manu minore superne spinulosa, extus sparsim granulosa. ♂ Carapacis long. 0·31; lat. 0·43 poll.

Hab.—In mari Sinensi boreali, et prope insulam "Ousima"; in fundo conchoso prof. 20–30 org.

96. Pilumnus marginatus, nov. sp. Carapax pedesque supra subtusque pilosa. Carapax transversus, antice areolatus et linea elevata marginatus; areolis non prominentibus; superficie pæne lævi. Margo antero-lateralis dentibus sat cristatis; posterioribus acutis. Manus extus aspera vel granulis rugosa. Pedes ambulatorii graciles, valde setosi. ♂ Carapacis long. 0·275; lat. 0·355.

Hab.—Ad oras insulæ "Loo Choo."

97. Pilumnus dorsipes, nov. sp. Corpus globosum. Carapax sat areolatus, areolis granulatis et pubescentibus. Margo antero-lateralis quadridentata, angulo orbitæ incluso, dentibus æqualibus acutis, marginibus denticulatis. Margo postero-lateralis valde concava, excavata. Frons lobis medianis prominentibus, æqualiter rotundatis. Regiones latero-inferiores versus margines sulcatæ, sulcis inter dentes marginales egredientibus. Chelopoda grandia, inequalia, superne breviter pubescentia; manu superficie supero-exteriore, et margine infero-interiore granulatis, granulis prominentibus. Pedes ambulatorii sat breves, subdilatati, pubescentes. ♀ Carapacis long. 0·41; lat. 0·54 poll.

Hab.—In portu "Hong Kong"; e fundo conchoso prof. 10 org.

Eriphidæ.

98. Ruppellia annulipes, M. Edwards; Dana; loc. cit. i. 246. pl. xi. f. 4. Ad oras insulæ "Loo Choo."

99. Eriphia levimana, Latreille; Dana; loc. cit. i. 249. pl. xiv. f. 7. Ad oras insularum "Loo Choo" et "Kikaisima"; littoralis, rupicola.

100. Eriphia Smithii, Mac Leay; Dana; loc. cit. i. 251. Ad oras oceanicas insulæ "Hong Kong."

101. Eriphia scabricula, Dana; loc. cit. i. 247; pl. xiv. f. 5. Ad insulam "Ousima."

102. Eriphia spinifrons, Latreille; M. Edwards; Hist. Nat. des Crust. i. 426. Ad insulam Madeira.

103. Trapezia maculata, Dana; loc. cit. i. 256. pl. xv. f. 4. Ad insulam Hawaii.

104. Trapezia reticulata, nov. sp. Carapax in fœminis quam in maribus latior. Dens lateralis parvus, acutus. Frons sinuosa ut in *T. cymodoce*, (Dana.) Chelopoda mediocria, depressa; mero margine interno convexo, serrato, dentibus 5-6, exterioribus minus prominentibus; carpo obtuso. Pedes ambulatorii vix pubescentes; dactylo quam articulo penultimo breviore. Color superne pallide luteolus; carapax pedesque regulariter coccineo-reticulati, areolis parvulis numerosis. ♀ Carapacis long. 0·30; lat. 0·35 poll. *T. areolatæ* affinis, dente laterali minore, areolis coloris multo minoribus.

Hab.—Ad oras insulæ "Loo Choo"; inter ramos madreporarum.

105. TETRALIA GLABERRIMA, Dana ; loc. cit. i. 263, pl. xvi. f. 3. Ad insulam "Hong Kong."

106. TETRALIA LÆVISSIMA, nov. sp. *T. glaberrimæ* valde affinis, sed fronte vix denticulata ; manu majore brevi, crassa ; digitis late hiantibus, intus non dentatis ; dactylo valde curvato, superne subtiliter granulato. Carapacis long. 0·273 ; lat. 0·298 poll.
Hab.—Ad insulam "Ousima."

PORTUNIDÆ.

107. PORTUNUS STRIGILIS, nov. sp. Carapax pedesque parum pubescentes. Carapax convexiusculus, sat areolatus, transversim lineolatus, lineis elevatis undulatis, confertis. Margo antero-lateralis quinque-dentata, dentibus mediocribus. Frons interantennalis lata, prominens, vix convexa, laminiformis, margine undulata, indistincte trilobata. Chelopoda scabricula ; manu brevi, extus costata, spina parva prope basim dactyli ; carpo ad apicem dente acuto. Pedes natatorii dactylo lanceolato, longe ciliato. Carapacis long. 0·28 ; lat. 0·30 poll.
Hab.—In sinu "Kagosima" Japoniæ ; in fundo conchoso prof. 20 org.

108. SCYLLA TRANQUEBARICA, Dana. *Lupa tranquebarica*, M. Edwards ; Hist. Nat. des Crust. i. 448. Var. SERRATUS ; (*Portunus serratus*, Ruppell ; Krabben des rothen Meeres, p. 10, pl. ii. f. 1,) vulgaris, sæpe in aquis subsalinis in æstuario fluvii "Canton" Sinensis. Var. OCEANICA, Dana, ad insulam "Loo Choo."

109. LUPA PELAGICA, Leach ; M. Edwards ; Hist. Nat. des Crust. i. 450. Vulgaris in mari Sinensi.

110. LUPA SANGUINOLENTA, Desmarest ; M. Edwards ; Hist. Nat. des Crust. i. 451. In portu "Hong Kong."

111. LUPA SAYI, Gibbes ; Proc. Am. Assoc. 1850, p. 178. Dana ; loc. cit. i. 273, pl. xvi. f. 8. In mari Atlantico boreali.

112. AMPHITRITE GRACILIMANUS, nov. sp. Carapax convexus, pubescens, lineis transversis, elevatis, granulatis, interruptis, ad sex ornatus. Margo antero laterales novem-dentata dente postico duplo longiore. Frons interantennalis in media fissa, quadridentata ; dentibus medianis quam lateralibus paululum prominentioribus. Oculi pergrandes, globosi. Chelopoda maris elongata, pubescentia ; mero lato, crasso, superne squamoso, margine anteriore quadridentata, posteriore bidentata, dente exterior terminali, interiore submediano ; carpo gracili, bidentata ; manu gracili, longitudinaliter acute costata, superne trispinosa ; digitis quam palma paulo brevioribus, gracillimis, compressis. Pedes ambulatorii graciles, tertii quam quarti paris parum longiores. Abdomen maris triangulare, sed sat gracile. ♂ Carapacis long. 0·68 ; lat. 122 poll.
Hab.—Prope oras Sinenses, lat. bor. 23° ; in fundo limoso prof. 16 org.

113. AMPHITRITE HASTATOIDES, De Haan ; loc. cit. p. 39, pl. i. f. 3. In sinu bus prope "Hong Kong" ; in fundo limoso, prof. 5-8 org.

114. AMPHITRITE GRACILLIMA, nov. sp. Parvula ; spina laterali longissima ; angulis posticis spiniferis ; dentibus antero-lateralibus minutis. Pedes ambulatorii longi ut in *A. tenuipede*. *A. longispinæ, vigilantisque* affinis, sed manu spina una solum prope basim digiti. Ab *A. hastatoide* differt frontis dentibus lateralibus quam medianis prominentioribus, margine orbitali supra dentifera, et chelopodis gracilioribus.
Hab.—In sinu "Port Lloyd" ad insulas "Bonin" ; fundo limoso prof. 10 org.

115. AMPHITRITE HAANII. *A. gladiator*, De Haan ; loc. cit. p. 29, pl. i. f. 5. (v ix *L.gladiator*, M. Edwards.)

In mari Sinensi, lat. bor. 23°; ad insulam "Tanegasima"; et in sinu "Kagosima"; in fundis arenosis prof. 12–20 org.

116. AMPHITRITE MEDIA, nov. sp. *A. Haanii* affinis, sed dente laterali breviore, quam proximo vix duplo longiore. Dentes antero-laterales approximati. Frons interantennalis dentibus medianis et lateralibus æqualibus, non disparibus ut in *A. speciosa*. Chelopoda fœminæ mero brevi, lato. ♂ Carapacis long. 0·88; lat. ·32 poll.
Hab.—In freto "Gaspar."

117. AMPHITRITE SPECIOSA, Dana, loc. cit. i. 276, pl. xvii. f. 1. *A. gladiator*, De Haan; loc. cit. pl. xviii. f. 1 (?). Ad insulas "Tanegasima" et "Loo Choo"; fundo arenoso prof. 12 org.

118. CHARYBDIS ANISODON, De Haan; loc. cit. p. 42. In portu "Hong Kong"; e fundo limoso, sex org.

119. CHARYBDIS CRUCIFERA, Dana. PORTUNUS CRUCIFER, Fabr.; Herbst; Naturg. d. Krabben und Krebse, pl. xxx. f. 1. In portu "Hong Kong"; vulgaris in fundis limosis prof. 6-20 org.

120. CHARYBDIS VARIEGATA, De Haan; loc. cit. p. 42, pl. i. f. 2. In mari Sinensi boreali.

121. CHARYBDIS SEXDENTATA, De Haan; loc. cit. p. 41, pl. xii. f. 1. In portu "Hong Kong"; littoralis in locis arenosis lapidosisque.

122. CHARYBDIS GRANULATA, De Haan; loc. cit. p. 42, pl. i. f. 1. In fretis prope insulam "Hong Kong"; in fundo limoso et conchoso, prof. 10 org.

123. CHARYBDIS MILES, De Haan; loc. cit. p. 41, pl. xi. f. 1. In portu "Hong Kong."

124. CHARYBDIS TRUNCATA. THALAMITA TRUNCATA, De Haan; loc. cit. p. 43, pl. ii. f. 3. et pl. xii. f. 3. In portu "Hong Kong."

125. THALAMITA ADMETE, M. Edwards; Hist. Nat. des Crust. i. 459. Dana; loc. cit. i. 281, pl. xvii. f. 5. Ad insulam "Ousima."

126. THALAMITA INTEGRA, Dana; loc. cit. i. 281, pl. xvii. f. 6. Ad insulas "Ousima" et "Kikaisima."

127. THALAMITA SIMA, M. Edwards; Hist. Nat. des Crust. i. 460. In portu "Hong Kong."

128. THALAMITA CRENATA, Ruppell; Krabben des rothen Meeres, p. 6, pl. i. f. 2. Ad insulam "Loo Choo"; in æstuario parvo limoso sublittoralis.

129. THALAMITA DANÆ. *T. crenata*, Dana, loc. cit. i. 282, pl. xvii. f. 7. (non Ruppell.) In portu "Hong Kong"; littoralis.

130. THALAMITA PICTA, nov. sp. Parva, flavo coccineoque variegata. Carapax pubescens, lineis transversis elevatis ut in *T. Danæ* dispositis. Margo antero-lateralis dentibus quinque, quinto quam tertio parum minore, quarto parvulo. Frons media paulo prominente, margine profunde crenata, dentibus sex; duobus medianis parvis rotundatis, proximis latis, externis parvis acutis. Antennæ articulus basalis crista brevi, laminiformi, lævi, valde prominente, ultra frontem extensa. Chelopoda supra squamosa, spinifera, et pubescentia; spina ad apicem carpi longa; manu extus costata. Pedes natatorii articulo penultimo margine postico spinoso. ♂ Carapacis long. 0·470; lat. 0·745 poll.
Hab.—Ad insulum "Ousima"; littoralis inter lapides et rupes.

131. THALAMITA CRASSIMANA, Dana; loc. cit. i. 284, pl. xvii. f. 9. *T. prymna*, De Haan; loc. cit. p. 43, pl. xii. f. 2 (non Herbst, M. Edwards.) Ad insulam "Loo Choo"; fundo limoso prof. 1 org.

132. ANISOPUS PUNCTATUS, De Haan; loc. cit. p. 44, pl. ii. f. 1. Prope oras insularum "Niphon" et "Jesso," Japoniæ Borealis; in fundis arenosis.

CORYSTOIDEA.

133. TRICHOCERA GIBBOSULA, De Haan; loc. cit. p. 45, pl. ii. f. 4. et pl. xiii. f. 3. In mari prope oras orientales insulæ "Niphon"; fundo arenoso prof. 30 org.

134. KRAUSSIA NITIDA, nov. sp. Carapax suborbicularis, nitidus, pæne lævis, obsolete lineolatus. Frons interantennalis valde prominens, media profunde fissa, bilobata, lobis profunde excavatis; margine ciliato. Margo orbitalis superior fissura valida. Margo antero-lateralis ciliata, minute crenulata, incisuris inconspicuis tribus v. quatuor dentes significantibus. Chelopoda vix rugulosa. ♂ Carapacis long. 0·32; lat. 0·36 poll. Differt a *K. integro* carapace augustiore et fronte magis prominente; a *K. rugulosa* et *porcellana* spinis lateralibus nullis.

Hab.—In mari Sinensi Boreali et in sinu "Kagosima"; fundo arenoso prof. 20–24 org.

135. CHEIROGONUS ACUTIDENS, nov. sp. *C. hippocarcinoide, serratoque* affinis, sed dente laterali v. majore longo, graciliore; post quam dente parvulo intermedio. ♂ Carapacis long. 1·45; lat. (inter apices dentium) 1·83 poll. Vulgariter duplo major.

Hab.—In sinubus freti "Tsugar" inter insulas "Jesso" et "Niphon."

136. NAUTILOCORYSTES OCELLATUS, M. Edwards; Hist. Nat. des Crust. ii. 149. *Dicera octo-dentata*, De Haan, Krauss. Ad Promontorium Bonæ Spei in sinu "Simon's Bay"; fundo arenoso prof. 12 org.

Descriptions of New Species of Unio, from Tennessee, Alabama and North Carolina.

BY ISAAC LEA.

UNIO TURGIDULUS.—Testâ lævi, ellipticâ, subæquilaterali, ad latere vel paulisper planulatâ vel impressâ; valvulis crassis, anticè crassioribus, natibus tumidis, subelevatis incurvisque; epidermide luteo-olivaceâ, crebrè virido-radiata; dentibus cardinalibus subgrandibus, elevatis, subconicis, crenulatis, in utroque valvulo duplicibus; lateralibus curtis, subcrassis subrectisque; margaritâ albâ et iridescente.

Hab.—Cumberland River, Tennessee, Dr. Troost and T. C. Downie. Florence, Alabama. Rev. G. White.

UNIO PERRADIATUS.—Testâ lævi, subtriangulari, inflatâ, posticè obtusè biangulatâ, subinæquilaterali; valvulis crassiusculis, posticè crassioribus; natibus subgrandibus, tumidis et incurvis; epidermide nitidâ, luteâ et totâ virido-radiatâ; dentibus cardinalibus parviusculis, valdè crenulatis; in utroque valvulo duplicibus; lateralibus sub brevis, lamellatis subcurvisque; margaritâ albâ et iridescente.

Hab.—Florence, Alabama. Rev. George White.

UNIO MEREDITHII.—Testâ sulcatâ, subtrigonâ, vald compressâ, posticè obtusè angulata, inæquilaterali; valvulis subcrassis, anticè crassioribus; epidermide croceâ; dentibus cardinalibus subcrassis, crenulatisque; lateralibus crassis, curtis subrectisque; margaritâ subcroceâ et iridescente.

Hab.—Tennessee River, Florence, Alabama. L. B. Thornton.

UNIO PYBASII.—Testâ lævi, ellipticâ, inflatâ, posticè obtusè angulatâ, inæquilaterali; valvulis subcrassis; natibus prominulis; epidermide tenebroso-fuscâ, obsoletè radiatâ; dentibus cardinalibus submagnis, obtusè angulatis, crenulatis; lateralibus longis, lamellatis curvisque; margaritâ vel albâ vel salmonis colore tinctâ et valdè iridescente.

Hab.—Tennessee River at Florence, Alabama. B. Pybas.

UNIO VIRESCENS.—Testâ lævi, ellipticâ, subinflatâ, posticè angulatâ, valdè; inæquilaterati; valvulis subtenuibus, anticè crassioribus; natibus prominulis; epidermide nitidâ, luteo-viridi, obsoletè radiatâ, anticè tenebrosâ; dentibus, cardinalibus parvis, accuminatis, crenulatis, in utroque valvulo duplicibus; lateralibus longis, lamellatis rectisque; margaritâ albâ et valdè iridescente.

Hab.—Tennessee River, at Florence, Alabama. B. Pybas.

UNIO NEUSENSIS.—Testâ lævi, oblongâ, subcompressâ, ad laterè planulatâ posticè tumidâ et biangulatâ, valdè inæquilaterali; valvulis subcrassis natibus prominulis; epidermè nigricantè, striatâ et eradiatâ; dentibus cardinalibus parviusculis, crenulatis, in utroque valvulo subduplicibus; lateralibus prælongis subcurvisque; margaritâ vel purpureâ vel salmonis colore tinctâ et iridescente.

Hab.—Neuse River, six miles from Raleigh, N. C. Prof. Emmons.

UNIO PURUS.—Testâ lævi, ellipticâ, subcompressâ, posticè rotundatâ, inæquilaterali; valvulis subcrassis, anticè spissatâ; natibus subprominentibus; epidermide luteo-olivà, glabrâ, ad umbones politâ, obsoletè radiatâ; dentibus cardinalibus submagnis, accuminatis, crenulatis, in utroque valvulo subduplicibus; lateralibus sublongis, lamellatis subcurvisque; margaritâ albâ et iridescente.

Hab.—Neuse River, six miles from Raleigh, N. C. Prof. Emmons.

UNIO EXACTUS.—Testâ lævi, ellipticâ, compressâ, posticè rotundatâ, inæquilaterali; valvulis subcrassis; natibus prominulis; epidermide tenebroso-rufâ, striatâ; dentibus cardinalibus parviusculis, crenulatis, in utroque valvulo duplicibus, lateralibus sublongis, lamellatis subrectisque; margaritâ albâ et iridescente.

Hab.—Neuse River, six miles from Raleigh, N. C. Prof. Emmons.

Descriptions of a New Helix and Two New Planorbes.

BY ISAAC LEA.

HELIX CLARKII.—Testâ supernè rotundatâ, infernè plano-convexâ, regulariter striatâ, brunneo-corneâ, imperforatâ, unodentatâ: anfractibus septenis, obliquè striatâ; aperturâ lunatâ, subdilatâ; labro albido, reflexo, infernè calloso; columellâ in medio uno-dentatâ, ad basim impressâ.

Hab.—Tuskee Cove, Cherokee County, North Carolina. Prof. D. Christy, Hamilton, Ohio.

PLANORBIS WHEATLEYI.—Testâ parvâ, tenubroso-corneâ, planulatâ, obsoletè striatâ, bicarinatâ, supernè depressâ, infernè latè et profunditè umbilicatâ; anfractibus quinis, supernè obtusè carinatâ, infernè acutè carinatâ; aperturâ albidâ, crassâ et valdè constrictâ, intus sexdentatâ.

Hab.—Cotoma Creek, Montgomery County, Alab. C. M. Wheatley.

PLANORBIS NEWBERRYI.—Testâ pallido-corneâ, depresso-turritâ, minutissimè striatâ, supernè et infernè acuto-carinatâ, latè et profunditè umbilicatâ; anfractibus quinis, planulatis; aperturà magnâ, pallido corneâ, subtriangulari.

Hab.—Klamath Lake and Canoe Creek, California. J. S. Newberry, M. D.

Descriptions of New Organic Remains collected in Nebraska Territory in the year 1857, by Dr. F. V. Hayden, Geologist to the Exploring Expedition under the command of Lieut. G. K. Warren, Top. Engr. U. S Army, together with some remarks on the Geology of the Black Hills and portions of the surrounding Country.*

BY F. B. MEEK AND F. V. HAYDEN.

After leaving the great area of comparatively low country composed of nearly horizontal Tertiary and Cretaceous formations, lying between the Missouri and the Black Hills, the geologist, on approaching the latter, soon begins to see in

*WASHINGTON, D. C., March 1, 1858.

Capt. A. A. Humphreys, Top. Eng. in charge Off. Expl'n and Surveys.

SIR: The accompanying paper, by Messrs. F. B. Meek and F. V. Hayden, descriptive of New Organic Remains discovered by the exploration in Nebraska, organized by the War Department and placed under my command in May last, the disturbed condition of the strata over which he is passing, unmistakable evidences that the hills looming up before him are not merely elevations left by the denudation of the surrounding country, but monuments of the former action here of those powerful subterranean forces which have played so important a part in modifying the earth's physical features.

First, in passing from the undisturbed overlying Miocene formation, we come directly upon No. 5, or the upper member of the Cretaceous series of the north-west, as subdivided in the published sections of the Nebraska formations. Then in regular succession Nos. 4, 3, 2, and 1, are passed over, all dipping sometimes at a high angle away from the Black Hills.* Beyond, and coming up from beneath No. 1, an older series of very similar strata, containing many organic remains, which we regard as Jurassic types, is passed over, as we ascend the hills. Then we have some fine red gypsum bearing deposites, separated by a bed of limestone containing a few fossils like Coal measure forms.

Next comes a group of well-marked Carboniferous formations, which repose upon a reddish and grayish sandstone of the same age as the Potsdam sandstone of the New York system,—all of which were often seen highly inclined, and apparently conformable. The Potsdam, in its turn, was met with, some-

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with remarks in relation to the Geology of the Black Hills, has been prepared for the purpose of being read at the next meeting of the Academy of Natural Sciences in Philadelphia, and I therefore, beg leave to ask the authority of the Department thus to dispose of it.

The region embraced by these Black Hills lies mainly between the north and south forks of the Shyenne River, and north-west of the well-known Mauvaises Terres of White River. Everything relating to it has hitherto been most imperfectly understood. Situated remote from the great lines of travel to the Pacific, and inhabited by brave and numerous warriors of the Dakota nation, determined to resist the encroachments or intrusions of white men, it has remained an unknown land, especially to scientific men, whose pursuits are viewed by the Indians with superstitious apprehension. Even the trappers and traders have generally avoided this dangerous locality, and hence the most erroneous ideas have been entertained of the position, direction, extent, and formation of these so-called Hills.

Our exploration of the past year has, however, in a great measure settled these points. We now know them to be a detached portion of the great upheaved mountain mass occupying the western portion of the territory of the United States, and the most eastern part of it yet discovered. They form an assemblage of mountain elevations lying between the meridians of 103° 15, and 104° 45, west from Greenwich, and between the parallels of 43° 20 and 44° 45 north latitude, the general deviation of the upland being about N. 20° W. The highest peaks are elevated about 6700 feet above the level of the sea, and from 500 to 4500 feet above the surrounding country.

The geological discoveries which the exploration has made are of much value to science, and the announcement of a few of the most important ones is the object of the paper herewith submitted. Mr. Meek has co-operated with Dr. Hayden in elaborating the results from the materials collected, without any pecuniary recompense from the government, Dr. Hayden being the Geologist to the expedition. Very respectfully your ob't serv't,

G. K. Warren, Lt. Top. Engrs.

The above letter, and accompanying paper, have been submitted to the Secretary of War. Their communication to the Academy of Natural Sciences is authorized. A. A. Humphreys,

March 1, 1851. Capt. Topl. Engrs. in charge of Office &c.

* We should state here that the Tertiary beds were also often seen in the form of outliers, reposing unconformably on several of the older rocks, even down to the Carboniferous, near the south base of the Black Hills.

times far up on the higher points of the mountain, resting unconformably upon the upturned edges of what appears to be a series of very ancient, highly metamorphosed sedimentary strata, standing vertical. Beyond and beneath the latter, the main body of the mountains seems to be made up of a coarse feldspathic granite, composed of large crystals of feldspar, with very small proportions of quartz and mica. This granite, and portions of the adjacent strata, were often seen traversed by various veins, dikes, and larger outbursts of basaltic and other eruptive rocks.

In order that our remarks may be more clearly understood, we give below a general vertical section of the rocks seen in the Black Hills and around their base, showing their order of succession, and approximate thickness. It is not, of course pretended that all these formations were seen lying in contact at any one locality; but they were often met with, under such circumstances, and holding such relations, as to leave little room to doubt that this is their true order of superposition.

General Section of the Geological Formations seen in and near the Black Hills (descending).

1*st.* Miocene beds consisting of whitish clays and sandstones of various thickness.

Cretaceous System.

No. 5. Of the Nebraska general section, with its usual characters and fossils—150 ft.

No. 4. Presenting its usual characters and containing its characteristic fossils,—150 feet.

No. 3. Usual fossils and composition,—150 to 200 ft.

No. 2. Usual lithological characters and fossils, with some new forms,—200 to 250 ft.

No. 1. Upper part yellowish and reddish sandstone, sometimes in heavy beds, passing down into alternations of yellowish, gray, bluish, and reddish laminated shale, with seams and layers of dark carbonaceous matter, or impure lignite; beneath which there is a heavy bed of compact yellowish and reddish sandstone, with indistinct vegetable remains, and much fossil wood,—above beds variable at different places,—300 to 400 ft.

Then come alternations of light gray argillaceous grit, and rather soft sandstone, containing *Ammonites Henryi*, n. s. p., and a small oyster; also in bluish gray compact argillo-calcareous masses *Unio nucalis* n. s. p., and a small *Planorbis*, with other small univalves like *Paludina*.

Jurassic System.

A.—Layers of argillo-calcareous, somewhat gritty mass, containing *Belemnites densus*, n. s. p., *Ammonites cordiformis*, n. s. p., *Avicula (Monotis) tenuicostata*, n. s. p., *Arca (Cucullæa) inornata*, n. s. p.; passing down into a 6 or 8 foot bed light gray, or yellowish sandstone, with ripple marks and trails of marine worms, 50 to 80 ft.

B.—Light red argillo-calcareous gritty bed, with greenish seams, and nodules (sometimes wanting,)—30 to 40 ft.

C.—Soft gray and dark brownish sandstone, passing down into about 8 feet of laminated shale of various colors, below which there is a 6 foot bed of sandstone similar to that above, containing *Avicula tenuicostata*, and trails of marine worms. Then comes 30 to 40 feet of bluish, or ash-colored argillaceous shale, with great numbers of *Lingula brevirostra*, n. s. p., and *Serpula*. Next we have a light-gray calcareous grit, containing columns of *Pentacrinus asteriscus*, n. s. p., *Avicula tenuicostata*, *Serpula*, &c., the more compact and calcareous portions often perforated by *Pholas?* The latter bed passes down into a light-yellowish gray sandstone, splitting into thin layers, and containing imperfect casts of *Mytilus (Modiola)*, *Pecten*, *Trigonia*, and other bivalves, in considerable numbers. Whole 60 to 100 ft.

Carboniferous System.

D.—Brick-red, incoherent, argillo-calcareous, very fine slightly gritty material, containing great quantities of gypsum in the form of seams, layers, and irregular beds,—100 to 150 ft.

E.—Bluish and reddish gray, very hard gritty limestone, in which were found a smooth *spirifer*-like *S. lineatus*, two or three species small *Pleurotomaria*, two species *Macrocheilus* and one or two species of *Bellerophon*. This bed is variable in thickness,—10 to 50 feet.

F.—Brick-red material, very similar to the bed D, excepting that it contains much less gypsum; passing down into a very hard compact concretionary sandstone,—250 to 300 ft.

G.—Hard, more or less gritty, yellowish and whitish limestone, containing *Productus*, *Spirifer*, *Euomphalus*, &c. &c., passing down into a light-yellow calcareous grit; altogether 50 ft.

H.—Very hard reddish-gray limestone, containing *Syringopora*, *Productus*, *Terebratula*, &c. In the middle of this bed there is an 8 foot layer of very hard compact bluish limestone containing many crinoid remains, whole 50 ft.

Oldest Silurian.

I.—Potsdam sandstone, containing *Lingula*, *Obolus?* and fragments of *Trilobites*,—30 to 50 ft.

J.—Highly metamorphosed strata, standing vertical.

K.—Coarse feldspathic granite, forming mountain masses.

The upper beds of the foregoing section, as seen along the Missouri, and in other portions of Nebraska, having been described on former occasions, and presenting few important new features, in the region of the Black Hills, we pass, for the present, at once to the consideration of those below, beginning with No. 2. This formation, it will be observed, augments greatly in volume towards the west, its thickness along the Missouri, above the mouth of Big Sioux River, having been generally estimated at about ninety feet, while here, near the Black Hills, it attains a thickness of two hundred feet. As it appears to be entirely wanting on the Missouri, near Judith River above Fort Union, and is found to diminish rapidly as we ascend the Big Sioux from the Missouri; while there are many facts pointing to the conclusion that it is one of the main fossil bearing beds of the Cretaceous series in Texas and New Mexico, we may reasonably infer that the sediment of which it is composed came originally from some source far to the southwest.

Lithologically this formation presents much the same characters near the Black Hills as along the Missouri, being composed of dark gray laminated clays. Several of its characteristic fossils were also found near the S. E. base of the Black Hills amongst which we recognise *Ammonites percarinatus* (Hall and Meek), of much larger size than those usually obtained along the Missouri, and numerous specimens of a *Cytherea*, perhaps identical with *C. tenuis* (Hall and Meek). Some interesting new forms were likewise found associated with the foregoing, amongst which there is a large *Ammonite*, having septa somewhat like those of *A. placenta*, but rounded on the dorsum; and a large strongly costated *Ammonite*, with very prominent nodes along the dorso-lateral margins, apparently very similar to a species described by Drs. Evans and Shumard under the name of *A. Galpinanus;* also a new species of *Scaphites*, closely related in the structure of its septa to *S. hippocrepis* of Dr. Kay.

It will be remembered, we have in all our published papers, when speaking of that portion of the Nebraska section composing No. 1, expressed doubts respecting its age. We placed it provisionally as the basis formation of the Cretaceous series, but at the same time stated it was "not positively known to belong to the Cretaceous system." In our last paper on the Nebraska formations, and their parallelism with those of the States, and the far southwest, communicated to the Academy in May, 1857, after having given all the facts in our possession bearing on this point, we stated that "although the weight of evidence thus far favors the conclusion that this lower series (No. 1) is of the age of the Lower Green sand, or Neocomian of the old word, we yet want positive evidence that portions of it may not be older than any part of the Cretaceous system."

Although we have little direct additional evidence at this time in regard to the age of this series, as we have always understood it, we now know that from beneath its lower beds, around the base of the Black Hills, there rises a series of very similar strata, as may be seen by the foregoing section, separated from its base by no well-marked line of demarkation, and containing many fossils closely similar to those considered characteristic of the Jurassic system of the old world. At the same time we have failed to recognize amongst these fossils any forms peculiar to the Cretaceous epoch, or even very nearly analogous to species common in rocks of that age.

The formations above alluded to as containing Jurassic types of fossils, are marked in the foregoing sections A, B, and C inclusive. But as before stated, these beds often pass so gradually, in their lithological characters, into No. 1 above, and so few fossils have been found near the junction, that we confess we have but a vague and indefinite idea in regard to the particular horizon at which the line should be drawn between them. Indeed, the general aspect of No. 1, and that of the formations below, are so very similar, and they are all so unlike the beds above, that if we were to classify them by their lithological characters alone, we should be inclined to view No. 1, and formations A, B, and C as forming one natural group, or at least to think that portions of No. 1, as we now understand it, should be classed with the series below. This view also appears to be the more reasonable when we take into consideration the great thickness of No. 1 in the vicinity of the Black Hills, and the fact that the beds A, B, and C contain a group of fossils apparently more nearly related to lower than upper Jurassic forms.

Inasmuch, however, as numerous leaves beyond a doubt belonging to dicotyledonous trees, closely analogous to the oaks, willows, and other existing forest trees, are known to occur in No. 1 along the Missouri, near the Big Sioux, and in northeastern Kansas,* and we have a *Baculite* from similar beds, apparently of the same age, near the mouth of Judith River, ou the upper Missouri,—while we also learn from the letters and notes of our deceased friend, Mr. Henry Pratten, that he saw a species of *Baculite* in formations presenting the same characters, and seeming to occupy the same position, along the Platte above Fort Laramie, we think we hazard little in viewing at least a considerable portion of No. 1 as belonging to the Cretaceous system.

Another fact favoring the opinion that No. 1, even down as low as we have provisionally carried it in the Black Hills section, probably belongs to the lower Cretaceous, is the occurrence at its base of a bed containing *Ammonites* and *Ostrea*, along with *Unio*, *Planorbis*, and *Paludina*; an association of fossils which, in that position, carries the mind rather to the Wealden than to older formations.

The occurrence of these forms at this horizon, also leads us to suspect that a considerable portion of the estuary beds at the mouth of Judith River, above Fort Union, in regard to the age of which we have been so much puzzled, may be, as first suggested by Dr. Leidy, a representative of the Wealden, and as we were then inclined to suppose, belong to our No. 1.

The close similarity between the lithological characters of these deposits, and those of some of the Tertiary formations of the north-west, and the estuary character of their fossils, together with the analogy of many of the species of mollusca found in one of the upper beds, (which may be an outlier of Tertiary resting on older formations), taken in connection with the fact that amongst the fossils collected from one of the middle beds (see section, page 124, vol. viii. Proceedings, 1857,) there were some fragments of a *Trionyx*, regarded by Dr. Leidy as identical with a species occurring in well-marked Tertiary deposits near Long

* We are indebted to Maj. Hawn for our knowledge of the occurrence of these leaves in No. 1, as seen in Kansas.

Lake, below Fort Clark, led us subsequently to think the whole of these estuary beds, near the Judith, might possibly be only an outlier of Tertiary reposing upon deposits of the age of our No. 1. At the same time, in consequence of the occurrence in them of remains regarded by Dr. Leidy as analogous to *Lepidotus*, *Iguanodon*, and *Megalosaurus*, we stated that "in the midst of evidence of such a conflicting nature, it is unsafe to express any very positive opinion respecting the age of these formations."

Since we know that there is a similar group of beds at the base of No. 1, as we now understand it, near the Black Hills, containing a mingling of freshwater and marine fossils, although we are not sure any of them are specifically identical with those found near the Judith, we are inclined to think our first views in regard to these Judith River formations will prove to be correct, or in other words, the beds from which the saurian remains, described by Dr. Leidy, were obtained, will yet prove to be a part of the series we include in No. 1 of the Black Hills section. This view receives additional support, too, from the fact that the Judith River freshwater or estuary formations were often seen much upheaved and distorted, while around the Black Hills the Tertiary deposits appear to lie undisturbed upon the upheaved older rocks, in such a manner as to indicate that the last period of disturbance amongst the strata of this region occured after the close of the Cretaceous epoch, but previous to the deposition of the Tertiary.

The evidence pointing to the conclusion that formations A, B, and C of the foregoing section should be regarded as probably Jurassic, is, first, the affinities of their organic remains; and secondly, their stratigraphical position. It is true we do not pretend to have recognized in these deposits any genera *peculiar* to the Jura; but at the same time we have failed to identify amongst these fossils any species belonging to genera limited in their range to the Cretaceous system; while in their specific relations, so far as we have been able to make comparisons, they are nearly all much more closely allied to Jurassic than Cretaceous forms, if not indeed actually identical with the former in some cases. This will, perhaps, be better understood by the following comparisons of some of the species described in this paper, from these formations:—

1*st*. *Pentacrinus asteriscus*, n. s. p., from near the lower part of formation C, is so nearly like the Liassic *P. scalaris*, Goldfuss, that it is with some hesitation we have regarded it as new.

2*d*. *Avicula* (*Monotis*) *tenuicostata*, n. s. p., ranging from the lower part of the bed A to near the base of bed C, is very closely related to *M. substriata* of Minster, from the Lias.

3*d*. *Arca* (*Cucullœa*) *inornata*, n. s. p., from the lower part of bed A, is very similar to *C. Munsteri* (*Zeiten*), also from the Lias.

4*th*. *Panopœa* (*Myacites*) *subelliptica*, n. s. p., from the bed C, is similar to the Liassic forms *M. Liassensis* and *M. Alduininus* of Quenstedt.

5*th*. *Ammonites cordiformis*, n. s. p., from bed A, is of the same type as the Oolitic species *A. cordatus* (Sowerby).

6*th*. *Belmnites densus*, n. s. p., from bed A, is scarcely distinguishable from the Oolitic species *B. eccentricus*, Blinville, if indeed it is really distinct.

In addition to the above, there are in the collection from the beds A, B, and C, other species we have not yet had time to describe, which closely resemble Liassic and Oolitic forms. These facts when viewed in connection with the stratigraphical position of these deposits, below what appear to be lower Cretaceous formations, and as above stated, so far as we yet know, the absence in them of well-marked Cretaceous types, are, we think, sufficient reasous for supposing they probably represent the Jurassic system.*

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* On a former occasion we expressed the opinion that Mr. Marcou was mistaken in regard to the existence of Jurassic rocks in the region of the Black Hills. This opinion was based upon the fact that one of us had traversed the belt of country he intended to color, east of these hills, as Jurassic, and found it occupied by Tertiary and Cretaceous formations. We also knew his map of this region had been mainly colored theoretically,

It is, perhaps, scarcely necessary for us to remark that the presence of *Ammonites* and *Belemnites*, in the rocks above alluded to, aside from the other organic remains, is alone satisfactory evidence that they do not belong to the Triassic epoch. It is true the bed C is not known to contain either *Belemnites* or *Ammonites*, but so many of the same forms associated with these fossils in the beds above, range down into the bed C, that unless it be the lowest stratum of yellowish gray sandstone at its base, there appears to be little reason for suspecting that it may belong to another system of rocks. In regard to this lowest stratum of formation C, we would state that the fossils contained in it are casts in a bad state of preservation, but as near as we have been able to determine, some of them appear to belong to types occurring in the beds above; we, therefore, for the present, place it provisionally as a part of the group composing formation C; but it is possible future investigations may bring to light facts that may prove it to belong to an older series, though it evidently is not Carboniferous, nor Permian.

Carboniferous Rocks of the Black Hills.

As may be seen by consulting the foregoing general section of the formations seen in and around the Black Hills, the rocks we regard as of Jurassic age, repose in that region upon a group of deposits, the larger portion, at least, of which clearly belong to the Carboniferous epoch.

We would, however, just here remark before entering upon the discussion of the Carboniferous formations of the Black Hills, that near the south-eastern base of these hills some loose masses of a cherty rock were seen, on more than one occasion, under circumstances indicating that the stratum from which they were derived holds a position between the base of the bed C and the bed D of the section. Yet as these cherty masses were no where actually seen in place, we have not given them a position in the Black Hills' section, though there can scarcely be a doubt that they belong to it. The fossils they contain, or at any rate several of them, are identical with species occurring in a formation in north-eastern Kansas, now known to be of Permian age.

The first formation in the descending order of the foregoing section we are inclined to place, (at least provisionally) in the Carboniferous system, is the bed D, which is composed of a brick-red fine silicious or argillaceous, slightly gritty material, effervescing very feebly in acids. Although from a hundred to one hundred and fifty feet in thickness, no vestiges of any kind of organic remains were seen in any part of this bed; but it was always found to be characterized by large quantities of gypsum, in the form of seams, layers, and large beds or irregular masses.

Beneath the foregoing bed we have a bluish and reddish gray, somewhat gritty limestone (E of the section), varying from 10 to 50 feet in thickness, and containing fossils, resembling coal measure forms. The collections from this rock consist of a small smooth *spirifer*, broader and more compressed than *S. lineatus*, but otherwise somewhat similar, two or three species of *Macrocheilus*, two small species of *Pleurotomaria*, and one or two species of *Bellerophon*, all in a rather bad state of preservation, but showing very satisfactorily their generic characters.

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and was necessarily based upon very erroneoua views in regard to its topography. In addition to this, we had found the immense area represented by him as New Red Sandstone, in the upper Missouri country, almost entirely made up of Tertiary and Cretaceous deposits; while not a single Jurassic or Triassic fossil had ever been found throughout the whole country.

Since the position of the Black Hills has been determined by Lieut. Warren, we now know the area occupied by the Jurassic belt Mr. Marcou intended to place *east* of these hills, actually lies rather on the west of their middle portion, and does probably cover some surface occupied by the formations we regarded as Jurassic.

By these remarks we do not wish to be understood as intimating that a geologist is responsible for errors into which he may be led by incorrect topographical maps; nor do we wish to withhold from Mr. Marcou the credit justly due him for having first suggested the existence of Jurassic rocks in this region.

Next in the descending order, we have formation F, which is two hundred and fifty to three hundred feet in thickness, and very similar, towards the upper part, to the red bed D in its composition, excepting that it contains less gypsum; below, it passes into a very hard compact gray sandstone, the whole apparently destitute of fossils.

It will, perhaps, be remembered we mentioned in one of our former papers the existence of some facts which we thought point to the conclusion that the great gypsum deposits of the south-west, might be on a parallel with No. 1, or the lower part of No. 2 of our Nebraska section. From the great similarity of these red formations near the Black Hills, to the red gypsum bearing deposits described by Mr. Marcou and others, in Texas, Arkansas, and New Mexico, we are now inclined to the opinion that they all hold the same position, and are of course much older than our No. 1.

The entire absence, so far as we yet know, of organic remains in these red formations in the region of the Black Hills, as well as in the south-west, shows that during their deposition the physical conditions in the waters where they were deposited, must have been unfavorable to the existence of animal life.

That the lower bed F, of the foregoing section, is of Carboniferous age, is very probable, coming in as it does immediately above a well-marked Carboniferous formation, and below a limestone containing fossils closely similar to well-known coal measure forms, two of which belong to genera (*Bellerophon* and *Macrocheilus*), not known, we believe, to range above the Carboniferous system.

It is not, however, so easy to determine the age of the upper red bed D. From its stratigraphical position, as well as lithological characters, it might with almost as much propriety be referred to the Permian or Triassic systems, as to the Carboniferous. Yet as it appears to have been deposited during a repetition of the same physical conditions that prevailed during the deposition of the bed F, we think it is perhaps safer to refer it provisionally, in the absence of palæontological evidence, to the Carboniferous system, though it is possible both these red beds and the intervening limestone may prove to be Permian.

Immediately below the foregoing formations there is a rather fine grained somewhat gritty whitish subcrystalline limestone (G of the section), containing in great numbers a species of *Spirifer*, perhaps new, and resembling more nearly forms common in the lower Carboniferous series of the west than those of the coal measures; along with this a fragment of another *Spirifer* was found, having fasciculate bifurcating costæ, like *S. Meusebachanus* (Rœmer), a common coal measure fossil; also two species of *Productus*, one of which is probably identical with *P. semireticulatus*, and an other similar, but smaller species, with apparently a less deeply marked sinus in the larger valve, and a shorter hinge. This bed passes gradually down into a yellowish gritty somewhat friable limestone, in which was found a *Spirifer* having a high area like *S. cuspidatus;* and a large *Euomphalus*, apparently identical with a species common in the Encrinital or Burlington limestone of the lower Carboniferous series in the west,—the two rocks are fifty feet in thickness.

The succeeding formation is a hard yellowish gritty limestone often tinged with red (H of section), in which were found specimens of a small smooth *Terebratula*, a small deeply sinuate *Productus*, and a *Syringopora?* having small, straight, very regularly disposed tubes, about ·06 inch in diameter, and separated by spaces about ·09 inch across. In the middle of this formation, which is usually forty feet in thickness, there is often seen an 8 foot layer of bluish rather compact argillaceous limestone, containing a smooth *Terebratula* resembling *T. subtileta* (Hall), but perhaps distinct, and a *Productus* like *P. cora*, in the fineness of its striæ.

The fossils in the collection from these lower limestones (G and H) are unfortunately almost all in a very bad state of preservation; so that it is nearly impossible to determine with any degree of certainty their specific characters. As near as can be ascertained, however, the majority of them appear to resemble more nearly lower than upper Carboniferous forms, though some of them certainly are like coal measure species.

The color, texture, and composition of the beds are such as to carry the mind at once to the lower Carboniferous series, and quite unlike those of any rock known in the western coal measures.

Lower Silurian.

Potsdam Sandstone.

At several places in the Black Hills, the oldest Carboniferous bed of that region (H) was seen reposing, to all appearances conformably, upon a bed thirty to fifty feet in thickness of reddish and grayish sandstone, composed of angular grains of quartz, cemented by silicious, and sometimes small portions of calcareous matter. The fossils obtained from this rock were *Lingula antigua*, (Hall), and great numbers of a small shell very similar to *L. prima* (Conrad), but from its thickness and structure probably an *Obolus;* also a shell nearly related to *O. appolinus*, as figured by Murchison and De Vernueil, in their work on the geology of Russia, but perhaps new, and fragments of a Trilobite belonging apparently to one of the forms figured by Dr. Owen from the lower sandstones of Minnesota.

The above mentioned fossils, as will be at once understood by the Palæontologist, clearly prove this lower sandstone (I) to belong to the oldest portion of the Silurian system, or in other words, to the Potsdam sandstone of the New York series. The identification of this rock, at this remote point in the far west, we regard as a matter of peculiar interest, proving, as it does, the extension of that formation several hundred miles further westward than it has hitherto been known to occur in this country.*

Metamorphic and Igneous Rocks.

At almost every place where the base of the Potsdam sandstone was seen in the Black Hills, it was found to repose upon what appears to be upturned edges of an ancient series of sedimentary rocks. These older rocks present the appearance of having their strata thrown into a vertical or highly inclined condition, while the Potsdam, although much disturbed, rests unconformably upon them.

Further in towards the interior of the mountain, and beneath the metamorphic rocks, as already stated, the main body of the Black Hills is composed chiefly of a coarse feldspathic granite and other igneous rocks.

DESCRIPTIONS OF NEW FOSSILS.*

Pentacrinus asteriscus.

Our knowledge of this crinoid is entirely derived from detached pieces of its column, and other parts, as seen imbedded in a sandy matrix cemented by calcareous matter. These segments or joints of the column may be characterized as rather thin, small, and very symmetrical pentagonal, star-shaped bodies, the rays of which are usually longer than wide, and rather acutely angular at their extremities. Through the centre of each joint there is a very small circular perforation, from which five regular lance-oval, petaloid areas radiate, one to the extremity of each of the angles; the areas being bounded by rather narrow, slightly elevated transversely crenulate margins.

The above description applies more particularly to the largest sized specimens, measuring about ·18 inch across from point to point of the opposite angles. Associated with these there are other much smaller joints, varying from ·05 to ·10 inch in diameter. These have proportionably shorter and broader rays, or

* Figures and more extended descriptions to appear in Lieut. Warren's final report.

angles, which, however, appear never to be rounded at the extremities. It is possible these smaller joints may belong to another species, though we incline to the opinion that they are only the joints of smaller individuals of the species here indicated.

The star-like surfaces of the column joints above described, present some varieties of form, but usually resemble so closely those of *S. scalaris*, Goldf., that we are in some doubt about the propriety of considering our fossil a distinct species. These joints are all much smaller than those figured by Goldfuss, and appear never to have had the angles so short and rounded as some of the examples given by that author and Quenstedt, of *P. scalaris.*

Locality and position.—South and south-west base Black Hills; Stone Butte. Lower part of bed C of the accompanying section.

Lingula brevirostris.

Shell oblong elliptical, thin; lateral margins slightly convex, nearly parallel, sometimes converging a little towards the beaks in young individuals; front subtruncate; cardinal edge sloping to the beaks at an angle of about one hundred and thirty degrees; beaks obtuse, scarcely projecting beyond the cardinal margin; valves nearly equal, convex along the middle, compressed near the margins and in front. Surface polished, and marked by fine rather obscure concentric striæ; on the surfaces of the inner laminæ a few very obscure radiating, or longitudinal lines are sometimes seen along the middle of the valves, near the front. Length ·54 inch; breadth ·35 inch; thickness (depth of the two valves) ·16 inch.

Locality and position.—Western and south-western base Black Hills, towards lower part of bed C of foregoing section.

Inoceramus umbonatus.

We only know this species from an internal cast of a left valve, with portions of the shell adhering near the beak and hinge. This valve is remarkably gibbous, and the beak, which is a little oblique and near the anterior side, is much produced, elevated and involuted, so as to give the valve the appearance of some of the Palæozoic univalves usually referred to the genus *Capulus.* The aperture of this valve is subcircular, being straighter on the hinge side than elsewhere. The portion of the shell remaining near the hinge is very thick, and composed of an inner laminated layer, and an external coarsely fibrous portion, the latter being much thicker than the other. We know nothing of the surface markings, beyond the fact that obscure concentric undulations are visible on the cast.

The remarkable form of this valve indicates that the other must have been comparatively much less gibbous, or, perhaps, bore the relations to this, of an operculum to a univalve shell, as in *I. involutus* of Sowerby. It is the first species of this type discovered in American formations, so far as we know. Height 3.10 inches; length 2.38 inches.

Locality and position.—This specimen was obtained from near Fort Benton on the upper Missouri; but as it was found by a person unacquainted with geology, at a locality not yet visited by any person familiar with the formations of the country, its position is doubtful. The composition of the matrix, however, as well as the thickness and structure of the shell, lead us to think it holds a position in No. 4 of the general section; all the north-western species yet known from formations below No. 3 being comparatively thin and entirely fibrous.

Avicula (Monotis) tenuicostata.

Shell suborbicular, or slightly oval, a little oblique, usually higher than long; valves nearly equally convex; anterior side subtruncate, rounding rather abruptly into the hinge above, forming a broad oblique curve below; basal and postero-basal margins rounded; upper posterior margin sloping obliquely forward, but often curving gently outwards just below its junction with the extremity of the hinge line, so as to make the angle of the small, more or less compressed posterior wing not more than eighty or ninety degrees; hinge line less than the greatest length of the shell. Beaks scarcely oblique, located nearer the anterior than the posterior side; that of the left or larger valve more prominent than the other, and extending a little above the hinge; beak of the smaller valve more compressed, and scarcely distinct from the hinge margin. Surface marked by small, obscure, slightly elevated, radiating lines or costæ, which are less than the spaces between, and crossed by fine, nearly obsolete lines of growth, usually most distinct near the upper anterior margin. Length ·60 inch; height ·64 inch; breadth ·26 inch.

The sinus for the passage of the pedal muscle in the anterior margin of the smaller valve is rather deep, narrow, and connected with a deeply impressed narrow groove, which extends on the outside of the valve nearly parallel to the hinge, quite to the beak.

The surface markings are usually rather obscure on both valves, and often nearly obsolete on the smaller one. Young individuals are more nearly orbicular than mature specimens.

A closely allied representative of the Liassic species *Monotis substriata* Münst. (see Leonh. Br. t. ii, p. 8, 406.)

Locality and position.—Southwestern and eastern sides of Black Hills, ranges from upper part bed A, low down in bed C, but not in to B.

Mytilus pertenuis.

Shell small, extremely thin and fragile, slightly arcuate; valves convex along the middle from near the beaks, obliquely backwards and downwards to the lower part of the posterior end; extremities narrowly rounded, the anal end being a little broader than the other, and having its most prominent part below the middle. Base somewhat arched behind the middle, more prominent and curving very gradually upwards toward the front; dorsum carinate from a little behind the beaks posteriorly, its outline forming a broad, sloping curve. Hinge nearly straight, rather short, rounding gradually into the dorsal edge behind. Beaks small, rather obtuse, subangular above, and located at the anterior end, scarcely projecting beyond the hinge and anterior margin. Surface marked by fine, rather obscure lines of growth.

Locality and position.—West base of Black Hills, bed C, of the accompanying section.

Arca (Cucullæa) inornata.

Shell oblong-oval, subrhombic, rather gibbous in the umbonial region; anterior side rounded up from below, so as to meet the hinge at an angle of about ninety degrees; posterior side a little broader than the other, obliquely truncate above, somewhat narrowly rounded below; base nearly straight along the middle, but not exactly parallel to the hinge, rounding up more gradually towards the front than behind. Beaks rising somewhat above the hinge, rather pointed, incurved and very slightly oblique, located a little in advance of the middle; posterior umbonial slopes subangular. Hinge rather long, but not equalling the greatest length of the shell; posterior teeth two or three in each valve, linear and elongate parallel to the hinge margin; anterior teeth much shorter and oblique; ligament area not very broad. Surface apparently smooth. Length ·75 inch; height ·45; breadth ·46 inch.

Has the teeth of the hinge arranged like those of *Cucullœa*, or approaching those of *Macrodon*, but the posterior muscular impression seems not to be raised upon a projecting lamina as in those genera.

Locality and position.—South western base of Black Hills; also around Bear Butte, on east side of Black Hills, bed A, of the foregoing section.

Unio nucalis.

Shell oval, moderately gibbous; extremities rather narrowly rounded, the most projecting part of the posterior end being below the middle, and that of the anterior extremity above it; base semioval, often quite prominent in the middle; beaks a little depressed, located about half way between the centre and the anterior end; umbonial region rather gibbous, and rising above the hinge, subangular on the posterior slopes. Surface marked by fine lines of growth, and more or less distinct concentric wrinkles; the latter becoming quite small and very regular on the beaks. Traces of extremely small regular radiating wrinkles are also sometimes seen between the obscure angle on the back part of the umbones, and the hinge. Length 1·85 inches; height 1·34 inches; breadth 1 inch.

We were at first in much doubt about referring this shell to the genus *Unio*, because it is associated with a small oyster and *Ammonites Henryi* of this paper. The hinge, however, as far as we have been able to make out its characters, is like that of the genus *Unio*, and entirely different from *Cardinia*, and other forms usually resembling *Unio*. In the left valve, (we have not seen the hinge of the right valve,) it is moderately thick, somewhat arched, and provided with two posterior lateral teeth, which are elongated parallel to the cardinal edge, and separated by a groove apparently for the reception of a tooth in the other valve. The cardinal tooth, which is placed nearly under the beak, is rather irregular, somewhat flattened, and a little corrugated on the edge.

In addition to the foregoing characters, we are led to think this must be a true *Unio*, from finding in the same matrix several specimens of a small *Planorbis* and a fragment of *Paludina*.

Locality and position.—Southwest base of Black Hills, in lower part of No. 1.

Corbula inornata.

Shell small, trigonal, very gibbous; anterior side more or less rounded; posterior extremity angular below, base semiovate, the most prominent part being towards the front; hinge sloping from the beaks, which are central; posterior umbonial slopes angular. Right valve more convex than the other, and having its beak more gibbous, elevated and incurved; but the margins of the two valves are equal, nearly or quite closed, and a little warped. Surface nearly smooth or only marked by very obscure lines of growth, and sometimes a few indistinct concentric wrinkles near the base. Length ·27 inch; breadth ·29; height of larger valve 23 inch, of smaller 20 inch.

We have not yet had an opportunity to see the interior of this shell, but owing to the fact that there is often seen on the posterior side of each valve, just within the posterior umbonial angle, a rather distinct groove curving down from the beaks, directly over the position of the raised internal lamina in our genus *Corbulamella*, we suspect this species may possibly be found to possess the internal characters of that genus.

Locality and position.—Long Lake, No. 5, of the general section.

Panopæa (Myacites) subelliptica.

Shell narrow, subelliptical, or subovate, moderately compressed, extremities narrowly rounded, the posterior end being more compressed than the other, and sometimes very faintly truncate on the oblique upper slope, both ends apparently nearly closed, or but slightly gaping. Base forming a very broad gentle curve, rounding up gradually towards the extremities; dorsal outline slightly concave in front and rear of the beaks, the anterior slope being more abrupt than the other. Umbonial region obscurely angular on the posterior side; beaks rather depressed, but rising above the hinge, approximate, and located in advance of the middle. Surface of cast marked by small, moderately distinct, irregular concentric wrinkles of growth. Muscular and pallial impressions unknown. Length 2·10 inches; height 1·10 inches; transverse breadth ·70 inch.

Locality and position.—Western and southwestern base Black Hills, low down in bed C of the accompanying section.

Teredo globosa.

Shell globose, thin, rounded or subtruncate and gaping posteriorly; anterior hiatus large, and consisting of a rectangular notch extending from the base half way up towards the beaks, and back to the middle of the shell. Umbonial region gibbous; beaks placed near the anterior side, much incurved obliquely forward. Surface marked by rather distinct lines of growth, which, on the back part of the shell, curve down, parallel to the posterior border, until they approach a small indistinct ridge, or slightly elevated line, passing down from the umbones, when they curve abruptly upwards nearly parallel to the margin of the anterior hiatus, becoming at the same time much finer and more regular, as well as very finely and beautifully crenulate; on reaching a small, indistinct groove, which curves down obliquely from the beaks towards the corner of the anterior notch, these lines are abruptly deflected upon the anterior portion of the shell extending out over the notch.

The tubes are thin, subcylindrical, and sometimes nearly straight, but generally variously curved; and increase gradually from the smaller to the larger end. Length of shell ·23 inch; height and breadth of do. each ·22 inch. Diameter of one of the larger tubes .26 inch.

Locality and position.—Square Butte, near Fort Clark, upper part of No. 5 of the general section. Found in great numbers in large masses of fossil wood.

Pholas cuneata.

Shell small, very thin, cuneiform, most gibbous at the anterior end, which is truncate, and more or less gaping,—narrowing and much compressed posteriorly; anal extremity very narrowly rounded and gaping a little. Dorsal margin declining slightly from behind the beaks, with a very gentle convex curve towards the posterior end; basil margin nearly straight, or a little concave in outline. Beaks small, located at the anterior extremity, scarcely rising above the hinge, incurved and touching.

The surface is marked by small concentric wrinkles, which are much more distinct on the gibbous anterior half of the shell than behind, and crossed by two grooves, the anterior one of which is linear, but well defined (on the cast), and extends from the beaks downwards, and a little backwards, so as to reach the base in advance of the middle; the other groove is more shallow, broader, less distinctly defined, and extends from the back part of the beaks, obliquely backwards and downwards, just within the subangular posterior umbonial slopes.

There is also a small ridge or elevated line, on the anterior end of each valve, curving parallel to the concentric wrinkles, from the base about half way up towards the beaks, from which point it is deflected abruptly at right angles forward, so as to delineate exactly the form of the angular notch or hiatus of *Teredo* and *Xyophaga;* but the margin of the valve, (at any rate in adult shells) extends out beyond this line, so as to leave a comparatively small hiatus.

The posterior muscular impression is long, very narrow, and placed near the postero-dorsal edge; while the pallial line passes obliquely down near the middle of the valves, and appears to be provided with two sinuses, the upper one being very small, and lower of medium size. The space behind the pallial line is marked on the interior by extremely fine, obscure radiating striæ. Length ·37 inch; height ·18 inch; breadth ·16 inch.

Locality and position.—Long Lake, No. 5 general section.

ACTEON (SOLIDULA) ATTENNUTA.

Shell small, elongate; spire elevated; volutions (number unknown) depressed, or but slightly convex, separated by a shallow, but distinct suture. Surface ornamented by numerous small punctate striæ, usually less than the spaces between, and numbering about fourteen on the second turn; sometimes there is on the body whorl a much smaller stria between each two of the others; while near the base of this volution the striæ are stronger than above, and more distinctly punctate. Lip and columella unknown. Length about ·57 inch; breadth 17th inch; apical angle convex, divergence 18°.

As our specimen is not in a condition to show the collumella, we are left in some doubt respecting its generic relations, but its form and surface markings are similar to those of species usually referred to the genus *Acteon.*

Locality and position.—Yellow-stone river, formation No. 4 and 5 blended together.

HELICOCERAS? TORTUS.

Our specimen of this species is a fragment, consisting of one septate volution of the spire. This evidently belonged to a sinistral conical shell, composed (at any rate during a part of its growth) of rounded whorls, which are coiled in an ascending spiral, so far out of the same plane as to be disconnected by a free space equalling about one-third the diameter of each succeeding whorl below. The umbilical cavity left within, is, at its aperture, less than the diameter of the largest volution; while the whorls increase in size, so as nearly to double their diameter each turn. The surface is ornamented by two rows of rather low nodes, passing round the lower outer side (the apex of the spire being above) of the whorls,—and small, but distinct annular costæ, which often bifurcate at the nodes.

The siphuncle is very small, and in the specimen before us presents the remarkable peculiarity of gradually changing its position in passing from the smaller to the larger extremity of the fragment before us. That is to say,—at the smaller end of the specimen, it occupies exactly the middle of the dorsal, or outer side, but in passing round it gradually curves upwards, so that by the time it reaches the larger end, it comes out on the summit of the whorl. Consequently, if it goes on in this way, another turn of the spire would bring it on the inner or umbilical side,—a third on the underside, and the fourth again on the dorsal or outer side. It is also worthy of note that the lobes and saddles of the septa, and to some extent the nodes, followed the peculiar curve of the siphuncle, so that it would seem the whorls not only form an ascending spiral curve, but are, as it were, at the same time, twisted in such a manner as to change the relative positions of the dorsal and ventral sides.

The septa are provided with six lobes and six saddles, the larger of which are profoundly sinuous and variously branched. The dorsal lobe is comparatively small, and ornamented at the extremity by two nearly equal branches, each of which is subdivided into from three to five small divisions with sinuous margins; above this there is a small lateral branchlet on each side, the right hand one of which is bifid. The superior lateral lobe is considerably larger than the dorsal lobe, and deeply divided by its auxiliary saddle into two large unequal spreading branches, of which the one on the ventral side is somewhat longer than the other, and provided at the extremity by two nearly equal spreading bifid branchlets and several smaller digitations; the other principal division is less deeply divided at the extremity into two unequal parts, the terminal or longer of which is bifid: the margins of the main branches, as well as of the body of the lobe, are also provided with several subordinate divisions with sinuous edges. The inferior lateral lobe is somewhat smaller, but in other respects scarcely differs from the superior lateral lobe.

The dorsal saddle is nearly as large as the inferior lateral lobe, but less spreading above, and narrower, as well as more oblique at its base; while its extremity is profoundly divided, by its auxiliary lobe, into two subequal tripartite, deeply sinuous branches. The lateral saddle is very nearly of the same size and form as the dorsal lobe, but less oblique, and a little more deeply divided by its long auxiliary lobe.

The greater transverse diameter of our specimen is 2·43 inches ; do. of umbilicus, ·65 inch ; diameter of larger end of the whorl 1·04 inch ; do. of the smaller end ·74 inch ; diameter of the siphuncle at the larger extremity ·6 inch.

The peculiar twisted character of the volutions in this shell led us to suspect it may be found, when better specimens are obtained, to constitute a distinct genus from any Cephalapod hitherto described. For the present, however, we refer it provisionally to the genus to which it appears most nearly related.

Locality and position.—Great Bend of the Missouri, lower part of No. 4, general section.

Turrilites (Helicoceras) cochleatus.

Shell sinistral, very thin, and composed of rounded, nearly or quite contiguous whorls, which gradually increase in size from the smaller to the larger extremity; umbilicus slightly wider than the diameter of the largest whorl. Surface ornamented by numerous small rather irregular bifurcating, annular costæ, which first pass obliquely backwards and outwards from the umbilicus above, then curve so as to cross the dorsum obliquely downwards and forwards, but on reaching the lower side, they curve backwards again, in approaching the ventral side. There are also two rows of obscure, flattened, or depressed oval nodes, one of which passes round nearly exactly over the siphuncle, which occupies the middle of the outer side of the whorl, while the other is placed less than one-fifth of the circumference of the whorl lower down.

The septa are rather distant, and divided into six lobes and six saddles, which are a little unsymmetrical, in their subordinate details, but about of the same size and general form on opposite sides of the siphuncle. The dorsal lobe is small, and ornamented at the extremity, by four small branches, the two terminal of which are a little larger than the others, slightly dissimilar, and each provided with five or six unequal digitations; the other two divisions are not exactly opposite, differ slightly in form, and are each armed with about from three to five or six unequal digitate points : above these principal terminal divisions, there are also along the body of the lobe a few small alternating lateral pinnules.

The superior lateral lobe is greatly larger than the dorsal lobe, and very deeply divided into two great, subequal, spreading branches, of which the one on the ventral side is a little larger than the other (especially on the side of the whorl below the siphuncle), and unequally subdivided into three bifid branchlets, the two terminal of which are much larger than the third, and each ornamented by several small unequal, projecting points, the other main branch is divided into two principal, bifid branchlets with many smaller sinuosities and digitations. The inferior lateral lobe is somewhat smaller than the superior, but in other respects very similar.

The dorsal saddle is small, very oblique, much contracted at its base, and divided above into two unequal variously subdivided, sinuous branches. The lateral saddle is not so oblique, but does not otherwise differ materially from the dorsal saddle.

Our specimen consists of a little more than half a volution, the greatest transverse diameter of which is 2·34 inches; breadth of umbilicus ·75 inch. Diameter of the volution at larger end, which is a little oval, ·73 inch by ·64 inch ; do. of smaller end, which is very nearly circular, ·54 inch.

It is not easy to determine, from our specimen, whether this species is most nearly related to the genus *Turrilites* or *Helicoceras*. In the rounded and comparative slender form of its whorls, as well as the large size of its umbilicus, it is more like the latter genus ; while the fact that the volutions are nearly or quite in contact, as is shown by an impression left on the matrix, would seem to indicate that it must belong to the genus *Turrilites*. It is probable, however, these two types will be found to be connected by many intermediate gradations of form, when larger numbers of these *Cephalopods* are known.

Locality and position.—Great Bend of the Missouri, lower part of No. 4.

HELICOCERAS TENUICOSTATUS.

The fragment upon which we propose to found this species is slender, nearly cylindrical, and increases very gradually in size, from the smaller to the larger extremity. It makes a remarkably broad sinistral, ascending spiral curve, so as to leave the volutions disconnected, and form a large umbilical space, having a diameter about four times as broad as that of the largest whorl. The siphuncle is of medium size, and occupies a position above the middle of the outer side of the volutions.

The surface is ornamented by rather irregular moderately distinct annular costæ, which occasionally bifurcate, and pass nearly straight around the whorls On the outside of the volutions the costæ are stronger than within, and show. a disposition to swell out into obscure nodes. Length of fragment 1·64 inch; diameter at larger extremity ·49 inch ; do. of smaller end ·44 inch.

We have for a long time past had this specimen in our possession, but always supposed it identical with *Hamites Mortoni*, (Hall and Meek, Mem. Am. Acad. Arts and Sci. N. S. vol. 5, pl. iv. fig. 3 a. c.) which is probably a *Helicoceras*. After a more careful comparison, however, we find the following differences, which we think are of specific importance,—in the first place, the costæ of the shell now before us are less prominent, and encircle the volutions much less obliquely than those of *H. Mortoni*; while the siphuncle occupies a higher position in the dorsum, and the spiral coil of the shell was sinistral, while that of *H. Mortoni* is dextral. In addition to the foregoing, there are well marked differences in the details of the lobes and saddles of the septa, which cannot, however, be well explained without the use of figures.

Locality aud position.—Great Bend of the Missouri, lower part, No. 4.

TURRILITES ? UMBILICATUS.

We have of this species nearly an entire volution, a little more than half of which is septate, but not in a condition to show the form of the lobes. It is a sinistral shell, the rounded volutions of which are coiled in an ascending spiral, nearly or quite in contact, and increase gradually in size, from the smaller to the larger extremity. The umbilicus is a little less than the diameter of the largest volution; and the siphuncle occupies a position in the middle of the outer side of the whorls.

The surface is ornamented by rather distinct, annular bifurcating costæ, which, on the upper side of the whorls, curve first obliquely backwards and outwards from the umbilicus, then forwards and downwards, as they cross the dorsum, and on reaching the under side, curve inwards to the umbilicus. There are also two rows of more or less distinct nodes passing around the under outer side of the whorls, at which the costæ usually bifurcate.

Greatest transverse diameter across the volutions and umbilicus 3·20 inch; breadth of larger end of whorl 1·19 inch ; do. of smaller end 1·06 inch.

Not having seen the septa of this species, it is with some hesitation we have considered it distinct from *T. cochleatus* of this paper ; though it differs from our specimen of that species in having less neatly rounded volutions, much stronger nodes and costæ, and proportionably a little smaller umbilicus ; they may, however, be only varieties of the same species.

Locality and position.—Great Bend of the Missouri, lower part of No. 4 of general section.

ANCYLOCERAS (HAMITES) UNCUS.

We have only seen a fragment of this specie, consisting of the curved portion of the non-septate, or body part of the shell. It is compressed laterally, and makes a rather short curve in the same plane,—leaving between the two extremities, a free space equalling about half the greater diameter of the larger limb; both ends are then extended in the same direction, and, apparently, nearly parallel.

The surface is ornamented by strong, rather angular more or less oblique annular costæ, which occasionally bifurcate on the sides, and are much more prominent towards the dorsal, than the ventral side. There are, also, two rows of rather small nodes on each side of the dorsum, placed on the costæ; those nearest the dorsum being more prominent than the others, which merely consist of a slight swelling of the ribs.

Diameter across the curve 3·92 inches; greater diameter, transverse section of larger limb 1·73 inch; smaller diameter of do. 1·10 inch.

We are unable to determine from this fragment whether it is an *Ancyloceras* or a *Hamite.*

Locality and position.—South fork of Cheyenne River, near base of Black Hills. No. 4, of the general section.

Ammonites cordiformis.

Shell, when young, rather compressed, but becoming much more convex with age; dorsum distinctly carinate, in small specimens, much more obtuse in the adult. Umbilicus one half to one third as broad as the outer whorl; proportionally smaller in large than small individuals; transverse section of the volutions distinctly cordate. Surface ornamented by numerous small costæ, which are largest near the umbilicus, where they sometimes (in the medium sized specimens) swell a little, so as to form obscure transversely elongated, subnodose prominences. A short distance beyond this, they bifurcate regularly, or are increased by the implantation of others between, to two or three times their number, at the umbilicus. As they approach the dorsum, they curve distinctly forward, and in passing over it, impart to the dorsal carina, especially in young specimens, a more or less distinctly serrated outline: on the outer volutions of large individuals, the costæ are almost entirely obsolete,

The septa, which are not very closely crowded, are divided into five lobes on each side, the first four of which are similar in their mode of branching to those of *A. cordatus* of Sowerby; but they are less deeply sinuous, and present other differences in their details. Greater diameter (of an imperfect specimen) 3·30 inches; transverse diameter of its outer whorl 1·90 inch: breadth of same from umbilicus to dorsum 1·64 inch. Breadth from umbilicus to dorsum of a portion of an outer volution of large individual 3·50 inches; transverse diameter of same, near the umbilicus 3·18 inches.

In many respect this shell is nearly related to the Liassic species *A. cordatus*, of Sowerby, of which it may be regarded as a representative. All our specimens are internal casts.

Locality and position. South west base of Black Hills, associated with the foregoing species.

Ammonites henryi.

Shell convex lenticular; dorsum narrowly rounded, or subangular; inner volutions entirely hidden: umbilicus very small and deep: surface apparently without nodes or costæ.

Septa not very profoundly lobed, rather closely crowded, slightly unsymmetrical on opposite sides of the shell. Dorsal lobe divided into four principal branches, the two terminal of which are smaller than the others, and usually tridigitate at their extremities; while the two lateral divisions are bipartite, with more or less sharpely dentate extremities.

The superior lateral lobe is about the size of the dorsal lobe, and irregularly divided into four nearly equal branches, one of which, on the dorsal side, is separated from the others by a deeper and broader sinus, than those by which they are divided; while the other three branches form together a kind of large tripartite division: each of the four branches is provided at the extremity with from three to six sharp digitations. The next succeeding lobe is not more than one-fourth as large as the superior lateral lobe; it is, on one side of the shell, divided nearly to its base, into two equal branches; while the corresponding lobe on the other side, is narrower, and rather regularly divided into three short sharply digitate branches. The remaining lobes are very small, and simply digitate at their extremities. Greatest diameter 2·14 inches; transverse diameter 1·33 inches.

This species is remarkably distinct in its internal structure from all the *Ammonites* hitherto found in this country. We take pleasure in naming it in honor of the distinguished philosopher Prof. Joseph Henry, Secretary of the Smithsonian Institution.

Locality and position. Southwest part of Black Hills, lower bed of No. 1, general section of Nebraska formations, and of preceding section.

Scaphites larvæformis.

Shell small, ovate, laterally compressed, rounded on the dorsum; body whorl cylindrical, first extended horizontally from the convoluted inner whorls, then curving upwards a little, after which it bends backwards upon itself, so as to bring the aperture almost in contact with the inner coil; but leaving a free space within the curve. Inner whorls mostly hidden, forming a small coil at one end of the shell, and so closely rolled up as to leave but a very small umbilical impression: aperture nearly circular. Surface ornamented by rather small costæ which pass round a little obliquely from the inner side of the whorls, to a point about halfway across the outsides, where they swell out into small obscure transversely elongated nodes, and then each branch into two or three smaller costæ, which pass very regularly over the dorsum.

The septa are moderately close, and provided with three lobes on each side, of which the superior lateral is the largest. The dorsal lobe is still larger, and provided with two small obscurely bilobate branches on each side. Greatest length .88 inch.; greatest height ·60 inch.; breadth of the body whorl ·32 inch.

This species is very closely allied in the structure of its septa to *S. hippocrepis*, DeKay, (*S. Cuvieri*, Morton, Synop. Org. Remains, pl. vii. fig. 1,) but differs in the details of its septa lobes, and the body whorl is proportionally much more slender, more cylindrical, and forms a larger curve; it also wants the outer row of round nodes.

Locality and position.—East base of the Black Hills, formation No. 2 of the general section.

Belemnites densus.

Shell large and thick, subcylindrical, more or less compressed laterally, so as to give the cross section a slightly oval outline: lower portion tapering to a point, sometimes a little oblique, usually more compressed than any part above, often having a narrow obscure groove on the ventral side, and sometimes a very slight carina on the dorsal side, near the apex; the groove being more frequently present than the carina, and extending further up from the point: surface smooth.

Alveolus extending about half way down from the summit to the lower extremity, where it terminates nearly midway between the centre and the ventral side; from this point the apical line passes down, gradually approaching the ventral margin, but curving slightly so as not to intersect it before reaching the apex.

Phragmacone conical, very slightly curved, apical angle 20°; septa rather closely arranged, about twenty of them occurring in a section one inch in length, measuring ·72 inch in diameter at the larger end, and .35 inch at the smaller end; siphuncle unknown.

The best specimen we have seen, of the outer horny shell, measures 5 inches in length, and ·90 inches in diameter at the larger end; the alveolus measures about 2.39 inches in length, and .75 inch across the aperture. Some fragments, in the collection of other individuals, appear to have been at least one third larger than the specimen from which the above measurements were taken.

This species is closely allied to *B. excentricus*, Blv., and *B. panderianus* D'Orbigny, of the lower oolite, but appears to be distinct from both.

Locality and position. Southwest base Black Hills. Also east side of same; near Bear Peak. Bed A of the section.

We are under many obligations to Prof. Henry for the use of rooms and books, and also for other facilities at the Smithsonian Institution, while making the forgoing investigations as well as those of our former papers.

Description of New Species of Coleoptera, chiefly collected by the United States and Mexican Boundary Commission, under Major W. H. Emory, U. S. A.

BY JOHN L. LE CONTE, M. D.

GALERITA Fabr.

G. atripes, nigra, capite punctato postice oblique rotundato, thorace elongato, rugose punctulato rufo, lateribus postice late sinuatis, ad basin utrinque impresso, elytris elongatis oblongo-ovalibus, confertissime rugose punctulatis, æqualiter pubescentibus, striis punctulatis. Long. ·67.

One specimen in Dr. Berlandière's Collection, probably found on the Rio Grande: many others have been recently collected by Dr. W. A. Hammond, at Fort Riley, in Kansas. This species has the form, size and sculpture of G. Lecontei, and G. californica, but differs by the uniform pubescence of the elytra, the less sinuate sides of the thorax, and still more by the black antennae and feet.

CALLEIDA Dej.

C. planulata, nigro-picea, supra cuprascens, thorace latitudine longiore, parum convexo, canaliculato, lateribus rotundatis, ante medium magis angustato, pone medium parum angustato, utrinque ad basin profunde late foveato; elytris interstitiis paulo convexis parce punctulatis, margine virescente ante medium subimpresso, antennis articulis tribus primis ferrugineis. Long. ·48.

One specimen from Dr. Berlandière's Collection. The base of the thorax is broadly subsinuate, and only slightly oblique towards the angles, which thus become almost rectangular, although the sides of the thorax are not sinuate.

C. cyanoptera, rufa, capite nigro-cyaneo, thorace latitudine fere sesqui longiore, minus convexo canaliculato, lateribus late rotundatis, pone medium paulo angustato, et lateribus subsinuato, utrinque profunde impresso; elytris læte cyaneis, tenuissime punctulato-striatis; abdomine genubusque nigris, antennis extrorsum nigro-piceis. Long. ·32—·38.

Also from Dr. Berlandière's Collection. Larger than C. decora; the thorax is less convex, more broadly rounded on the sides anteriorly, and less narrowed and sinuate hehind the middle. The posterior angles are hardly prominent, and owing to the obliquity of the base are very obtuse.

STENOMORPHUS Dej.

S. rufipes, valde elongatus, niger nitidus, thorace latitudine sesqui longiore, postice sensim angustato, angulis posticis rotundatis, ad basin utrinque breviter et profunde impresso, elytris profunde striatis, antennis palpis pedibusque obscure ferrugineis. Long. ·42.

Dr. Berlandière's Collection.

HARPALUS Latr.

H. laesus, ovalis supra æneus, thorace latitudine fere duplo breviore, lateribus rotundatis, magis versus apicem, postice subangustato et utrinque vix impresso, angulis posticis obtusis, fortius marginato, margine diaphano;

elytris tenuiter striatis, striis 2nda et 5ta multifoveatis, ad marginem subtiliter pubescentibus; palpis pedibusque ferrugineis, antennis fuscis ad basin ferru gineis. Long. ·29—·36.

Fort Gates, Texas, and Tampico, Mr. H. Haldeman. Resembles closely H. stigmosus, *Germ.*, but is a little more elongated; the thorax is more strongly margined, and the posterior angles are much more obtuse; belongs to the group Selenophorus *Dej.*

H. gravis, crassus convexus, capite thoraceque nigro-æneis nitidis, hoc latitudine fere duplo breviore, lateribus antice rotundatis, basi truncata, utrinque fovea parva notata, angulis posticis rectis; elytris virescentibus nitidis, striis profundis, interstitiis planis, 3io unipunctato, margine corporeque subtus rufo-piceis, pedibus antennisque ferrugineis. Long. ·34.

One male found at San Antonio, Texas, by Mr. Haldeman. Shorter and stouter than most species of the genus, with the antennæ slightly moniliform, and hardly reaching the base of the thorax; the labrum is piceous and slightly emarginate; the emargination of the mentum is nearly square, and the medial tooth obsolete; the ligula is dilated and truncate, as in the other species with inflated paraglossæ.

Stenolophus Dej.

S. flavipes, nigro-piceus nitidus, thorace transverso, lateribus rotundatis, limbo omni anguste piceo-testaceo, ad basin utrinque late impresso et punctulato, angulis posticis valde rotundatis, elytris thorace latioribus, limbo laterali piceo-testaceo, striis postice profundioribus, interstitiis paulo convexis, 3io unipunctato; pedibus palpisque testaceis, antennis fuscis ad basin testaceis. Long. ·32.

San Diego, California. Resembles S. ochropezus, and belongs to the same division of the genus, but is much larger, with the thorax more transverse and more rounded on the sides.

S. cincticollis, nigro-piceus nitidus, thorace latitudine vix breviore, postice angustato, lateribus rotundatis, angulis omnibus rotundatis, limbo omni testaceo, ad basin rugoso utrinque punctulato vix foveato, elytris cyaneomicantibus limbo laterali testaceo, striis profundis postice exaratis, 2nda unipunctata, pectoribus medio, pedibus, ore antennisque flavo-testaceis, his extrorsum fuscis. Long. ·25.

One male found on the Colorado River, near the Gila. Of the size and form of S. dissimilis, but of a different color, and with the basal foveæ of the thorax less marked; the middle tarsi are slightly, the anteriorly broadly dilated.

Bradycellus Er.

B. nitens, testaceus nitidissimus, capite infuscato pone oculos punctato, thorace latitudine breviore, lateribus rotundatis postice paulo angustato, angulis posticis obtusis vix rotundatis, ad apicem parce ad basin densius punctato et utrinque profunde impresso, elytris thorace latioribus, infuscatis, basi, sutura margineque piceo-testaceis, tenuiter striatis, interstitiis planissimis, 3io unipunctato, ad apicem et marginem parce subtiliter punctatis, postpectore abdomineque nigro-piceis, antennis fuscis ad basin testaceis. Long. ·20.

San Diego, California, one specimen. Very distinct from all others known to me except B. longiusculus from Sitkha; it differs however from that by its larger size, paler color, and more slender striæ.

B. nubifer, rufo-testaceus nitidus, capite saturatiore, thorace latitudine vix breviore, lateribus rotundatis, postice paulo angustato, angulis posticis obtusis subrotundatis, ad basin utrinque late foveato et introrsum parce punctato; elytris elongatis, thorace paulo latioribus striis profundis, interstitiis paulo convexus, 3io unipunctato, 2—4 a medio fere ad apicem nigris; postpectore abdomineque nigro-piceis, ano rufo-testaceo, antennis paulo infuscatis, ad basin testaceis. Long. ·17.

A very pretty species found by me at San Diego, California, and at Tuvac in Northern Sonora. The scutellar stria is merely a basal puncture.

B. rivalis, rufo-testaceus nitidus, thorace latitudine vix breviore lateribus rotundatis, postice paulo angustato, angulis posticis obtusis minime rotundatis, ad basin utrinque late foveato et subtilius punctato, elytris elongatis thorace paulo latioribus, striis profundis, interstitiis paulo convexis, 3io unipunctato, sæpe pone medium utrinque infuscatis; subtus concolor, antennis fuscis ad basin testaceis. Long. ·12—·14.

Colorado Desert, at New River and at the Colorado. Readily distinguished from the preceding by the uniform color of the under surface, and by the finer and more numerous punctures of the base of the thorax; the posterior angles are also not rounded but almost prominent.

B. ventralis, rufo-testaceus nitidus, capite saturatiore, thorace latitudine vix breviore, lateribus rotundatis, postice paulo angustato, angulis posticis obtusis rotundatis, ad basin utrinque late foveato et ad medium punctato, elytris elongatis thorace paulo latioribus, striis profundis, 2nda unipunctata; pectore abdomineque obscuris, antennis vix infuscatis. Long. ·17.

One specimen found on the Gila River. Of the same form as B. nubifer, but distinguished by the finer and more numerous punctures of the base of the thorax. Both species resemble in form B. rupestris, but differ by the punctures being accumulated at the inner part of the basal foveæ, leaving the angles smooth, while the latter themselves are more rounded.

Pasimachus Bon.

P. viridans, niger nitidus, thorace limbo laterali et basali læte viridiæneo, latitudine breviore, lateribus rotundatis anguste marginatis, postice brevissime sinuatis, angulis posticis parvis rectis; elytris planiusculis subovatis, postice subacutis, seriatim punctulatis (seriebus per paria approximatis), limbo laterali et basali læte viridi-æneo, margine ad basin magis reflexo, humeris vix distinctis, carina humerali brevissima fere nulla; tarsis posticis tibiis haud longioribus. Long. 1·08.

One specimen, Sonora, Mr. Schott. A very distinct species, remarkable not only by its color, but by the almost entire absence of the humeral carina. The second, third and fourth joints of the antennæ are less compressed than in P. depressus and validus.

Lymnæum Stephens.

L. laticeps, piceum, rufo-tinctum, depressum, capite magno, oculis parvis rotundatis haud prominulis, fronte utrinque breviter impressa, thorace capite haud latiore, trapezoideo, lateribus subrotundatis et subsinuatis, angulis posticis rectis, linea dorsali profunda utrinque abbreviata, ad basin vix foveato; elytris ellipticis striis externis obliteratis internis distinctis, 5to et submarginali postice profundis, dorso bifoveatis, palpis pedibusque testaceis fusco-testaceis. Long. ·14.

One specimen from the seashore at San Diego, California.

Quedius Leach.

Q. explanatus, niger parum nitidus, capite subtiliter parce punctulato, thorace elytris fere latiore, lateribus explanatis; abdomine elytrisque pubescentibus, his subtiliter dense punctulatis, antennis utrinque attenuatis. Long. ·38—·5.

San Diego, California, under stones. A fine species very different from any previously described. It belongs to division (*1) of Erichson.

Pæderus Fabr.

P. femoralis, alatus, rufus nitidus, elytris cyaneis grosse punctatis, capite, abdominis segmentis ultimis duobus, postpectore pedibusque nigris, his coxis femorumque dimidio interiore rufis, antennis tenuibus ad basin rufis. Long. ·41.

Two specimens found on the Gila River, below the Pima villages, one was subsequently destroyed, and the other is imperfect. Head black, shining sparsely punctured, more grossly towards the sides; before the eyes transversely impressed. Palpi rufous. Antennæ slender, joints 1—3 red, third more than twice as long as the second, and blackish at the tip; 4th and 5th black, the others wanting. Thorax oval convex narrowed behind, one fourth narrower than the head, a little longer than wide, shining red, with a few very small punctures and erect hairs. Elytra as long as the thorax, cylindrical, bright blue, grossly and densely punctured; abdomen smooth, shining red, with the last two joints black. Beneath red, postpectus blackish. Feet black, with only the coxæ and basal half of the thighs red.

P. ustus, alatus rufo-testaceus nitidus, elytris fusco-ferrugineis minus dense punctatis, abdominis segmento ultimo antennisque piceis, his basi testaceis. Long. ·18.

Colorado River, about the junction of the Gila: very abundant in March and April. Remarkably different from the other species by the color, which is of an almost uniform yellowish red. Antennæ slightly thickened externally, fuscous with the first four joints rufous. Head with a few large lateral posterior punctures. Thorax a little longer than wide, hardly narrower than the head, oval convex slightly narrowed behind, truncate at base, disc with a few scattered punctures. Elytra convex usually dark ferruginous, sometimes hardly darker than the rest of the body, as long as the thorax, strongly not densely punctured. Abdomen very sparsely punctured, last joint piceous.

Colastus Er.

C. obliquus, depressus ovalis, niger griseo-pubescens, thorace subtilius punctato, antrorsum angustato, margine angusto testaceo postice latiore, elytris subtilius punctatis, obscure rufo-testaceis, limbo laterali postice latiore apicalique nigris, sutura paulo infuscata, antennis nigris, pedibus obscure rufis. Long. ·1.

Variat (immaturus), piceo-testaceus, elytrorum disco a humeris ad suturæ apicem pallidiore, versus scutellum infuscato.

Colorado River, California. Of the same size and form as the next species, from which it differs by the less dense punctuation of the thorax, and by the lateral black margin of the elytra being gradually broader from the humerus, and by the base not being margined with black.

C. limbatus, depressus ovalis, niger griseo-pubescens, thorace confertissime subtilius punctato, antrorsum angustato, margine angusto angulisque posticis indeterminate testaceis, elytris confertim subtilius punctatis, testaceis limbo omni æquali suturaque nigris, abdomine subtilissime punctulato, pedibus antennisque testaceis, his clava paulo infuscata. Long. ·1.

Colorado River, near the Gila.

Carpophilus Leach.

C. discoideus, oblongus fere depressus, piceus nitidus, subtiliter pubescens, thorace brevi, lateribus rotundatis marginatis, subtilius punctato, elytris thorace duplo longioribus, fortius marginatis, subtilius punctulatis, macula testacea triangulari postice truncata antice attenuata utrinque ornatis; pedibus antennisque rufis his clava paulo infuscata. Long. ·09.

One specimen found at the Colorado River, near the Gila. Somewhat allied to C. marginatus Er., but larger, more regularly oblong and more flattened.

TEMNOCHILA Westwood.

T. acuta, læte viridi-ænea, cyaneo-micans, capite antice subtilius, postice vage grosse punctato, thorace latitudine haud longiore parcius punctato, lateribus late rotundatis, postice angustato, angulis posticis haud prominulis, elytris thorace haud latioribus, humeris acutis, subrugosis seriatim subtilius punctatis, punctis postice minus profundis. Long. ·58.

One specimen, Texas, Mr. Haldeman. Resembles T. chlorodia, but the thorax is more regularly rounded on the sides, and less suddenly narrowed behind, and the posterior angles are not at all prominent; the series of punctures of the elytra are less effaced towards the tip.

T. aerea, olivaceo-ænea, subnitida, capite antice subtilius, postice vage grosse punctato, thorace latitudine haud longiore, lateribus antice parallelis, postice oblique angustato, angulis posticis paulo prominulis, elytris thorace haud latioribus, subtiliter rugosis, subseriatim punctatis, punctis postice paulo minus profundis. Long. ·58.

One specimen, San Francisco, California. Differs from the other species known to me by the rounded humeral angles of the elytra, the punctures are arranged in rows, but as they are all of the same size and not closely placed, the rows appear somewhat confused.

ANCHOMMA Lec.

A. costatum, elongatum piceum opacum, punctatum, pube pallida rigida parce vestitum, capite margine late deplanato, utrinque late sulcato, thorace latitudine longiore lateribus pallidioribus, rectis marginatis, dorso acute bicostato; elytris margine costisque utrinque tribus acute elevatis, interstitiis biseriatim punctatis; antennis crassis rufo-piceis, oculis divisis. Long. ·13.

One specimen from the sea shore at San Diego, California. This new genus is closely allied to Corticus and Sarrotrium. The antennæ are thick and setose: the first and second joints are equal, the third is nearly one half longer; 4—10 transverse, 11th narrower subquadrate. The sides of the head are dilated, so as to divide the eyes into two small linear portions, one superior, the other inferior. The mentum, palpi, feet and tarsi are as in Corticus. The first three joints of the abdomen are equal in length, the fourth is shorter, and the fifth hardly longer than the fourth.

DITOMA Latr.

D. sulcata, linearis, obscure ferruginea opaca, capite thoraceque scabris, parce setulosis, hoc marginato vix serrato, utrinque alte costato, elytris sutura, margine costisque utrinque quatuor acute elevatis, seriatim setulosis, interstitiis rugosis vix punctatis biseriatim setulosis. Long. ·13.

Colorado River, about Fort Yuma.

D. ornata, linearis depressa, picea opaca, capite thoraceque fortiter scabropunctatis setulosis, hoc lateribus marginatis serratis, angulis anticis parum prominulis, omnibus rotundatis, utrinque bicostato, elytris sutura margine costisque quatuor acute elevatis seriatim setulosis, interstitiis biseriatim cribratis et breviter setulosis, macula subbasali alteraque pone medium magnis rufis utrinque ornatis, antennis pedibusque obscure ferrugineis. Long. ·11—·13.

Found with the preceding. Larger and more depressed than D. quadriguttata, with the angles of the thorax more rounded.

SYNCHITA Hellwig.

S. variegata, oblongo-elongata, fusca opaca scabra, albo-setulosa, antennis pedibus elytrisque testaceis, his nigro-tesselatis, margine sutura costisque quatuor angustis elevatis, interstitiis biseriatim cribratis. Long. ·09.

Fort Yuma, Colorado River, California. Body oblong elongate, slightly convex, blackish brown; head and thorax scabrous, covered with short white hairs, which are decumbent though rigid. Thorax not wider than long, not narrowed anteriorly, emarginate in front, broadly rounded with a depressed lateral margin, which is partly testaceous, disc with two faint impressions near the base. Elytra tesselate with yellow and black; the spots are usually arranged so as to form a scutellar triangular spot, two undulating bands, two or three subapical dots, and the lateral margin black; the suture, margin and four discoidal costæ are acutely elevated, and crested with pale decumbent hairs; intervals with two rows of quadrate punctures and short decumbent setæ; antennæ and feet pale testaceous.

The sculpture of this species differs from that of the others known to me, but there are no sulci for the antennæ on the under surface of the head, and the club is solid.

Cryptophagus Herbst.

C. debilis, oblongus parum convexus, testaceus punctatus, dense pubescens, thorace transversim quadrato, lateribus late rotundatis, medio subtiliter unidentatis, angulis anticis rotundatis haud dilatatis, elytris versus suturam substriatis. Long. ·07.

One specimen from Santa Isabel. Of the form of C. cellaris, but smaller, with the middle tooth of the thorax very faint, and the anterior one entirely wanting; the sides are broadly rounded, and behind the tooth may be seen two or three very faint small teeth.

C. pilosus, oblongus parum convexus, piceus fortiter punctatus, longius pilosus, thorace transversim quadrato, lateribus late rotundatis, depresso-marginatis, bidentatis, dente antico distincto, posteriore ad medium sito; elytris subseriatim pilosis. Long. ·09.

Fort Yuma, California. Also resembles C. cellaris, but is more coarsely punctured.

Monotoma Herbst.

M. marinum, elongatum subdepressum, fuscum vel fusco-testaceum opacum, punctatum, breviter parce pallide pubescens, thorace latitudine longiore, postice subangustato, lateribus subtilissime serrulatis, late sinuatis, angulis omnibus rectis, antennis articulo penultimo sequente vix angustiore. Long. ·15.

San Diego, on the sea shore under Fucus giganteus. Although differing from the previously described species of the genus by the 9th joint of the antennæ being nearly as broad as the tenth, I prefer that this and the following species should be placed here, rather than that the number of genera should be multiplied on characters of light weight. From the larger size of the insect, I have been able to investigate in a satisfactory manner the structure of the tarsi, and find them to be four-jointed; the 3rd joint is however quite small, and closely attached to the fourth. On this account, as well as from the elongation of the fifth ventral segment, and the apparently close articulation of the anterior segments, I am disposed to remove Monotoma from the Lathridiidæ to the Colydiidæ, where it may form a group similar in value to the five others into which that family has been divided.

M. rufipenne, elongatum, subdepressum, nigrum subnitidum capite thoraceque punctatis, breviter pallide pubescentibus, hoc latitudine longiore, postice subangustato, angulis anticis acutis, posticis obtusis, dorso versus basin vage arcuatim impresso; elytris thorace haud latioribus, rufis pone medium nigricantibus, striis sex punctulatis, alterisque externis obliteratis, in striis brevissime pilosis; pedibus antennisque rufis, his articulo 9no decimo vix angustiore. Long. ·09.

San Jose, California, under bark of oak trees. This species is here added for the sake of illustrating the next, though it does not, so far I know, inhabit the region herein reported on. The pygidium as in the next is prominent, but not so large.

M. striatum, elongatum depressum, rufescens nitidum, capite thoraceque nigricantibus, illo parce et vage, hoc subseriatim parce punctato, latitudine longiore, postice subangustato, lateribus late rotundatis, angulis subrectis rotundatis, linea dorsali lata lævi, postice utrinque breviter impresso; elytris striis sex tenuibus antice punctatis, alterisque externis obliteratis, in striis vix brevissime pilosis, læte rufis, margine laterali quadranteque postico nigris. Long. ·07.

Colorado River, at Fort Yuma. The impressions towards the base of the thorax limit the dorsal smooth space, and are formed by the confluence of three or four punctures. The pygidium is larger and more prominent than in M. rufipenne, and is nearly horizontal.

Closely allied, and belonging to the same genus is Rhizophagus capito *Fairemaire*, a species found in the Sandwich Islands. On comparison, however, it is seen that the punctures of the thorax are larger than in M. striatum, though also unequally distributed in rows; the punctures and striæ of the elytra are deeper, the red portion of the latter extends from the base for only one third the length, and finally the head thorax and under surface are black, with only the feet and and antennæ red.

Aphodius Illiger.

A. dentiger, obovalis convexus, ater nitidus, clypeo parce punctato haud tuberculato, antice declivi, ad apicem linea elevata angulata notato, et subreflexo, dentibus duobus acutis parvis armato; thorace brevi antrorsum subangustato, angulis omnibus rotundatis, lateribus subrectis, parce punctato, ad basin subtiliter marginato; elytris striis punctulatis, interstitiis planis, biseriatim parce punctulatis, mesosterno haud carinato; tibiis anticis valde tridentatis, posticis spinulis æqualibus coronatis. Long. ·25.

Copper mines of the Gila, Dr. Webb; one specimen. Very distinct from all others in my collection by the peculiar construction of the apex of the clypeus; the outline is not emarginate, but the apical portion is slightly deflexed and marked with a transverse elevated angulated line, meeting the margin each side within the base of a small but acute tooth. The clypeus is not perceptibly tuberculate, or I might give the species to the same division with A. ursinus, aleutus and others from Western America; were it not that the terminal fringe of the posterior tibiæ is composed of equal spines it could be placed near A. bicolor. In A. oblongus may be observed two similar teeth at the anterior part of the clypeus, but there is no intermediate elevated line, and the base of the thorax is broadly sinuate each side.

A. militaris, oblongus ferrugineus, nitidus, clypeo modice punctulato, antice utrinque parce minus subtiliter granulato, postice obsolete trituberculato, ad apicem late truncato, acute bidentato, thorace subtilius punctato distinctius versus latera, transverso, lateribus rotundatis fortius marginatis, ad basin subtilissime marginato, elytris striis tenuibus punctulatis, interstitiis planis, dense subtilissime punctulatis, biseriatim subtiliter punctatis, mesosterno haud carinato, tibiis anticis valde tridentatis, posticis spinulis inæqualibus coronatis. Long. ·2.

San Diego, California. I am inclined to place this in the same division with the preceding, though the apical fringe of the posterior tibiæ is composed of unequal spines.

Euparia Lepell. (emend. Er.)

Eu. cognata, oblonga, nigra, clypeo subemarginato, punctato, antice rugoso, thorace punctulato et parce punctato, latitudine breviore, lateribus parallelis, antice paulo rotundatis, elytris striis crenatis modice profundis postice exaratis, interstitiis antice parum convexis, humeris prominulis. Long. ·17—·23.

Texas and Senora; Mr. Haldeman and Dr. Webb. Resembles Eu. stercorator, but the thorax is more transverse, and not at all narrowed towards the base, but even a little narrowed anteriorly. It more nearly resembles Eu. strigata, but differs by the more strongly punctured head and thorax.

Eu. puncticollis, oblonga ferruginea, nitida, clypeo subemarginato, antice rugoso, thorace latitudine breviore, confertim punctato, lateribus parallelis subrectis, angulis omnibus rotundatis, elytris humeris parvis acutis, striis impunctatis, insterstitiis vix convexis, biseriatim subtiliter punctulatis. Long. ·4.

A very distinct species of which but a single specimen was found by Dr. Webb at El Paso.

PSILOPTERA Sol. (emend. Lac.)

P. Webbii, crassa chalybea, capite thoraceque punctis viridi-æneis variegatis, hoc inæqualiter punctato, ad basin medio late foveato, latitudine fere duplo breviore, antrorsum angustato lateribus ad medium obtuse angulatis, dein vix subsinuatis, angulis posticis rectis; elytris striis punctatis, interstitiis spatiis impressis quadratis granulatis pubescentibus viridiaureis ornatis, ad apicem oblique paulo truncatis; subtus dense grosse viridipunctato; prosterno bisulcato. Long. 1·06—1·25.

Found at Ures, Sonora, by Dr. Webb. Allied to Dicera Woodhousei *Lec.*, but it is larger and stouter, and differs not only by the thorax not being dilated in front of the base, but by the ground color being bluish black, not bronzed, as well as by the elytra being distinctly and obliquely truncate at tip. The impressed green metallic spots of the elytra vary in number; in one specimen they are few, forming irregular narrow fasciæ, while in another they are confluent, and cover more than half the surface.

P. valens, crassa, chalybea, capite thoraceque punctis viridi-æneis variegatis, hoc inæqualiter punctato, ad basin medio late foveato, latitudine fere triplo breviore, ante basin latiore, lateribus antice valde rotundatis, postice sinuatis angulis posticis rectis; elytris striis punctatis, interstitiis spatiis plurimis quadratis granulatis pubescentibus viridi-æneis impressis, ad apicem oblique subtruncatis, sutura prominula; subtus dense grosse viridipunctato, prosterno bisulcato. Long. ·9—1·15.

Eagle Pass, Texas; Mr. Schott. Also resembles P. Woodhousei, but differs by the thorax being shorter, more dilated and more rounded on the sides; the ground color, as in P. Webbii is bluish black.

CHALCOPHORA Sol. (emend. Lac.)

C. planicosta, ænea virescens, subtiliter dense punctulata, thorace transverso, antrorsum angustato transversim constricto et lateribus rotundato, angulis posticis acutis divaricatis, ad basin late trisinuato, dorso plaga elongata antice abbreviata, callisque versus latera pluribus chalybeis nitidis; elytris sutura, lineis tribus integris, cum scutellari humeralique brevibus, parum elevatis chalybeis nitidis, costa singula bistriatim punctata, ad apicem subserratis et subbidentatis. Long. 1·05—1·13.

San Diego trip, Dr. Webb. The head is finely pubescent; the anterior margin of the thorax is densely ciliate with yellowish white hair. The under surface is finely very densely punctured, finely pubescent, with the middle of the sterna and the middle posterior margin of the abdominal segments shining and coarsely punctured. The sterna are each impressed with a short deep medial furrow: the mesosternum is widely divided.

C. obliterata, ænea cuprascens, subtiliter dense rugose-punctulata, capite lineis nitidis reticulato, thorace transverso, antrorsum angustato, transversim constricto et lateribus rotundato, angulis posticis acutis divaricatis, ad basin late bisinuato, costa dorsali antice abbreviata, callisque pluribus lævibus nitidis chalybeis, margine basali præcipue ad medium elevato; elytris sutura lævigata parce punctata, costis tribus integris humeralique brevi fere obliteratis, et tuberculis parum elevatis compositis, postice serratis ad apicem bidentatis. Long. ·77—1·0.

Dr. Webb. Found with the preceding, which it resembles in form and characters. It is however more slender, the basal margin of the thorax is more elevated, and the costæ of the elytra are hardly to be seen. The sculpture of the under surface is precisely as in L. planicosta.

C. caelata, capite æneo punctato, lineis elevatis reticulato, thorace rugis profundis ænescentibus punctatis minus densis insculpto, interstitiis elevatis politis cyanescentibus, antrorsum angustato, lateribus late rotundato, ad apicem transversum impresso, ad basin trisinuato, angulis posticis acutis; elytris punctato-striatis, transversim parce at profunde rugosis, postice subserratis, ad apicem truncatis bidentatis; subtus ænea pubescens dense punctata, pectore abdominisque segmentis postice grosse punctatis, nitidis chalybeo-variegatis. Long. ·93.

One specimen found at Ures, Sonora, by Dr. Webb. This has also nearly the same form and general characters as the two preceding, but the sculpture both above and beneath is much coarser. The tip of the 5th ventral segment of the abdomen in them is broadly emarginate, with an acute elevated transverse line before the tip; the lateral angles in one sex project in the form of teeth, while the outline in the other sex is simply sinuous.

In the present species the line is not so acutely elevated, and beyond the 5th joint is seen a short punctured brown appendage, which is prolonged at the middle into an obtuse process.

The antennal pores in this and in B. sphenicus Lec. which is strictly congeneric, are more numerous than in the two preceding, and occupy nearly the whole of the sides of the outer articulations; the basal joint of the posterior tarsi is also but little longer than the second.

Chrysobothris Esch.

C. gemmata, latiuscula, depressa, capite punctato læte æneo, chalybeo-variegato, thorace punctato densius versus latera, subcanaliculato, ad latera utrinque, et ad apicem oblique impresso, versus basin utrinque late foveato, his impressionibus omnibus in fundo inauratis; elytris purpureis, punctatis, costis antice obliteratis postice autem distinctis, 3ia pone stigma haud extensa; fovea basali, stigmate ante medium, alteroque externo pone medium reniformibus, tertioque interno triangulari læte inauratis dense punctatis, strigaque brevi humerali aurea ornatis; subtus viridiaurea nitida punctata, segmentis abdominis postice, pleurisque chalybeis. Long. ·88.

Sonora; two females collected by Mr. Schott. The sides of the thorax are in one specimen obliquely truncate at the anterior angles, then oblique and slightly converging to the base: in the other specimen they are rounded anteriorly instead of truncate. The 5th ventral segment is carinate in the middle, but the usual lateral tooth is not seen.

C. octocola, depressa ænea, capite sæpe virescente, dense rugose punctato, thorace dense subtilius punctato, latitudine breviore, lateribus parum rotundatis, antice oblique subtruncatis, elytris subtilius confertim punctatis, costis duabus primis integris, 3ia postice, 4ta vero antice abbreviata, fovea profunda basali, stigmatibusque tribus dense punctatis inauratis ornatis, primo ante medium in costam 2ndam, 2ndo pone medium in costam 3iam sæpe reniformi, tertio triangulari inter costas 1mam et 2ndam; subtus ænea punctata. Long. ·45—·65.

Found in Texas, by Messrs. Haldeman, Schott, and Weise; in Sonora by Mr. Schott, and on the Colorado River near the Gila by myself. Varies much in size and form. The anterior and middle tibiæ of the male are much curved, but slender and armed internally with only a few very small teeth. This species lives on the various species of Mezquite. The 5th ventral segment of the female, as usual, is finely carinate in the middle, with the lateral teeth distinct.

C. basalis, longiuscula depressa, ænea, capite virescente, densissime rugose punctato, thorace subtilius dense punctato, parcius autem in disco, linea dorsali indistincta sublævi, latitudine breviore, lateribus obliquis antice oblique truncatis, callo angusto basali utrinque notato, elytris subtilius punctatis, costa 3ia postice abbreviata, fovea profunda basali stigmatibusque tribus sicut in priore positis subauratis, subtus ænea punctata. Long. ·7.

Laredo to Ringgold Barracks, Mr. Schott. Resembles the preceding, but is longer and less densely punctured. The impressed spots of the elytra are similar, but less brightly colored. The sexual characters are quite distinct; the anterior and middle tarsi of the male are thicker, much curved and armed with several distinct teeth internally; on the anterior tibiæ these teeth are placed from the middle to the tip, but on the middle tibiæ they are all within the limits of the middle third. The female has the same sexual characters as in C. octocola.

C. exesa, latiuscula, ænea, capite dense punctato, multicalloso, thorace latitudine breviore, lateribus obliquis antice oblique truncatis, inæquali valde punctato, partibus elevatis fere lævibus nigricantibus; elytris postice fortius serratis, dense minus subtiliter punctatis, costa 1ma integra, reliquis interruptis, partibus elevatis lævibus nigricantibus, stigmatibus duabus magnis transversis trilobatis subauratis. Long. ·36—·42.

A female found by me on the Colorado, and another by Mr. Schott in Sonora. Evidently related to C. scabripennis *Lap.* (*Bup. trinervia* Kirby); it is however much more uneven and more strongly punctured. The complete breaking up of the second and third of the elevated lines of the elytra does not take place in any other species known to me; the punctures beneath are large; the fifth ventral segment has a smooth medial space, but is not carinate; the lateral tooth is very distinct.

POLYCESTA Esch.

P. elata, nigro-ænea, fronte concava, thorace inæqualiter punctato, callo utrinque ad apicem lævi notato, medio late sulcato, in medio ipso tenuiter carinato, et postice subtiliter canaliculato, utrinque ad basin late excavato, antrorsum valde angustato, lateribus pone medium angulatis, elytris postice oblique angustatis, seriatim clathratis, dense punctatis, interstitiis alternis elevatis, sutura antice, 3ia et 5ta valde elevatis lævibus. Long. ·93.

One specimen, Texas, Mr. Haldeman. Resembles P. californica *Lec.* Pac. R. R. Expl. vol. 9 (insects), 45, but is larger: the posterior angles of the thorax are less obtuse, and the medial excavation is carinated; the suture of the elytra is elevated towards the base.

There are now known to me five species of Polycesta found within the limits of the United States: they may be thus distinguished.

A. Prothorax with three large excavations; elytra strongly costate.

* Front deeply concave.

1. Elytra moderately clathrate; interstices (except the smooth costæ) densely punctured, P. elata Lec.
2. Elytra coarsely clathrate; interstices (except the smooth costæ) sparsely punctured, P. cavata Lec.

* * Front slightly concave.

3. Elytra moderately clathrate; interstices (except the smooth costæ) densely punctured, P. californica Lec.

B. Thorax excavated only at the middle.

4. Medial excavation distinct; elytra variolate in rows, 3rd interstice wider and more elevated towards the base; obtusely rounded behind, P. obtusa Lec.
5. Medial excavation weak; elytra coarsely punctate-striate; interstices sparsely punctured, alternately a little more elevated, P. velasco Lap.

P. cavata is a small species (·7 inch long) found in Alabama by Mr. Hentz, and given me by Prof. Haldeman.

P. obtusa is a still smaller species (·48 inch long), found near Philadelphia and given me by Mr. Newman. The sides of the thorax are strongly angulated, and the elytra are not attenuated, but are parallel on the sides, and obtusely rounded behind.

Acmæodera Esch.

A. semivittata, æneo-nigra nitida, pube erecta hispida, fronte canaliculata, thorace dense punctato, antrorsum angustato, lateribus rotundatis flavo-marginatis, profunde oblique et in medio late triangulariter excavato, canaliculato; elytris vittis duabus, lineisque reticulatis flavis paucis pone medium, maculis nigris includentibus ornatis, punctato-striatis, striis postice impressis, interstitiis uniseriatim punctatis. Long. ·34—·45.

Eagle Pass, Texas, Mr. Schott. The yellow lines vary in width, so that the included spots are more or less numerous, but the extreme tip is always black. The spots are usually placed; two transverse ones on the suture, and five on the margin; of the vittæ, one is marginal, and the other dorsal, somewhat nearer the suture than the margin. The form of body is like that of A. pulchella.

A. haemorrhoa, elongata, cuneiformis, nigro-ænea nitida, pube erecta hispida, capite canaliculato, thoraceque dense punctatis hoc lateribus antice rotundatis, antrorsum valde angustato, puncto laterali flavo ornato, ad latera oblique, et medio triangulariter valde profunde excavato et canaliculato; elytris violaceo-nigris, humeris prominulis punctis flavis plurimis confluentibus ornatis, ad apicem minio marginatis; punctato-striatis, interstitiis uniseriatim punctatis. Long. ·4—·45.

Laredo to Ringgold Barracks, Mr. Schott. Resembles the figure of A. stellaris *Chevr.* (Col. Mex. 2nd cent. 89), as given in the monograph of Messrs. Gory and Laporte, but the apical red margin of the elytra is not mentioned.

A. gibbula, nigro-ænea, supra pilis pallidis parce vestita, thorace confertim punctato, antrorsum angustato, lateribus parum rotundatis, medio triangulariter excavato, versus basin utrinque late et profunde foveato; elytris cyaneo-nigris, humeris valde callosis, maculis pluribus magnis flavis ornatis, posticis versus latera rufo-tinctis; fortiter punctato-striatis, striis postice exaratis, 1mo antice fere obliterata, interstitiis subtiliter uniseriatim punctulatis; subtus ad latera valde albo-pilosa. Long. ·5.

Found by Dr. Webb on the journey from San Diego to El Paso. The elytra of the male are gradually narrowed behind, and sinuate on the sides; those of the female are subparallel, and very slightly sinuate, obliquely narrowed at the apex: the discoidal spots are from five to seven in number, and form a series on the 3d, 4th, and 5th interstices, some of them being wider and some narrower; the other spots are placed, a humeral dot, three marginal spots occupying two intervals, and finally three spots on the third interval from the margin; of these last the two posterior are tinged with red.

A. opacula, cuneiformis, supra nigra opaca, pilis erectis hispida, thorace brevi, dense punctato, antrorsum angustafo, lateribus fortiter marginatis rotundatis flavis, margine nigro; ad medium late et profunde triangulariter excavato versus latera oblique impresso; elytris humeris callosis, maculis pluribus flavis, posticis rufo-tinctis, ornatis, ad apicem acutius attenuatis, striis fortiter punctatis, interstitiis angustis uniseriatim punctatis; subtus nigro-ænea, parce pubescens. Long. ·42.

One specimen El Paso, Mr. Clark. The strongly margined sides of the thorax will readily distinguish this species; the spaces between the rows of punctures of the elytra are hardly greater than the distances between the punctures in the rows; the spots are a marginal elongate one near the humerus, another larger marginal about the middle which includes a black spot; a basal dot on the third interval two spots before the middle extending from the second to the fifth stria, then two smaller ones, the position of which is nearer the suture; finally two transverse oblique ones reaching the margin, and a subapical dot.

A. conata, valde elongata, cuneiformis, nigra supra pilis longis lanuginosis albis parce vestita, capite thoraceque grosse punctatis, hoc antrorsum vix angustato lateribus parum rotundatis, dorso triangulariter, ad basin utrinque suboblique excavato, elytris a basi sensim, postice autem magis oblique attenuatis, punctis paucis parvis flavis ornatis, seriatim crenatis, interstitiis 3io 5toque totis, 7mo versus basin elevatis nitidis : subtus præcipue versus latera longe albo-pubescens. Long. ·38.

One specimen found by me on the Colorado River, below the Gila.

Agrilus Esch.

A. muticus, obscure cyaneus opacus, subtiliter dense punctulatus, capite canaliculato, thorace latitudine haud breviore, lateribus rectis, rugoso, postice profunde canaliculato, lateribus ad medium late impressis, angulis posticis rectis extrorsum paulo vergentibus, carina basali utrinque parum elevata, margine laterali duplici, elytris lateribus parum sinuatis, postice oblique angustatis, ad apicem rotundatis haud serratis. Long. ·33.

Texas, Mr. Haldeman.

A. macer, valde elongatus, cupreo-æneus, capite canaliculato, thorace transversim rugoso, antrorsum latiore, latitudine sesqui breviore, medio postice late excavato, lateribus oblique profunde impressis, ad basin utrinque carina acuta munito, margine laterali superiore distincto, inferiore fere obliterato ; elytris lateribus subsinuatis, postice oblique attenuatis, ad apicem serratis acuminatis, confertim subscabro-punctatis, costa a humero ad apicem modice elevata. Long. ·35.

Eagle Pass, Texas ; Mr. Schott.

Schizopus Lec.

Antennæ, 11-articulatæ, articulis 5—10 latioribus triangularibus, 11mo ovata ; clypeus minutus in fronte emarginata receptus, labrum maiusculum antice subemarginatum, mandibulæ emarginatæ. Mentum trapezoideum transversum (ligula invisa palpis deficientibus) ; palpi maxillares breves cylindrici, articulis subæqualibus : oculi mediocres ovales. Coxæ anticæ magnæ transversæ quadratæ receptæ ; mediæ eis approximatæ maiusculæ distantes ; tarsi tibiis breviores, articulis 1—3 subtus breviter, 4to autem longe bilobatis, ultimo præcedentes tres longitudine æquante, unguibus ad apicem fissis. Abdomen articulis duobus primis arcte connatis, 5to emarginato, 6to prominulo valde emarginato.

A remarkable genus, which by its form and color recalls certain Gallerucites of the family Chrysomelinæ, while the structure of the abdomen is equally suggestive of Psephenus. It seems by its general characters to belong properly among the Atopidæ ; in which family, however, all the genera thus far described have but five ventral abdominal segments. The head is small ; the thorax is gradually narrowed in front, closely applied to the elytra, and slightly sinuate at base. The scutel is trilobed, with the middle lobe produced into a point. The elytra are wider than the thorax, oblong, rounded at the tip, coarsely but densely punctured. The legs are moderate ; the anterior tibiæ are terminated by very short spurs, but I can see none on the middle or posterior tibiæ. The anterior coxæ are large, leaving only a very short prosternum, which extends between them, and abuts against the declivous mesosternum ; the metasternum is short and flat, forming an angle with the mesosternum, which widely separates the middle coxæ ; the parapleuræ are flat, broad, and project in front ; the posterior coxæ are suddenly dilated internally, truncate at tip, with the inner margin oblique ; their anterior margin is curved, with the concavity forwards, and the mesosternum is sculptured with a line parallel to this margin. The joints of the abdomen are nearly equal in length, but the 3rd and 5th are a little shorter; the 6th is deeply cleft, very small, and only visible within the emargination of the fifth.

S. laetus, oblongus, viridiæneus, subtiliter albo-pubescens, capite, thoraceque confertissime scabro-punctatis, hoc convexo canaliculato, latitudine duplo breviore, antrorsum angustato, lateribus late rotundatis et late præcipue postice subdepressis, elytris læte sanguineo-rufis, confertim minus subtiliter rugose punctatis, et subtilius parce punctatis, sutura viridiænea; tibiis tarsisque testaceis, antennis fuscis ad basin testaceis, articulo 1mo viridiæneo. Long. ·55.

CHAULIOGNATHUS Hentz.

C. profundus, fulvus tenuiter pubescens, opacus, capite nigro, thorace rotundato, subtransverso, disco inæquali margine laterali late et valde reflexo, ad apicem paulo concavo, ad basin tenuiter marginato, punctis dorso tribus nigris notato: elytris pone medium ad apicem nigris, ano nigro, abdomine postice supra et subtus biseriatim nigro maculato; antennis nigris extrorsum testaceis, pedibus nigris, femoribus dimidio basali fulvis. Long. ·65.

One specimen, Sonora, Mr. Schott. The three black spots of the thorax are in a transverse line behind the middle. The black of the elytra occupies about two-fifths of the surface.

C. limbicollis, nigro pubescens opacus, thorace transverso, subquadrato, angulis valde rotundatis, planiusculo, margine omni æqualiter anguste reflexo flavo, elytris flavis macula communi triangulari basali, apiceque late nigris, abdomine flavo, ano nigricante, tibiis tarsisque anticis piceo-testaceis. Long. ·47.

One specimen, Sonora, Mr. Schott. At first sight resembles C. scutellaris, but is very different. The posterior spot of the elytra covers more than one-third the surface.

DASYTES Fabr.

D. rufipennis, elongato-oblongus, niger punctatus, cinereo-pubescens, thorace transverso lateribus rotundatis haud serratis, elytris densius punctatis rufis, pedibus rufis, tibiis anticis extrorsum spinulosis, unguiculis omnibus valde appendiculatis; antennis nigris, articulis a 5to sensim maioribus triangularibus. Long. ·24.

One specimen found in Sonora by Mr. Schott.

CYMATODERA Gray.

C. morosa, piceo-nigra nitida, pubescens, capite thoraceque confertim punctatis, hoc latitudine sesqui longiore, antice paulo, postice magis constricto, ad medium parum haud subito dilatato, lateribus inde late bisinuatis, elytris thorace sesqui latioribus, planiusculis, subparallelis, humeris prominulis, punctis quadratis striatis, striis præcipue internis postice obliteratis, ad apicem dense subtiliter punctulatis; antennis elongatis subserratis articulo ultimo vix longiore. Long. ·53.

Sonora, Mr. Schott, one specimen. Quite distinct from all the other species known to me by the characters above given, but yet more nearly allied to C. inornata than to any other.

C. usta, piceo-ferruginea, pubescens, nitida, capite thoraceque subtiliter punctulatis, hoc latitudine fere sesqui longiore, antice vix, postice vero profunde constricto, lateribus medio rotundatim paulo dilatatis, elytris thorace plus sesqui latioribus, oblongis dorso planiusculis, punctis mediocribus striatis, postice sensim minoribus, et ante apicem obliteratis, interstitiis omnino planis, parce subtiliter punctulatis, antennis subserratis, articulo ultimo paulo longiore acuminato. Long. ·38.

Dr. Berlandiére's Collection, one specimen. This species is also sufficiently distinct from all others in my cabinet, and probably from any of those described by Mr. Spinola in his beautiful monograph of Cleridæ. It is however, much to be regretted that his descriptions are drawn up in such a manner as to render it extremely difficult to recognize the species; the present does not agree with any of the figures in his work.

TRICHODES Herbst.

T. tenellus, elongatus, cyaneus, pilis albis erectis pilosus, capite thoraceque punctulatis, elytris linearibus, annulo humerali ramum suturalem dilatatum postice emittente, fascia ad medium introrsum oblique descendente, alteraque postica, ascendente flavis, grossius subseriatim punctatis. Long. ·22—·27.

Fort Yuma, California. At first sight this might be considered a variety of T. ornatus, but the smaller size, the more slender form and the much coarser and more regular punctuation of the elytra induce me to regard it as distinct. The markings are as in that species, except that the middle band of the elytra is more oblique: no variety in the markings was observed.

CLERUS Geoffr.

C. affiliatus, obscure rufus, albo-pubescens, thorace dense punctulato, latitudine haud breviore, antrorsum angulatim impresso, elytris densissime punctatis, versus basin fere scabris, fascia alba lata ad medium nigro-marginata ad suturam anguste interrupta, alteraque postica angusta cinereo-pubescente ad apicem nigricantibus; pedibus antennisque nigris, his ad basin rufis. Long. ·38—·5.

Texas, at Eagle Pass and Ringgold Barracks, Mr. Schott. Resembles in color C. 4-signatus, but the elytra are much more densely punctured and without lustre. The posterior band is only a little paler than the ground color, and is only rendered obvious by the cinereous hair with which it is clotted: the space between the fasciæ is partly dark rufous, while in C. 4-signatus it is entirely black.

C. latecinctus, rufus albo-pubescens, thorace subtiliter punctato, latitudine paulo breviore, antice angulatim impresso, elytris confertim æqualiter minus subtiliter punctatis, fascia lata media pallida ornatis, apice pallidiore late cinereo-pubescente, apice summo infuscato, spatio intermedio plus minusve rufo-tincto. Long. ·3—·38.

Colorado River and Sonora. Resembles somewhat C. ichneumoneus, but the thorax is not so convex, and the other characters are also different. Even in the darkest specimens the feet are rufous, but in one the abdomen is marked with two rows of black spots.

C. abruptus, brevior rufus, cinereo-pubescens, thorace confertissime punctulato, latitudine haud longiore, antrorsum angulatim impresso, elytris convexis, confertim postice subtilius punctulatis, nigris macula basali, fascia lata paulo lunata integra ad medium albidis, apice late cinereo-pubescente, postpectore abdomineque nigris, pedibus rufis. Long. ·3.

One specimen found at Eagle Pass by Mr. Schott. Must be placed near C. 4-signatus, though very different from that as from every other species known to me.

DORCATOMA Herbst.

D. grave, ovale convexum, antice obtuse acuminatum, fusco-testacum dense subhelvo-pubescens, subtilissime punctulatum, elytris parce punctatis, striis externis duabus postice profundis antice obliteratis; antennis flavis, articulo 1mo testaceo, ultimis tribus latitudine longioribus. Long. ·11—·14.

Middle and Southern States, as far as Texas. I have adopted a manuscript name proposed hy Dr. Melsheimer.

D. pusillum, rotundato-ovale, convexum antice obtuse acuminatum, fusco-testaceum dense helvo-pubescens, subtilissime punctulatum, elytris parce punctatis, striis externis duabus pone medium impressis, antice obliteratis; antennis flavis articulis tribus ultimis latitudine vix longioribus. Long. ·07—·08.

Fort Yuma, California. Resembles in color and sculpture D. grave, but is smaller and broader; the two outer striæ of the elytra are shorter and not so deep.

ANOBIUM Fabr.

A. setiferum, oblongo-elongatum, fuscum sordide pubescens, et pilis longioribus parcis erectis vestitum, thorace rotundato convexo, medio elevato fere gibbo, antice late emarginato, granulis parvis nitidis obsito, elytris grosse seriatim punctatis, punctis hic inde subconfusis, antennarum articulis 2-8 æqualibus, latitudine haud brevioribus, discretis, 9—11 elongatis, singulis funiculo haud brevioribus. Long. ·15.

One specimen from San Diego, California.

PTILINUS Geoffroy.

P. basalis, cylindricus, fuscus opacus, subsericeo-pubescens, thorace globoso punctulato, antice parce exasperato, spatio dorsali postico lævi nitido, elytris modice at haud profunde punctatis; antennis pallioribus. Long. ·15—·23.

Several females found at San Diego, California. This species is of the same form as P. bicolor *Mels.* (which is probably the female of P. ruficornis *Say,*) but it differs in the feet being of the same color as the body, while the antennæ are not very obviously paler; the more distinct posterior smooth dorsal space of the thorax, and the stronger punctures of the elytra also serve to distinguish it. P. thoracicus (*Tomicus thoracicus* Randall) has the thorax more uniformly roughened and sparsely granulate, while the dorsal space is distinctly elevated, and the antennæ are black.

APATE Fabr.

A. punctipennis, cylindrica, atra, capite opaco scabro, fronte transversim elevato, vertice nitido paulo concavo, thorace opaco, quadrato-globoso, antice valde exasperato, in cornubus duobus ad apicem protenso, postice sensim granulato et punctato, elytris nitidis fortiter punctatis, punctis versus latera seriatis, stria suturali impressa, postice oblique declivibus, margine callisque utrinque oblongis duobus elevatis. Long. ·46—·53.

Mexico, Sonora, Texas and California. The antennæ are not longer than the head.

SINOXYLON Redt.

S. sericans, cylindricum nigro-piceum, thorace transversim subquadrato, convexo, antice rotundato et valde exasperato, dein sensim granulato et punctulato, elytris tenuiter sericeo-fulvo-pubescens, antice versus suturam seriatim modice punctatis, postice oblique declivibus, margine callisque duobus oblongis utrinque elevatis, superiore altiore; antennis pedibusque obscure rufis. Long. ·17—·25.

Ringgold Barracks, Texas, Mr. Haldeman.

S. asperum, cylindricum, nigrum, thorace transversim subquadrato, convexo, antice rotundato et valde exasperato, dein sensim granulato et punctulato, elytris subtiliter fulvo-pubescentibus, antice versus suturam grosse subconfluenter punctatis, postice oblique declivibus, margine callisque duobus utrinque elevatis, superiore valde prominulo, antennis rufis. Long. ·25.

Colorado Desert, at New River. This species is of the same size and form as the preceding, but differs by the much larger punctures of the elytra: the posterior declivity is more sudden, and the upper callus more prominent. The feet are black, with the anterior femora and coxæ partly red.

S. sextuberculatum, cylindricum, nigrum, thorace transversim subquadrato convexo, antice rotundato et valde asperato, dein sensim granulato et punctulato, elytris subtiliter pubescentibus subseriatim fortiter punctatis, humeris lineisque versus basin lævibus, antice rufescentibus, postice haud punctatis oblique declivibus, margine tuberculisque utrinque tribus acutis elevatis, superiore minore, antennis pedibusque rufis. Long. ·14—·15.

Colorado Desert. Abundant.

EXOPS Curtis.

E. exesus, ater, capite confertissime granulato, thorace latitudine haud breviore convexo, postice parum angustato, lateribus rectis, angulis omnibus rotundatis, granulato-punctato, modice canaliculato, elytris thorace sesqui latioribus, cylindricis antice truncatis, fortiter cribratim postice confluenter punctatis et sensim granulatis, postice oblique declivibus et linea elevata arcuata notatis, antennis ferrugineis. Long. ·47.

Ringgold Barracks, Texas, Mr. Haldeman. The posterior curved elevated line of the elytra becomes marginal near the apex, but anteriorly bends inwards so as to define the oblique declivity. This curious species is the transition form from Exops towards Apate and allied genera.

LYCTUS Fabr.

L. planicollis, ater subtilius pubescens, thorace latitudine paulo breviore, lateribus rectis serrulatis, angulis anticis rotundatis, postice subangustato, confertim punctato, dorso late canaliculato, elytris punctulatis et seriatim brevissime puberulis. Long. 17—·25.

Colorado River near the Gila. Differs from L. striatus by the broader, flatter and less deeply excavated thorax, and by the much finer pubescence.

PELECYPHORUS Sol.

P. morbillosus, ater opacus, thorace latitudine sublongiore, lateribus late rotundatis serratis, postice subangulato, angulis basi rectis, varioloso, versus latera late subdepresso et plicato, elytris thorace duplo latioribus rotundato-ovalibus, postice valde declivibus et subacutis, ad basin truncatis, humeris dentiformibus, margine costisque utrinque duabus (interna tenuiore) elevatis plicis transversis irregularibus connexis, epipleuris sublævibus. Long. ·75.

One specimen, Sonora, Mr. Schott. This species has nearly the form of P. carinatus, but differs much in its sculpture.

HELOPS Fabr.

H. farcta, ovalis convexa, æneo-nigra nitida, capite thoraceque dense fortiter punctatis, hoc ad latera aciculato, latitudine plus sesqui breviore, antrorsum parum angustato, et lateribus late rotundato, angulis anticis acutis, ad basin subsinuato, angulis posticis rectis, elytris thorace parum latioribus striis valde profunde exaratis, interstitiis convexis. Long. ·25—·33.

New Braunfels, Texas; Mr. Lindheimer. The elytra of the female are broader and more inflated than those of the male, but in the latter the first three joints of the anterior and middle tarsi are dilated.

DACODERUS Lec.

Caput quadratum, postice in collo tenui constrictum; mentum trapezoideum concavum, fissura buccalis nulla; palpi brevissimi tenues; (maxillæ obtectæ, invisæ,) genæ prominulæ acutæ, mandibulæ parvæ haud prominulæ; labrum minutissimum. Antennæ remotæ, in fovea profunda sub tuberculo laterali insertæ, 10-articulatæ crassæ, articulis rotundatis æqualibus, 9no et 10mo paulo majoribus subtruncatis. Oculi in capitis latera postice siti, longitudinales ovales, prominuli. Thorax trapezoideus elongatus, medio transversim valde excavatus, tuberculo rotundato utrinque in lateribus munitus: elytra plana, elongata ovalia, ad basin emarginata, stria suturali profunda, epipleuris angustis. Pedes debiles, tarsi anteriores articulis 1—4 brevibus subæqualibus, 5to longiore, postici articulis 1—3 paulo elongatis æqualibus, 4to paulo longiore.

Coxæ anticæ parvæ prominulæ acetabulis confluentibus, intermediæ approximatæ, posticæ parvæ modice distantes. Abdomen articulo 1mo elongato, sequentibus sensim minoribus.

A remarkable genus, which at first sight is suggestive of Rhysodes, and seems to have no relation to any genus of Tenebrionidæ, although properly belonging to that family. I have placed it near Cononotus, in which also the anterior coxæ become contiguous by the confluence of the acetabula: there is however no other point of resemblance.

D. striaticeps, castaneus nitidus, capite thoraceque supra et subtus profunde striatis, fronte arcuatim excavata, et ad apicem foveata, thorace latitudine longiore, postice paulo angustato, angulis anticis valde rotundatis, posticis subrectis rotundatis, dorso canaliculato, ad medium transversim maxime excavato, et tuberculo rotundato haud prominulo in latere ipso munito, (quapropter latus biincisum apparet); elytra plana elongato-ovalia, thorace paulo latiora, ad basin emarginata, profunde minus dense punctata, stria suturali exarata, abdomine parce profunde punctato. Long. ·15.

Fort Yuma, California, under bark of cottonwood; very rare.

Opatrinus Latr.

O. aciculatus, oblongo-ovalis, parum convexus, niger opacus, brevissime parce pubescens, thorace æqualiter confertissime aciculato, lateribus antice rotundatis, postice subparallelis, late depresso-reflexis, margine incrassato, elytris fortiter striato-crenatis, (punctis interstitiis parum angustioribus), his parce punctulatis; prothorace subtus profunde sulcato-punctato, parapleuris grosse punctatis, abdomine modice punctato. Long. ·4.

Texas, Mr. Lindheimer; two females. Seems to differ both from O. anthracinus and moestus *Muls.* (Opusc. Entom. No. 5, p. 79, 82) by the thorax being densely aciculate, with the sides strongly depressed and somewhat reflexed. From O. notus it is at once known by the more strongly striate elytra and by the very deep grooves of the under surface of the prothorax.

Glyptotus Lec.

Mentum triangulare, angulis anticis acutis, medio valde elevatum et antice acuminatum. Antennæ tenues, extrorsum sensim incrassatæ. Caput pone oculo superne utrinque sulco maxime profundo insculptum. Pedes tenues, femoribus haud clavatis, tibiis haud sulcatis, tarsis tibiis brevioribus subtus aureo-pilosis, posticis articulo 4to reliquis conjunctis haud breviore. Corpus alatum.

A genus closely allied to Upis, but of a more robust form, and differing by the shorter legs and posterior tarsi, and by the non-clavate femora. It approaches most nearly to a genus (probably nondescript) represented by Tenebrio femoratus *Beauv.* (*Upis fulvipes* Herbst), but that species has the mentum much less elevated, and the antennæ more thickened externally so that the penultimate joints become transverse; the postocular groove in it is reduced to a short line or oblong fovea.

G. cribratus, niger subopacus, capite fere lævi, inter oculos transversim late impresso, thorace latitudine breviore, lateribus antice rotundatis deflexis, posticis subrectis, elytris thorace latioribus, oblongis convexis, humeris obliquis prominulis, punctis oblongis remotis seriebus 8 utrinque positis, interstitiis vix obsoletissime punctulatis. Long. ·45—·6.

Georgia and Texas. Besides the eight rows of large remote punctures, there is a marginal series and a short scutellar one. The body beneath is almost free from punctures. The sides of the thorax converge a little behind the middle, and are almost straight to the posterior angles, where they are bent a little inwards.

Mordella Linn.

M. comata, longiuscula, transversim convexa, nigra densissime longius flavescenti-cinereo-pubescens, elytris parallelis postice obtusis, stylo anali mediocri, antennis pedibusque testaceis. Long. ·19.

One specimen, Fort Yuma, California. No other species in my collection resembles this in color and pubescence.

M. vilis, elongata sublinearis, nigra tenuiter griseo-pubescens, thorace parce subtilissime, elytris densius punctulato-strigosis; stylo anali longo, thorace basi utrinque late sinuato. Long. ·10—·12.

San Diego, California. This species has the form of M. nigricans *Mels.*, but it is more finely pubescent, and the basal lobe of the thorax is less prominent.

M. nubila, elongata linearis, flavo-ferruginea, dense luteo-pubescens subsericea, thorace latitudine haud breviore, ad basin utrinque modice sinuato, disco postice paulo obscuriore, elytris sutura anguste, lateribusque prope medium paulo infuscatis; stylo anali longo, parapleuris tarsisque posticis infuscatis. Long. ·15.

One specimen, San Diego, California.

Anaspis Latr.

A. pusio, elongato-ovalis, tota testacea concolor, dense fulvo-pubescens, sericea, thorace latitudine sesqui breviore ad basin late sinuato. Long. ·05.

One female, Fort Yuma, California. More robust than the other species known to me, but especially distinguished by its small size.

A. laetula, elongata, flava, elytris macula communi scutellari, fascia lata postice obliqua suturam haud attingente ad medium, alteraque integra ante apicem nigris. Long. ·12.

Texas, Mr. Clark: one male. The fifth ventral segment is broadly emarginate, the anal segment has two long processes gradually dilated, and obliquely subtruncate at the extremity. This species is allied to A. trifasciata, but the markings are different.

Another species of Anaspis was found at Frontera by Mr. Clark, but it seems closely allied to others in my collection, and I have not yet fully made out its characters; I therefore prefer for the present not to suggest a name.

Lytta Linn.

L. melaena, elongata, nigra, nitida, capite parce punctato, oblongo, gutta verticali obsoleta testacea, angulis posticis rotundatis, thorace parce punctato, oblongo, latitudine longiore, antice rotundato, elytris confertim intricato-rugosis, ad basin sublævibus; tibiis posticis calcari externo crasso oblique truncato, concavo; antennis extrorsum incrassatis, articulis globosis, ultimo vix longiore acuminato. Long. ·65—·8.

Sonora, Mr. Schott. Resembles in form L. nitidicollis, but differs by the color, by the finer sculpture of the elytra, and by the shorter and stouter antennæ. These in the male are as long as the head and thorax, with the 5th and 6th joints broader than the following; in the female they are a little shorter and uniformly thickened.

Phodaga Lec.

Oculi ovales integerrimi, longitudinales; antennæ inter oculos insertæ, breves filiformes, compressæ, versus apicem attenuatæ, 11-articulatæ, articulis haud laxe articulatis, 1mo crasso obconico, 2ndo parvo sequente triplo breviore. Tarsi compressi spinulosi, subtus haud pubescentes; ungues fissi, parte inferiore breviore. Corpus alatum.

This genus bears a very close relation to Lytta, and has very nearly the outline of certain species (e. g. L. lemniscata) of that genus, except that the head is very much elevated, so that the vertex becomes conical, somewhat as in Rhipiphorus; the eyes, moreover, instead of being transverse and emarginate as in all Lyttæ, are longitudinal and oval; the antennæ are inserted between the eyes, and the front is therefore narrowed at that point. The mouth is a little more elongated, but I observe no character worthy of mention in the oral organs; the labrum is rounded in front. The antennæ are nearly as in L. lemniscata, but shorter, and with the joints less loosely articulated. The spurs of the posterior tibiæ are equal and slender; the ungues are double, but the inferior part is about one-third shorter than the upper, and is soldered to it, so as to form a large tooth, which does not descend abruptly as in Lytta erosa, but is rather as in L. elegans. The anterior femora are filiform and uniformly pubescent, having no trace of the slight inferior emargination and patch of sericeous hair seen in most species of Lytta.

P. alticeps, elongata, opaca atra, capite lateribus cinereo-pubescente, conoideo, vertice conico elevato, subacuto, fronte canaliculata, thorace campanulato, linea dorsali insculpto, ad basin medio impresso, elytris thorace duplo latioribus, minus profunde subtiliter scabris, sutura lineisque angustis quatuor indistinctis parum elevatis, calcaribus unguiculisque rufis. Long. ·58—·85.

Sonora, Mr. Schott. The thorax is not perceptibly punctured, and the front is marked with only a few scattered points. The middle tibiæ of the male are curved, much dilated, and very profoundly excavated along the inner face from near the base to the apex: the anterior legs are alike in both sexes, the posterior legs of the only male procured are wanting.

NEMOGNATHA Illiger.

N. discolor, luteo-testacea, nigro-villosa, thorace sat dense punctato, transverso, lateribus rectis, elytris dense subtilius punctatis, vitta utrinque lata nigro-picea antice abbreviata; antennis nigris, tibiis tarsisque infuscatis, calcaribus posticis obtusis concavis, externo paulo latiore. Long. ·37.

Texas, Mr. Haldeman, one specimen. Closely allied to N. piezata, but the under surface is of the yellow color as the upper, while that species is black beneath. Varieties of N. piezata were brought by Mr. Haldeman, in which the usual elytral vittæ are completely wanting.

N. longicollis, elongata, fusco-lutea, breviter nigra-pubescens, capite fusco, valde elongato, plano punctato, spatio frontali lævi, ore producto, thorace latitudine sesqui longiore, antice attenuato et utrinque late impresso, modice punctato, elytris thorace duplo latioribus, confertim rugose punctulatis, sutura margineque infuscatis; pectore obscuro, antennis nigris extrorsum paulo incrassatis, articulis arcte conjunctis; tibiis posticis calcaribus planis obtusis, interno latiore; maxillis corpore paulo breviores. Long. ·25.

Ringgold Barracks, Texas, Mr. Haldeman. This species belongs to the genus Gnathium of Kirby, but I do not think it necessary to retain it as distinct from Nemognatha. It may indeed be a variety of N. minima *Say*, (a species otherwise unknown to me), but differs considerably in color from the description given by him.

BRUCHUS Linn.

B. uniformis, oblongo-ovatus, fusco-ferrugineus, dense cinereo-pubescens, thorace latitudine longiore, antrorsum angustato, lateribus paulo concavis, sat dense grossius punctato, vitta dorsali pallidiore sæpius ornato, elytris haud vel vix tesselatis, striis angustis punctatis, antennis pedibusque flavo-testaceis cinereo-pubescentibus, illis extrorsum obscuris. Long. ·17—·20.

Colorado Desert. Abundant in the pods of Prosopis and Strombocarpus.

B. prosopis, oblongo-ovatus, fusco-ferrugineus, dense cinereo-pubescens, thorace fusco-pubescente, latitudine longiore, antrorsum angustato, lateribus paulo concavis, sat dense grossius punctato, lateribus vittaque dorsali interrupta pallidis, elytris striis angustis punctatis pube fusca pallidaque tesselatis, maculisque obscuris maioribus paucis versus latera ornatis; pygidio fusco pallidoque variegato, pedibus flavo-testaceis, antennis obscuris, ad basin testaceis. Long. ·15—·18.

Colorado Desert. Found with the preceding, which it greatly resembles, but differs from it in the color of the pubescence. In each the posterior femora are armed near the tip with one tooth and two small denticles.

B. desertorum, oblongo-ovatus, ferrugineo-testaceus, dense cinereo-pubescens, sæpe ferrugineo-nebulosus, fronte verticeque infuscatis, thorace latitudine haud longiore, antrorsum angustato, punctatis ; elytra striis angustis profundis punctatis, sutura margineque sæpe subinfuscatis, pedibus antennisque testaceis. Long. ·08.

Colorado Desert. Also allied to the two preceding, and found on the same plants ; it is however much smaller, but otherwise shows no special difference.

Apion Herbst.

A. oedorhynchum, brevius ovatum, virescente nigrum, parce tenuiter cinereo-pubescens, rostro cylindrico curvato, capite thoraceque fere longiore opaco, pone medium subsubito crassiore, fronte subtiliter striata, thorace opaco latitudine haud breviore, lateribus vix rotundatis, dense cribratim punctato, postice canaliculato, elytris ovatis valde convexis, striis profundis punctatis, interstitiis subtiliter dense rugulosis, antennis pone rostri medium insertis. Long. ·05.

San Diego, California, one specimen. Quite distinct from any other species known to me.

A. ventricosum, brevius ovatum, nigrum vix virescens, glabrum, rostro cylindrico, thorace paulo longiore, punctatum, versus apicem subnitidum, capite opaco, fronte medio sulcata, thorace opaco, latitudine longiore, lateribus subsinuatis, biimpresso, cribrato, postice canaliculato, elytris ovatis convexis, thorace triplo latioribus, sulcis profundis punctatis, interstitiis dense subtiliter rugulosis, antennis ad rostri basin insertis. Long. ·06.

One specimen, Fort Yuma, California. The impressions of the thorax are near the side, and a little before the middle.

Cleonus Schönh.

C. molitor, niger, pube decidua farinosa alba plus minusve dense vestitus, parceque brevissime pilosus, capite thoraceque variolosis, interstitiis dense punctulatis, rostro nec canaliculato, nec cristato, thorace parum breviore, hoc latitudine paulo longiore, lateribus rectis, prope apicem rectangulariter angulatis, et usque ad apicem constrictis, max ante medium utrinque transversim vage impresso, elytris thorace latioribus, dense punctulatis, striatim punctatis, interstitiis parce nigro-punctatis, pedibus antennisque valde albo-pubescentibus, his articulis arcte conjunctis, 2ndo et 3io sequentibus paulo longioribus. Long. ·7.

Vallecitas, California, Fort Yuma and Sonora. This is the largest species in my collection ; it belongs near C. angularis *Lec.* (Beckwith's Exped.), although the first joint of the funiculus of the antennæ is not longer than the second.

Lixus Fabr.

L. pleuralis, valde elongatus, niger sat dense cinereo-pubescens, thoracis lateribus elytrorumque vitta laterali densius albo-pubescentibus, thorace antrorsum angustato, lateribus late rotundatis ad basin profunde excavato, elytris versus scutellum impressis, dense punctulatis, punctisque quadratis striatim positis, ad apicem brevissime singulatim acuminatis ; rostro cylindrico recto punctato, thorace sesqui breviore. Long. ·34.

One specimen found on the Colorado River below the Gila.

L. laesicollis, elongatus niger dense punctulatus, tenuiter irregulariter cinereo-pubescens, thorace profunde cribrato, latitudine haud longiore, lateribus postice subparallelis, antice rotundatis, ad apicem subtubulato, postice profunde haud late excavato, elytris versus scutellum impressis, ad apicem rotundatis, subtilius punctulatis, punctis oblongis striatim positis ; rostro cylindrico paulo deflexo, nitido parce punctato, ad basin foveato, thorace haud breviore. Long. ·45.

Eagle Pass, Texas; Mr. Schott; one specimen. The punctures of the thorax are not confluent, but are longer and deeper than in any other species in my collection.

Anthonomus Germ.

A. fulvus, oblongus, læte fulvus nitidus, thorace latitudine breviore, antrorsum angustato, et lateribus rotundato, ad apicem subtubulato, confertim profundissime cribrato, et parce piloso, linea dorsali pilis longioribus pallidis cristata; elytris profunde crenato-striatis, interstitiis punctis pilisque paucis notatis, annulo postico subtriangulari densius pallide pubescente utrinque signatis; femoribus acute dentatis, rostro sulcato et punctato, ad apicem lævi, antennarum clava fusca. Long. ·17.

Ringgold Barracks, Mr. Haldeman. The anterior femora are armed with a small tooth near the apex, besides the large acute one.

A. scutellaris, oblongus, nigro-piceus, tenuiter cinereo-pubescens, rostro rugose punctato, carinato ad apicem lævi, capite confertim, thorace grossius dense punctatis, hoc lateribus et ad medium fulvo-piloso, latitudine breviore, lateribus postice parallelis antice subito rotundatis, ad apicem tubulato; elytris punctato-striatis, interstitiis planis pilis nigris tesselatis, lateribus parallelis, scutello dense pallide piloso; femoribus dente magno acuto armatis. Long. ·17—·20.

Found by Mr. Haldeman in Texas, and by me in Georgia.

Baridius Schönh.

B. mucoreus, oblongus elongatus, niger dense cinereo-pubescens, thoracis macula utrinque ad angulos posticos, scutelloque nigris nudis; thorace latitudine fere longiore, lateribus rectis fere parallelis, antice subito convergentibus et rotundatis. Long. ·18.

One specimen found near Fort Yuma. Exactly resembles our very abundant B. trinotatus *Say*, except in the form of the thorax, which instead of being obliquely and gradually rounded on the sides, is nearly parallel, with the curvature in front.

B. densus, niger opacus, oblongo-ovalis, pilis parcis cinereis brevissimis subpruinosus, capite antice punctato, rostro confertim punctato, thorace haud breviore, curvato, ad basin transversim impresso, thorace dense cribrato, latitudine haud longiore, antrorsum sensim recte, dein magis et curvatim angustato, ad apicem subconstricto, linea dorsali tenuissima lævi; elytris pone humeros sensim angustatis, striis exaratis punctatis, interstitiis planis valde punctatis; antennis validis, articulo funiculi primo elongato. Long. ·14.

San Diego, California.

B. carinulatus, oblongo-ovalis, niger nitidus, rostro punctato, thorace multo breviore crasso, curvato ad basin transversim impresso, capite parce punctulato; thorace latitudine breviore antrorsum paulo et recte, dein fortius curvatim angustato, ad apicem haud constricto, cribatim in lateribus rugose punctato, linea dorsali angusta subelevata lævi; elytris striis exaratis vix punctatis, interstitiis striis paulo latioribus, fortius præcipue uniseriatim punctatis; antennis validis, funiculi articulo primo elongato. Long. ·17.

Texas, Mr. Haldeman, one specimen. The punctures of the second and third and some of the outer intervals of the elytra are irregular; the others are placed in single rows.

Cratosomus Sch.

C. gemmatus, niger opacus, undique subæqualiter fulvo-pubescens, rostro glabro nitido subdepresso, thorace longiore subarcuato, extrorsum parce punctulato, ad basim punctato et subcarinato, fronte canaliculata, thorace latitudine breviore, ante medium rotundatim valde angustato, ad apicem vix tubulato, tuberculis nitidis glabris convexis dispersis (quorum unus ante medium dorsali magis acutus); elytris ad basin thorace tertia parte latioribus, convexis ad apicem rotundatis, antice grosse striatim punctatis postice striatis, interstitiis omnibus tuberculis nitidis ornatis postice evanescentibus. Long. ·82.

Tampico, Mr. Haldeman, one specimen. The tubercles of the interstices of the elytra are less numerous, and indeed almost wanting towards the apex; the 5th has only three, all of which are in front of the middle. The first to third joints of the funiculus of the antennæ are equal, the fourth and fifth are each a little shorter, and the sixth and seventh are still shorter and thicker.

SPHENOPHORUS Schönh.

S. validus, ater opacus subvelutinus, capite rostroque parce punctato, fovea frontali profunda, thorace subtiliter parce punctato, dorso postice subdepresso, latitudine parum longiore antice magis angustato, lateribus rotundatis, ad apicem subito tubulatim constricto; elytris tenuiter striatis, striis internis ad basin parce punctatis, externis obliteratis, sed punctis majoribus notatis; pygidio grosse punctato- subcarinato; tarsis articulo 3io latissimo transverso subtus spongioso, 1mo et 2ndo subtus excavatis glabris. Long. ·97.

One specimen brought from Sonora by Mr. Schott. Differs from the next by the larger size, the sudden constriction of the apex of the thorax, which is less gradually narrowed in front, aud by the subcarinate pygidium. The rostrum is longer than the thorax, cylindrical, and bent especially near the extremity.

S. procerus, ater opacus subvolutinus, capite rostroque parce punctato, fovea frontali profunda, thorace dorso postice subdeplanato, latitudine paulo longiore, antice sensim angustato, lateribus rotundatis ad apicem subtubulato, ad parum constricto; elytris omnino sicut in S. valido: pygidio grosse punctato haud carinato; tarsis sicut in priore. Long. ·65—·82.

San Diego, California; under decaying Opuntiæ. The beak of the male is a little shorter than that of the female; in the latter, it is as long as the thorax, cylindrical and regularly curved.

S. pictus, elongato-ovalis, supra niger nitidus, capite fascia postoculari pallida, thorace latitudine sesqui longiore, antrorsum sensim angulato, ad apicem tubulato, vittis dorsalibus duabus punctatis albidis postice vage impressis, lateribus parce punctatis late albidis, margine plus minusve nigro; elytris a humeris postice attenuatis, striis internis profundis haud punctatis, externis e punctis compositis, interstitiis planis vix parce punctulatis, 2ndo albido uniseriatim punctulato, 4to et 6to ad basin vittaque lata submarginali antice abbreviata albidis; subtus albidus, medio niger, pedibus variegatis, tarsis subtus lateribus spongiosis, articulo 3io dilatato; rostro cylindrico thorace parum breviore. Long. ·7.

One specimen; Vallecitas, San Diego County, California. The black portions on the under surface are: a large metasternal spot, and another abdominal, the latter is narrowed on the first segment, so that it becomes of the form of the abdomen of an ant. The coxæ are black with a pale margin, the femora are pale, with an elongate spot each side not reaching the tip: the tibiæ are black, with the outer edge pale. This species must be placed in Schönherr's second division near S. discolor, *Mann.*, which by error has been described as having the third tarsal joint spongy beneath; it is so only at the sides, and the middle is entirely glabrous. In the present species the terminal internal tooth of the anterior tibiæ is long and oblique, and immediately above it is a smaller tooth.

S. ochreus, elongato-ovalis, pallide fusco-ochreus, rostro cylindrico, antice nigro, vertice nigro, fronte foveata, thorace latitudine longiore, antrorsum sensim parum angustato, ad apicem tubulato-constricto, parce punctato, dorso subbisulcato, in fundo parcius grosse punctato, linea media dorsali, altera utrinque pone medium interrupta, margineque abbreviato nigris, nitidis; scutello nigro, elytris striis foveatim punctatis, interstitiis parce punctulatis, alternis latioribus nitidis, puncto humerali nigro, coxis macula magna abdominali epipleuris commissurisque nigris; tarsis articulo 3io dilatato, lateribus spongioso. Long. ·56.

Sonora, Dr. Webb, one specimen. Resembles in appearance a species found in the Atlantic States, but differs by the thorax being more uniformly punctured, as well as by the black dorsal vittæ.

S. vomerinus, ovalis, sordide ater opacus, fronte foveata, thorace dense punctato, linea dorsali angustissima subnitida, latitudine haud longiore, lateribus rotundatis, antice angustato, et tubulato; elytris a humeris angustatis, striis profundis, internis parum, externis foveatim punctatis, interstitiis confertim punctatis; tarsis articulo 3io haud dilatato, tibiis anticis angulo externo apicali quadratim producto; rostro compresso ad basin subito dilatato et punctato. Long ·35—·42.

Sonora, Dr. Webb. Of the form and size of S. retusus, but very distinct. The anterior tibiæ are terminated by the usual internal acute tooth, above which is a small one, and again at the middle an obtuse angle: the outer angle, however, instead of being obliquely rounded as usual, is produced into a broad truncate process. The third joint of the tarsi is very slightly dilated, and they are merely ciliate at the sides.

Rhyncolus Kreutzer.

R. dorsalis, elongatus cylindricus, niger nitidus, capite punctato, rostro capite breviore deplanato, tenuiter canaliculato, thorace capite parum latiore latitudine longiore, antrorsum sensim paulo angustato, ad apicem transversim impresso, sat dense punctato, linea dorsali lævi, elytris striis crenatis, interstitiis paulo convexis, antennis validis, clava oblonga funiculo vix latiore. Long. ·10.

One specimen, San Diego, California.

R. angularis, cylindricus, niger nitidus, capite parce punctato, rostro deflexo, medio parce lateribus densius punctato, capite vix breviore, ad apicem vage angulatim impresso, thorace latitudine longiore, grosse punctato, antrorsum sensim paulo angustato, lateribus rectis, ad apicem subito parum constricto, angulis pone apicem obtusis at distinctis; elytris punctis quadratis profundis striatis, interstitiis convexis, uniseriatim punctatis; pedibus antennisque piceo-rufis, his clava oblonga rufa, funiculo duplo latiore. Long. ·08—·10.

Under willow bark, at New River, Colorado Desert.

Hylesinus Fabr.

H. hystrix, cylindrico-ovalis, crassus nigro-piceus, setis brevibus erectis pallidis vestitus, punctatus, elytris margine basali fortius elevato, punctis quadratis striatis, interstitis 2ndo postice late sulcato, 3io ante apicem valde elevato, tridentato. Long. ·09.

San Diego, California, one specimen. By the curious posterior sculpture of the elytra a broad and deep excavation is produced: the club of the antennæ as in the other species is distinctly annulated.

Mallodon Serv.

M. gnatho, depressus, nigro-piceus nitidus, capite rude et confluenter cribrato, subcanaliculato, thorace transverso, parce punctato, medio late lconcavo et punctis paucis magnis insculpto, versus latera cribrato, inæquali, ateribus parallelis serrulatis, angulis posticis oblique late emarginatis, elytris fortiter marginatis vix rugulosis; mandibulis maris elongatis pone apicem dente magno armatis, intus parce pilosis. Long. 1·35.

One male from Sonora, Dr. Webb. Of the form of the male of M. dasystomus, but readily known by the thorax not being marked with bright facets separated by opake spaces, also by the posterior angles being obliquely but broadly emarginate, so that a prominent angle is formed before the base, and another at the base itself, and finally by the more slender mandibles having a strong tooth near the tip, and being only sparsely pilose internally. The under surface of the head is much more deeply excavated than in M. dasystomus, and the gular margins much more elevated; the genæ are broadly rounded with one subacute angle, while in the other they are emarginate.

Elaphidion Serv.

E. validum, fusco-piceum nitidum, fusco-pubescens, et parce pilosum, thorace latitudine haud breviore, lateribus rotundatis postice angustato, fortius punctato, dorso subdepresso quinque calloso, macula magna sericeo-pubescente laterali utrinque antica, elytris parcius postice subtilius punctatis, ad apicem subtruncatis, sutura spinosa, antennis corpore brevioribus ad basin crassiusculis, articulis 3—6 apice breviter unispinosis, femoribus muticis. Long. ·83—1·0.

Texas, Messrs. Haldeman and Schott. The sericeous patch of yellowish hair each side of the thorax in front recalls the European genus Stromatium.

E. protensum, elongatum, fusco-piceum, tenuiter parce cinereo-pubescens, thorace latitudine longiore, antice posticeque angustato, lateribus subangulatim rotundatis, rude punctato, transversim subplicato, callo dorsali nitidiore subelevato, scutello dense pubescente, elytris thorace latioribus, antice fortiter, postice subtilius punctatis, ad apicem longe bispinosis, femoribus ad apicem spinosis, antennarum articulis 3—6 spinis sensim brevioribus armatis. Long. 1·22.

One female found in Sonora by Mr. Schott. The form is about proportioned as in E. parallelum. This species is very conspicuous by its large size.

Eriphus Serv.

E? ruber, læte coccineus, nitidus, pilis erectis nigris parce vestitus, elytris grosse modice punctatis, postpectore nigro, antennis extrorsum, tarsisque fusco-nigris, (antennis tibiarumque apice rare nigris). Long ·4—·42.

Eagle Pass, Mr. Schott. Resembles E. suturalis, so closely, that I was for a time unwilling to consider it as distinct. The size is much greater, and the punctures of the elytra more numerous and comparatively smaller: the basal joint of the antennæ, except in one specimen, is red; a character I have never observed in E. suturalis.

Arhopalus Serv.

A. eurystethus, ferrugineus, subtus dense pallide sulphureo-pubescens, thorace fusco, dense sulphureo-pubescente, transverso, ad basin declivi, lateribus rotundatis ante basin angulatis, elytris fuscis piceo-pubescentibus, fascia lata dentata ad quadrantem, linea angulata ad medium, fascia lata pone medium et linea angulata pallide sulphureis ornatis, ad apicem singulatim longe acuminatis; pedibus late distantibus, prosterno postice subproducto, late subtruncato. Long. ·58—.80.

Sonora, Mr. Schott. The lateral angle of the thorax is sometimes distinct, sometimes indistinct, never acutely prominent as in A. erythropus. This species belongs to a group in which the anterior feet are widely separated, the prosternum broadly and slightly produced posteriorly, and the mesosternum suddenly declivous in front, thus exhibiting a tendency to Megaderus, which with the Trachyderides should immediately follow this group in a natural arrangement.

Crossidius Lec.

C. suturalis, fulvus, subtilius flavo-pubescens, capite, antennis, postpectoris lateribus, pedibus thoraceque supra nigris, hoc latitudine paulo breviore, subrotundato, opaco vage grosse et subtilius punctato, subinæquali, lateribus obtuse angulatis, margine basali ad latera valde prominulo; elytris antice fortiter postice subtilius et dense punctatis, vitta suturali communi, antice angusta, postice dilatata nigris, spina suturali parva armatis, scutello nigro. Long. ·62.

One female found in Sonora by Mr. Schott. This species has entirely the form of C. testaceus, but the elevated lines of the elytra are hardly distinct, and the punctures of the elytra anteriorly are smaller, and finally the suture terminates in a small spine. The black disc of the thorax does not reach the sides, so that a yellow margin is seen each side; the dilated portion of the black sutural vitta extends backwards from the anterior third forming a very elongate oval black spot.

Tragidion Serv.

T. annulatum, nigrum velutinum, thorace lateribus postice fortiter angulatis, elytris fulvis ad basin late nigris, antennarum articulis duobus primis nigris, reliquis fulvis ad apicem nigris. Long. 1·1.

One male, Sonora, Mr. Schott. Very different from T. coquus and its varieties by the color of the antennæ: the lateral angle of the thorax is more prominent, and the two small horns between the antennæ are longer, more compressed and more rounded at the tip: the third and fourth joints of the antennæ are very densely clothed at the tip with black hair.

Rhopalophorus Serv.

R. rugicollis, plumbeus, pube subtili depressa cinerea pruinosus, thorace rufo, latitudine sesqui longiore, antrorsum paulo angustato, lateribus late rotundatis, dorso subglabro, transversim plicatim rugoso et punctato, elytris profunde punctatis ad apicem truncatis. Long. ·38.

One specimen, Texas, Mr. Haldeman. This species has the same color and general proportions as R. longipes (*Stenocorus longipes* Say), but differs by the form and sculpture of the thorax.

Clythra Fabr.

C. militaris, oblonga subelongata, nigro-virescens, capite opaco rugose punctato, thorace brevi opaco, ad latera transversim biimpresso, elytris subnitidis punctatis, macula magna obliqua basali alteraque rotundata subapicali rubris, illo puncto humerali nigro signato. Long. ·17.

One specimen, New Braunfels, Texas, Mr. Lindheimer. Seems by the large and prominent anterior coxæ to belong with the group Anomoia.

Megalostomis Lac.

M. mucorea, oblonga, convexa, nigra, undique æqualiter dense albopubescens, confertim subtilius punctata, elytris macula humerali magna rufa; antennis articulo 3io parvo testaceo, 4to triangulari longiore. Long. ·25—·28.

Vallecitas and Fort Yuma, California. Differs from any described by Lacordaire by the uniform dense pubescence. It seems however to belong to his first division Minturnia, and to find its place near M. dimidiata.

Babia Lac.

B. tetraspilota, breviter ovata, postice latior, nigra nitida, subtus cinereo pubescens, supra glabra, capite lævi, thorace parce punctato, antrorsum sensim angustato, lateribus subrectis, transversim valde convexo, elytris striatim punctatis, macula magna obliqua humerali postice latiore, alteraque subapicali rotundata rubis. Long. ·11.

Fort Yuma, California; one specimen. Differs from our common species by the smaller size, narrower thorax and by the humeral spot of the elytra being wider behind, and trapezoidal.

Cryptocephalus Geoffroy.

C. spurcus, subcylindricus, fusco-badius nitidus, capite pedibusque flavis, thorace convexo parce subtilius punctato, lateribus, margine antico, maculisque duabus baseos pallide flavis; elytris pallide flavis, piceo-subvittatis, striis profundis punctatis, interstitiis vix convexis nitidis; subtus flavo-guttatus, prosterno apice acuto haud carinato, postice emarginato, lobis acutis. Long. ·17—·23.

Var. fere totus pallidus, antennis versus apicem punctisque elytrorum solis fuscis.

San Diego, California. Similar in appearance to C. incertus, but larger, and having the prosternum prominent in front. The striæ of the elytra are quite as deep as in that species, but the interstices are less elevated: between the third and penultimate striæ, which as usual unite around the apex, are four intermediate striæ uniting by pairs; in the space between the outer two, just behind the humerus, are two short striæ each consisting of three or four points. The dark color on the elytra is seen in the punctures of the striæ, at the tips of the loops formed by the striæ, at the middle and base of the third and fifth intervals, on the humerus, and along the outer margin. When the under surface is dark colored, the sterna, the pleuræ of the mesothorax, the middle of the base of the abdomen, and the last ventral segment are yellow: the pygidium is yellow, with large brown punctures; the legs are yellow, the middle of the thighs and tibiæ being sometimes reddish, and the tarsi fuscous. The under surface is almost glabrous and moderately punctured. Of the type were procured two males, and of the variety two females.

Pachybrachys Suffrian.

P. livens, elongatus oblongus, pallide sulphureus, punctis testaceis insculptus, thorace latitudine sesqui breviore, æqualiter fortiter minus dense punctato, lateribus rectis, antrorsum paulo angustato; elytris pone scutellum et mox ante medium impressis, striatim punctatis, punctis versus scutellum confusis, pedibus antennisque concoloribus, oculis nigris. Long. ·13.

Colorado River, California, on Salix. This species belongs to the numerous group of indefinite species such as P. abdominalis, tridens, sobrinus, &c., but differs from the others by the paler color. The striæ of the elytra are impressed only behind the middle; the rows are regular, but closer than usual, and are confused towards the suture, where the elytra are irregularly and densely punctured. The middle of the disc of the thorax is usually marked with a large testaceous spot.

P. caelatus, elongatus oblongus, supra luteus, fusco-variegatus, thorace fortiter inæqualiter punctato, fusco-trimaculato, elytris striatim profunde punctatis, striis internis sinuatis et abbreviatis, haud confusis, interstitiis hic inde callosis; subtus nigro-piceus, abdomine flavo-marginato, pedibus testaceis, femoribus flavo-maculatis. Long. ·12—·14.

San Diego and Fort Yuma, California. The head has a vertical line and the occiput blackish. The paler parts of the thorax are less densely punctured, and in one specimen the dark spots are confluent forming an M shaped figure. The three internal striæ of the elytra are contorted, and some of them are usually abbreviated, and behind the middle one of the intervals is usually broader and more elevated: a few confused punctures are seen here and there, but the striæ are not lost as in the preceding. The pygidium is yellow with three dark spots. This species greatly resembles P. abdominalis, but the dark spots of the thorax are more densely punctured, and the striæ of the elytra are more sinuous.

COLASPIS Fabr.

C. humeralis, ovalis convexus, nigro-cupreus nitidus, capite thoraceque parcius punctatis elytris minus dense punctatis lineis dorsalibus utrinque duabus sublævibus, intra humeros profunde breviter impressis, palpis antennisque basi testaceis. Long. ·15.

Texas, Mr. Haldeman ; one specimen. Resembles in form and size C. viridis Fabr., but differs by the thorax not being aciculate, but only sparsely punctured ; it differs from a species found in Georgia by the dark colored legs. The punctures of the elytra form irregular rows, but two intervals on each elytron are more obvious by their regularity ; the intra-humeral impression is deeper than usual. This species belongs to the division of the genus having the first joint of the tarsi not elongated, the claws with a broad basal process, and the antennæ slightly thickened externally.

METACHROMA Lec. (‡Chevr.)

M. ustum, longiusculum, fusco-castaneum, nitidum, capite thoraceque parcius punctatis, hoc latitudine duplo breviore, convexo, lateribus rotundatis marginatis, angulis parvis auriculatis, elytris thorace latioribus, antice leviter striato-punctatis, ad marginem et apicem indeterminate rufo-testaceis, ore capitisque maculis rufo-piceis, antennis pedibusque rufo-testaceis ; femoribus dente minuto armatis. Long. ·22.

Sonora, Dr. Webb. As large as M. interruptum (*Colaspis interrupta*, Say), and resembling it in sculpture, except that the striæ are more distant. The species to which I desire to restrict the name METACHROMA, are those congeneric with Colaspis quercata *Fabr.*, the first species mentioned in Dejean's Catalogue. They have the mouth free beneath, the thorax not lobed behind the eyes, which are large and prominent, the anterior coxæ occupying nearly the whole of the prosternum ; the antennæ widely separated, slender, with the joints 7–11 very slightly dilated, and the second and third equal. The femora are moderately incrassated, scarcely perceptibly dentate ; the posterior tibia are externally obliquely emarginate near the tip, and finally the ungues are acutely toothed or even bifid.

M. suturale, piceo-nigrum nitidum, capite thoraceque parcius punctatis, thorace latitudine duplo breviore, medio convexo, lateribus subexplanatis valde rotundatis marginatis, angulis parvis auriculatis, elytris punctato-striatis thorace latioribus, rufo-testaceis, vitta lata communi suturali nigra, ore, antennis, tibiis ad apicem et basin, abdomineque ad apicem et latera piceo-rufis ; femoribus dente minuto armatis. Long. ·24.

Texas, Mr. Haldeman. Related to the preceding, but differs in the arrangement of the colors. As in it, the head is less punctured at the middle, and has two vertical faint reddish spots.

M. puncticolle, nigro-piceum, capite piceo-rufo, fronte punctata, occipite obscuro, thorace transverso, lateribus rotundatis, angulis minutis auriculatis, linea postica dorsali tenui lævi, elytris testaceis striatim punctatis, punctis postice obliteratis, sutura usque ad dodrantem nigra antice latiore ; antennis pedibusque testaceis, femoribus omnino muticis. Long. ·17.

One specimen from Fredericksburg, Texas, Mr. Haldeman.

EUMOLPUS Fabr.

E. cuprascens, oblongus convexus, cupreus vel aureo-cupreus, nitidus, fortiter subrugose punctatus, breviter fere erecte albo-pubescens, antennis ad basin piceis, ore tibiis tarsisque nigris, elytris thorace latioribus. Long. ·2.

San Diego, California. Belongs to the same genus as E. smaragdulus *Lec.*, Pac. R. R. Survey, 9, (insects) 67, but differs from it by the color and more robust form. The generic characters are : thorax margined on the sides, lobed broadly behind the eyes, head not sculptured with lines, antennæ slender ; femora and tibiæ unarmed, ungues bifid.

Paria Lec.

P. quadriguttata, supra pallide testacea nitida, capite parce punctato, thorace convexo parce punctato, lateribus rotundatis angulis posticis haud rotundatis, margine basali apicalique infuscatis, elytris thorace latioribus convexis, fortiter striatim punctatis punctis postice parvis, macula utrinque subbasali, alterisque duabus linearibus confluentibus ad medium ornatis; subtus picea, abdominis margine pedibusque pallide testaceis, antennis testaceis ad apicem infuscatis. Long. ·17.

Fort Yuma, California. Closely resembles Colaspis 6-notata *Say*, but is more slender, with the thorax less punctured, and the under surface darker.

The genus Paria is established for the present species, Col. 4-notata *Say*, 6-notata *Say*, aterrima *Oliv.*, and canellus *Fabr.*, with several nondescripts. The species mentioned, which were known to Dejean, were placed by him at the end of the genus Metachroma, with the first mentioned species of which they have no affinity, except that resulting from form. They are to be distinguished as follows:

Body glabrous, head not sculptured, antennæ distant, slender, second joint thicker, but shorter than the third; thorax margined, angles not auriculated, beneath broadly lobed behind the eyes, prosternum deflected and hollowed so as to protect the mouth when the head is bent down. Femora not toothed, posterior tibiæ externally broadly emarginate near the tip; ungues bifid.

Myochrous (†Chevr.)

M. longulus, elongatus nigro-piceus, dense punctatus, squamulis æneofuscis densissime tectus, thorace latitudine longiore, lateribus subparallelis fortiter tridentatis, antice oblique truncatis, angulis omnibus prominulis. Long. ·2.

Fort Yuma, California. Different from our other species by the form of the thorax, and the more elongate body.

Haltica Fabr.

H. fumata, ovalis supra flava, ore occipiteque fuscis, thorace lævi, latitudine duplo breviore, lateribus obliquis subrectis, macula media antice latiore nigra, alteraque utrinque obliqua fusca; elytris subtilissime parce punctulatis, sutura vitta discoidali alteraque submarginali nigris; corpore subtus, pedibus antennisque fusco-nigris, femoribus anterioribus fusco-testaceis. Long. ·26.

Texas and New Mexico. Smaller and broader than H. alternata, and distinct from that as from all allied species in my collection, by the dark color of the under surface. The dorsal thoracic spot in one specimen is divided.

H. pura, elongato-ovalis flavo-testaceus, labro, occipite, antennis tarsisque nigris, thorace latitudine sesqui breviore, lateribus late rotundatis, subtiliter punctulato, antice guttis duobus vel quatuor nigris; elytris subtiliter rugosis et vix conspicue punctulatis, sutura vitta dorsali alteraque submarginali tenuibus nigris. Long. ·28—·31.

Colorado River, California. More slender than H. pluriligata *Lec.* and distinguished by the uniform yellow color of the under surface.

H. foliacea, elongata subovalis, viridiænea subnitida, thorace latitudine parum breviore, antrorsum angustato, subtiliter punctulata, linea transversa subtili postice inculpto, elytris punctulatis thorace parum latioribus. Long. ·19.

Texas, Mr. Haldeman. Closely allied in form and character to H. punctipennis *Lec.* (Beckwith's Expedition), but the thorax is less transverse and more densely punctulate, the posterior line is not more distinct at the middle than towards the side, and the elytra are more finely punctured.

H. opulenta, oblonga convexa laete viridiaurea, capite antice rugose et punctato, postice lævi, thorace rude punctato, et parce punctulato, latitudine breviore, lateribus vix late rotundatis, angulis anticis oblique truncatis, disco postice sulco profundo transverso striola basali utrinque terminata exarata, elytris fortiter striatim crenatis, interstiis parce punctulatis, antennis pedibusque rufo-testaceis. Long. ·10.

Fort Yuma, California. Entirely of the size, form, and sculpture of H. h e l x i n e s (var. nana *Say*), but the sides of the thorax are less rounded in front behind the apical angles.

H. m i t i s, elongata, capite fortius punctato, fusco-testaceo, medio sublævi, thorace pallido, latitudine parum breviore, lateribus nigris antice rotundatis, parce subtiliter punctulato et parcius punctato, prope basin linea transversa vage impressa; elytris punctulatis, obscuris, vitta dorsali apicem haud attingente, margineque postico pallidis, ore postpectoreque nigro-piceis, antennis fuscis, abdomine fusco-testaceo, pedibus testaceis plus minusve infuscatis. Long. ·15.

Colorado River, California. Very nearly resembles H. b l a n d a (*Systena blanda* Mels.), but the head is more punctured and the elytra are less densely punctulate.

H. o c h r a c e a, elongata, supra ochreo-flava nitida, capite antice parce punctato, thorace latitudine breviore punctulato et parce punctato, antrorsum angustato, lateribus rectis postice linea transversa vage impresso, elytris subtilius punctulatis, subtus fusca, antennis pedibusque testaceis. Long. ·15.

One specimen, San Diego, California. This specimen, with the preceding belongs to the group named Systena by Mr. Chevrolat, but is very different from any other in my collection.

Longitarsus Latr.

L. m a n c u s, apterus elongatus, subcylindricus, æneo-niger, capite lævi, thorace punctato latitudine breviore, lateribus late rotundatis, elytris thorace parum latioribus, punctatis, ad apicem divergentibus et singulatim rotundatis, ano prominulo, pedibus antennisque rufo-piceis, his articulis 2ndo tertioque æqualibus. Long. ·07.

Gila River, below the Pima villages. The form is nearly that of L. t e s t a c e a (*Teinodactyla testacea* Mels.) but the absence of wings, and the separately rounded elytra are characters known to me only in this and the next species.

L. a p t e r u s, apterus, elongatus subcylindricus, convexus æneo-niger, capite lævi, thorace versus latera parce punctulato, latitudine breviore, lateribus late rotundatis, elytris thorace parum latioribus punctatis, ad apicem divergentibus et singulatim rotundatis, ano prominulo, pedibus antennisque testaceis, his extrorsum fuscis, articulis 2ndo 3ioque aqualibus, femoribus posticis fuscis. Long. ·05—·07.

Found with the preceding, which it resembles, except in having the thorax only finely punctured towards the sides.

L. r e p a n d u s, alatus, flavo-testaceus nitidus, thorace latitudine breviore, subtilissime parce punctulato et ruguloso, lateribus late rotundatis subrepandis, elytris thorace sesqui latioribus, oblongo-ovalibus convexis, punctulatis et transversim subrugosis, antennis elongatis versus apicem paulo infuscatis. Long. ·07.

San Diego, California.

L. l i v e n s, alatus, supra flavo-testaceus nitidus, thorace latitudine breviore, subtiliter punctulato, lateribus late rotundatis, elytris thorace paulo latioribus, elongatis ovalibus, sat dense subtilius punctatis, antennis elongatis versus apicem parum infuscatis; subtus fuscus, pedibus testaceis. Long. ·07.

One specimen, Fort Yuma, California.

Psylliodes Latr.

P. i n t e r s t i t i a l i s, ovalis paulo convexus, nigro-æneus nitidus, capite thoraceque fortius haud dense punctatis, hoc latitudine breviore, lateribus rectis angulis anticis oblique truncatis, elytris thorace latioribus, striatim punctatis, interstitiis fortius subtiliter punctatis, antennis pedibusque piceo-testaceis, femoribus posticis nigro-æneis. Long. ·12.

Fort Yuma, California, one specimen. The striæ of the elytra in this species are formed merely of punctures, as in P. convexior *Lec.*, Pac. R. R. Survey, 9, (insects) 69, but the intervals are strongly punctured as in P. puncticollis *Mels.*

DIABROTICA (½ Chevr.)

D. tenella, elongato-ovata, pallide virescente-flava nitida, thorace latitudine haud breviore, bifoveato, lateribus subsinuatis, ore occipiteque fuscis, elytris guttis utrinque sex parvis nigris, 2, 2, 2 positis; scutello postpectore pedibusque fuscis, femoribus pallidis ad apicem infuscatis, antennis fuscis, articulis tribus primis pallidis, Long. ·2—·22.

Fort Yuma, California, Resembles D. 12-punctata, but the spots are always very much smaller, and the thorax is not transverse, and not much rounded on the sides near the apex, and all the angles are prominent.

D? fossata, elongata, nigra nitida, vertice profunde foveato, thorace latitudine haud breviore, foveis magnis duabus profunde excavato, lateribus subsinuatis, elytris subtiliter punctatis, plica versus marginem munitis, postice obsoleta introrsum sulco lata utrinque abbreviato definita. Long. ·21.

New Baunfels, Texas, Mr. Lindheimer. An immature specimen is dark testaceous; this species is of the same form as D. longicornis *Say* (Galleruca,) but the elytra are less strongly punctured.

GALLERUCA Geoffroy.

G. sordida, testacea, dense pallide sordide pubescens, capite canaliculato, thorace brevi, lateribus subangulatis, profunde canaliculato, utrinque late excavato, elytris subtrisulcatis, sulco secundo antice introrsum obliquo, tertio utrinque valde abbreviato, macula communi nigra suturali paulo impressa ad medium notatis, guttisque pluribus præcipue pone medium ornatis; antennis corporis dimidio brevioribus extrorsum paulo incrassatis, pectore fusco. Long. .13.

Fort Yuma, California. Related to G. guttulata *Lec.* Pac. R. R. Survey, 9, (insects) 70, but more finely punctured, and still more densely pubescent, so that the punctures are not visible. The grooves of the elytra are also different; the first is entire, but is a little deeper at the sutural black spot, the second runs obliquely inwards from the humerus, and forms a deep fovea near the first, then it runs parallel with the suture, but is faint; the third is very faint and short, being seen only about the middle.

G. luteocincta, elongata, thorace brevi flavo, lateribus subangulato, utrinque oblique excavato, minus dense punctato, cyaneo-trimaculato, elytris æneo-cyaneis, vel æneo-viridibus, sericeis pubescentibus, densissime punctulatis, limbo externo et apicali flavo, subtus cum pedibus fusco-nigra vel testacea, antennis elongatis fuscis. Long. ·32–·43.

San Diego, California; very abundant on a species of Artemisia. This species varies much in size and color; the head is usually dull testaceous, with the occiput blackish or greenish blue; sometimes the head is entirely blackish. It is closely related to G. flavolimbata *Mann.* from northern California, but differs by the thorax being broadly and deeply excavated each side, and again less deeply at the middle near the base and apex: in G. flavolimbata there is but one deep excavation, which extends transversely across the thorax. In one specimen the elytra are dull testaceous, having only a scutellar patch, and an external vitta olive green bronzed. In another, the black spots of the thorax cover nearly the whole surface.

EXOCHOMUS Redt.

E. texanus, rotundatus valde convexus, fere compressus, niger nitidus, capite obscure rufo, thorace prope angulos anticos ad marginem rufescente, elytris subtiliter punctulatis, macula rotundata ante medium utrinque ornatis, pectoris segmentique abdominis primi lateribus rufis; pedibus rufis, tarsis omnibus, tibiis posterioribus, femorumque postecorum margine nigris. Long. ·23.

One specimen found in Texas by Dr. Kinnerly. Of the same size and form as E. tripustulatus.

BRACHIACANTHA Muls.

B. quadrillum, ovalis valde convexa, nigra nitida, dense punctulata, thorace macula magna laterali rotundata elytris, altera subreniformi subapicali flavo-rufis ornatis; antennis palpis pedibusque flavo-rufis, femoribus infuscatis. Long. ·2.

New Braunfels, Texas, Mr. Lindheimer. More regularly oval than B. dentipes; it differs from that species by the black head, and by the anterior spots of the elytra being wanting.

HYPERASPIS Redt.

H. cincta, rotundato-ovalis, nigra nitida, capite thoraceque subtiliter punctatis, illo flavo, hoc margine laterali apicalique tenui flavis, elytris minus dense punctatis, margine lato flavo-rufo pone humeros emarginato, postice ambiente, sed suturam haud attingente ad apicem obtuse rotundato, margine laterali pone medium anguste nigro. Long. ·10.

Santa Isabel, California, one specimen. A very pretty and distinct species: the yellow margin of the elytra occupies about one fourth of the surface; internally it is suddenly and deeply emarginate behind the humerous; it follows the contour of the sides almost to the suture, where it is obtusely rounded; the extreme margin from the middle to the tip is black.

April 6th.

Vice President LEA in the Chair.

Fifty-one members present.

Dr. Leidy called the attention of the members to some fossil remains on the table just received from Dr. Hayden. They are part of the Niobrara collection, and apparently indicate two additional species of the ancient Camel (*Procamelus*). One of the species is founded on the greater portion of one side of the lower jaw containing most of the molar teeth. Six molars form a closed row, of which the back four have about the same size and form as in the recent Camel. The second premolar is like the third one, and the first of the closed series has a laterally compressed conical crown with trenchant borders. The caniniform premolar has almost the same size, form and relative position as in the recent Camel; and in the fossil, in a corresponding position, there is an equally large socket, as in the latter, for a true canine. The jaw is shorter but deeper than in the Camel, and it appears to indicate that the species to which it belongs was about the size of the latter animal. The length of position occupied by the closed row of six molars is six and a quarter inches; the depth of the jaw below the middle of the last molar is two and a half inches, and below the first molar one and three-quarter inches. For this species the name of PROCAMELUS ROBUSTUS is proposed.

The second additional species of this genus is indicated by several small fragments of an upper jaw with molar teeth, of an animal about the size of the Lama. The three premolars of the closed row occupy a position of fifteen lines in extent. For the species the name of PROCAMELUS GRACILIS is proposed.

Dr. Leidy added that he took the present opportunity to point out the admirable quality of bees-wax as a means of mending fractured fossils, and of increasing their strength when friable. If a fossil bone or shell have become quite brittle by the loss of its animal matter, and is dipped in melted wax and allowed to cool, it becomes nearly as hard as the specimen was in its original condition. For mending, it had the advantage over most cements that no time was lost in allowing certain parts to dry, which had been united, before others could be added.

Dr. Hays announced the death of Prof. John K. Mitchell, M. D., late a member of the Academy.

April 13th.

Mr. JEANES in the Chair.

Fifty-one members present.

A letter was read from Henry Hartshorne, M. D., Recorder of the Biological Department of the Academy, announcing its organization, and the selection of the first and third Mondays of each month as the time of meeting.

Dr. Leidy called the attention of the members to a drawing of a curious worm, which he said was obtained from the Schuylkill river, and was interesting from its being more nearly allied to marine forms than any other known fresh water species. It lives in tubes of mud; and is about a line in length. The body is divided into twelve annuli, including the head, which is cup-shaped, has two eyes, and supports on each side a process provided with seventeen cylindrical ciliated arms. The rings, except the head, are provided with four rows of bristles and two rows of podal hooks. The bristles are from four to six in a bunch; those anteriorly having a falcate extremity, and those posteriorly being whip-like. The anterior hooks are in series of five; and have a long handle with a lancet-like extremity. The posterior hooks are from fifteen to twenty in a series, and have a long handle with the extremity expanded and serrated on one side. It appears to be most nearly allied to the marine genus *Fabricia*. He proposed for it the name *Manayunkia speciosa*, from the Indian name of the river in which it was first discovered.

April 20th.

Vice-President BRIDGES in the Chair.

Thirty-six members present.

The following papers were presented for publication in the Proceedings:

Prodromus Descriptionis Animalium evertebratorum, &c., observavit et descripsit W. Stimpson, Pars. V. Crustacea Ocypodoidea.

Contributions to Helminthology, by Joseph Leidy, M. D.

And were referred to Committees.

Mr. Lea remarked that when, a few evenings since, Dr. Leidy made some observations on a few fossil Saurian and Batrachian bones, from the Red Sandstone of Gwynedd, 20 miles north of Philadelphia, and which were collected and presented by him and some other members, some observations were made by Mr. Lea on the epoch of that mass of red and gray sandstone rocks and blackslates. This formation is now assuming greater importance, and the interest in it has recently much increased by discoveries made by Major Hawn in Kansas Territory; descriptions of the fossil species, chiefly Mollusca, have been made by Messrs. Meek and Hayden and Prof. Swallow. No bones or foot prints have been observed by Major Hawn, but all the specimens of *Mollusca*, &c., indicate without any doubt their belonging to some portion of the *Permian Formation.*

The importance of the discovery of these rocks in Kansas cannot fail to impress our geologists, as the existence of any *Permian* in this country has been long and strenuously denied by nearly all the American geologists. Mr. Lea believed he was the first to suggest that the *Red Sandstone* of Connecticut, New Jersey, Pennsylvania, &c., bearing foot marks and other impressions of animal and vegetable life, were of Permian origin and older than the *Lias*,* but not older than the "New Red Sandstone"† of Europe, as supposed by Elie de Beaumont and Dr. Jackson; and in the memoir which Mr. Lea then read before this Academy, describing the *Clepsysaurus Pennsylvanicus*, of Upper Milford, Pennsylvania, he stated, in regard to the formation in which these bones were imbedded, that he was "inclined to place it among the superior strata of the *Permian* system."‡ In 1834 Mr. R. C. Taylor considered the coal of the Lignites of Fredericksburg, Virginia to be "coeval with the Oolites."

In 1836 Prof. H. D. Rogers stated that those red sandstones which he characterized as *Middle Secondary Strata*, "implied a date somewhere intermediate between that of the coal and that of the green sand;"§ and afterwards with his brother, Prof. W. B. Rogers and Sir Charles Lyell,‖ he considered that part of this system which containes the coal near Richmond, Virginia, was "closely related to the earliest deposits of the Oolite formation of Great Britain;" and he was disposed to add the whole of the red strata of his *Middle Secondary Red Sandstone* to these, and "assign them a position at or near the base of the great Jurassic system."¶ In 1839, Mr. Gesner in his Geological Survey of the Province of New Brunswick, assigned the variegated Red Sandstone Rock of Saint Andrews, at the mouth of the St. Croix river, to the "Bunter Sandstone," the lowest member of the *Triassic*.**

The late Mr. Redfield long since regarded the fossil fishes found in the Connecticut sandstone as *Triassic;* and a few years since he stated at the meeting of the American Association at Cincinnati, that this formation was characterized by a flora and fauna as recent as the *Trias*. In this, Prof. Agassiz differed from him, as he placed this formation at the base of the *Liassic* series.

In a note, to a memoir on *Bathygnatus borealis* by Dr. Leidy,†† Mr. Dawson in reference to the older rocks of Prince Edward Island, says, "these beds may either belong to the top of the carboniferous system, or to an overlying deposit of the Permian or Triassic age, and in either case the red sandstones which conformably overlie them will be equivalent to the New Red of Western Nova Scotia and Connecticut, and probably Triassic or Permian." These views tend to confirm Mr. Lea's, published several years before; and, subsequently Prof. Emmons, who thought in 1853,‡‡ that the red sandstones of North Carolina belonged to the *Trias*, changed his views in 1856, and while confirming Mr. Lea's as regarded the existence of the *Permian*, divided the well marked beds of Deep River, in North Carolina§§ into *Permian* and *Trias*, with their inferior divisions stating their equivalency to the European systems, and he considers the Chatham series of North Carolina, the Newark series of New Jersey, and the Greenfield series of Connecticut Valley, to represent one epoch belonging to the *Permian*. The Gwynedd series and that of Phœnixville, being evidently of the same horizon with the above mentioned, Prof. Emmons agrees with Mr. Lea, in referring these rocks to the *Permian* epoch, identified as they are in North

* Mr. Dawson, in Journ. Geological Soc., 1847, stated that the Red Sandstone of Prince Edward Island and Connecticut may be the same, and may be regarded as a post carboniferous deposit of uncertain age.

† Journ. Acad. Nat. Sci., May 11th, 1852, vol. 2, new series, p. 185.

‡ Journ. Acad. Nat. Sci., vol 2, new series, p. 195.

§ Geology of New Jersey, p. 116.

‖ Journal Geological Society, 1847.

¶ Johnston's Physical Atlas, p. 32.

** Page 15.

†† Journal Acad. N. S. vol. 2, new series, page 330, 1854.

‡‡ Geological Report on North Carolina, p. 272.

§§ See his excellent and thorough Reports of 1856, 1857.

Carolina by the same *Saurian forms*, *plants*, *scales* of *fishes* and the (so called mollusc) *Posidonia.*

In 1855 Mr. Marcou published his "Carte Geologique des Etats-Unis," and in his explanations published at length, he gives an enormous extent on both sides of the Rocky Mountains to the Red Sandstone formation, which he divides into four sections. As to the *Red Sandstone* of New Jersey, he places it on a horizon with the Muschelkalk of Germany, the upper portion of the *Triassic*, (page 58.)

Mr. Lea stated that his chief reasons in 1852 for attributing to these deposits a greater age than was given to them by other American geologists, arose from the fact that the vertebræ and teeth of the *Clepsysaurus*, which he then described, were very analogous the *Thecodontosaurus antiquus*, described by Riley and Stutsbury from the *Magnesian limestone* of Bristol, New England.

More recently we have the opinion of Prof. Heer, of Zurich, distinguished for his knowledge of fossil plants and insects, who has examined specimens sent to him by Prof. Emmons. He states that these plants are characteristic of the *Keuper*, and that none of those of Virginia and North Carolina are really Oolitic. And it seems, too, that Sir Charles Lyell, who has examined so carefully and frequently these red sandstone rocks in America, has changed his former opinions, and come to the conclusion that the Richmond and North Carolina coal series belong to the "Permian, or else to the Bunter sandstone."*

In a communication made by Prof. Emmons to the American Association of Science last August, he said that the question of the Permian age of the bituminous slates and lower sandstones of North Carolina must turn upon the age of the Bristol beds of England, the epoch of which is doubted by some English geologists. Mr. Lea wished it to be remembered that his conclusions in 1852 were based on the almost universal opinion, in England, that the Bristol beds were Permian, and he referred the rocks in which were found his *Clepsysaurus* to the *same horizon.*

NOTE.—On the southern side, the New Red Sandstone of Pennsylvania commences on the river Delaware above Morrisville, opposite to Trenton, N. J., passing near Willow Grove, below Norristown, Phœnixville and Ephrata, it crosses the Susquehanna at Bainbridge. On the northern side it commences at Kentnerville, on the Delaware, about thirty miles above Morrisville, passing through Upper Milford township, it crosses the Schuylkill river about two miles below Reading, and passes out of the State at High Spire, above Middletown, the width here being reduced to about ten miles.

April 27th.

Vice President BRIDGES in the Chair.

Forty members present.

A summary of the transactions of the Biological Department was read, and the following papers reported for publication in the Proceedings by Committees of the Department, which reports were adopted:

Summary of the Transactions of the Biological Society, reported by Henry Hartshorne, M. D., Recording Secretary.

Blood Crystals of the Sturgeon, by S. Weir Mitchell, M. D.

The following papers were ordered to be published in the Proceedings:

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*American Journal of Science, 2d series, vol. 24, p. 429.

Prodromus descriptionis animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit

W. STIMPSON.

PARS. V. *CRUSTACEA OCYPODOIDEA.*

CARCINOPLACIDÆ.

PILUMNOPLAX, nov. gen. Carapax depressus, postice latus, margine antero-laterali quam postero-laterali breviore. Oculi orbitæque parvuli, rotundati. Antennæ, antennulæ et hectognathopoda, iis *Pilumni* similia. Palatum colliculo plus minusve divisum. Chelopoda mediocria v. brevia. Pedes ambulatorii longi, tertii paris plerumque longiores; dactylis depressis, iis ultimi paris sat resimis. Veretra (appendices genitales maris,) abdomine tecta, coxalia, in canaliculo sterni brevi, late aperto ducta. Abdomen maris ad basin latum, sterni segmentum ultimum celans; cetero valde angustato; articulis totis distinctis. *Pseudorhombilæ* affinis; differt carapace angustiore, dactylisque non styliformibus.

137. PILUMNOPLAX SULCATIFRONS, nov. sp. *Maris* carapax antice parce declivis, postice planatus prope margines laterales angulatus; superficie nuda, lævi, fere æquali; sulco curvato inter dentem lateralem et regionem genitalem sat valido. Frons lata, recta, ad medium emarginata; margine transversim sulcato vel canaliculato. Antennæ graciles, nudæ, longitudine dimidiam carapacis adaquantes. Orbitæ majores. Margo antero-lateralis parce obliqua, quadridentata; dente tertio majore, parum elevato. Chelopoda grandiora, lævia; mero prope apicem unidentato; carpo extus lanoso circum manûs basin; manu brevi, glabra; digitis quam palma longioribus, apicibus decussantibus; digito immobili extus crista submarginali ornato. Pedes ambulatorii longi, graciles, sat compressi, parum pilosi, articulo penultimo dactyloque sulcatis. Carapacis long. 0·325; lat. 0·41 poll. *Fœminæ?* carapax levior, convexior, margine antero-laterali magis obliqua; chelopodis ut in mari.

Hab.—In portu Sinensi "Hong Kong."

138. PILUMNOPLAX LONGIPES, nov. sp. *Fœminæ* carapax valde depressus, planatus, subquadratus, antrorsum quam retrorsum vix latior; superficie lævi, æquali, pubescente. Margo antero-lateralis brevissima, rotundata, acuta, dentata; dentibus 4–5 parvis inconspicuis. Orbitæ parvulæ, marginibus integris, parce dilatatis. Frons lata, deflexa, ad medium emarginata; setis longis in serie submarginali. Regiones antero-inferiores læves, glabræ. Chelopoda extus dense pilosa; digitis longioribus, gracilibus, subuncinatis, intus irregulariter dentatis. Pedes ambulatorii longissimi, valde graciles, pilosi, tertii paris longiores; dactylo ultimi paris sat longo. Corpus subtus pubescens. Carapacis long. 0·195; lat. 0·28 poll.

Hab.—Ad insulam "Ousima."

139. PILUMNOPLAX SCULPTUS, nov. sp. *Fœminæ* carapax fere quadrangularis; profunde insculptus, areolis numerosis, angustis, sæpe curvatis, setosis, duabus post-frontalibus valde prominentibus. Margo antero-lateralis quinquedentata, dentibus tuberculiformibus vel paxilliformibus setosis, profunde separatis. Frons deflexa, emarginata, margine longe ciliata. Oculi pedunculus partim setosus. Regio latero-inferior sulcata. Chelopodorum meros carpusque profunde sculpti, sulcis setosis, prominentiis lævibus; carpos intus unidentatus, dente parvulo acuto; manus extus granulata et setosa, granulis subseriatis. Pedes ambulatorii setosi, longitudinaliter canaliculati; secundi paris parum longiores. Carapacis long. 0.22; lat. 0·28 poll.

Hab.—Ad insulam "Ousima."

140. Pilumnoplax ciliatus, nov. sp. *Fœminæ* corporis pedumque margines anteriores longe et dense ciliati. Carapax latus, antice declivis, postice subplanatus parum angustatus. Superficies superior æqualis, pubescens, pæne lævis, granulis versus margines sparsis. Sulci longitudinales breves septem e marginibus anterioribus orientes, medianus e fronte. Series setarum in regione frontali submarginalis ; in regionibus orbitalibus hepaticisque marginalis. Orbita supra subtusque profunde fissa prope angulum externum. Margo antero-lateralis tri-emarginata, dentibus truncatis quatuor, anteriore cum angulo orbitæ coalescente ; dente posteriore parvulo sat acuto. Regio subhepatica post orbitam erosa vel rugulosa. Antennæ articulus basalis brevis. Chelopoda brevia, æqualia ; meri crista superiore irregulariter dentata, dentibus parvis ; carpo piloso, angulo interno acuto ; manu granulis exasperata, prope basin digitorum lævi ; digitis rotundatis, deflexis, parum hiantibus, intus profunde sulcatis, extus partim granulatis. Pedes ambulatorii compressi, pilosi, tertii paris longiores ; mero superne cristata, crista acuta lævi ; dactylo ultimi paris brevi. Carapacis long. 0·38 ; lat. 0·60.

Hab.—In portu "Simoda" Japoniæ.

141. Carcinoplax eburneus, nov. sp. Parvulus. Carapax perlatus, durus, lævis, lateribus æqualiter rotundatis, tumidis, marginatis ; margine anterolaterali 3–4-dentata, dentibus minutis distantibus. Frons lata, recta, vix emarginata. Orbita parva, rotundata, marginibus integris. Regiones laterointeriores turgidæ. Palatum colliculo instructum. Area buccalis brevis, antice perlata, postice angustata. Hectognathopoda iis *C. longimanæ* similia ; exognatho vero latiore, dente spiniformi prædito ; endognathi margine externa profunde concava, mero quam ischio multo latiore, apice externo valde producto ; palpo endarthroideo (vix goniarthroideo.) Chelopoda longa, gracilia, glabra ; meri marginibus subpilosis ; carpo parvo ; manu elongata, palma subturgida, angulis rotundatis ; digitis gracillimis, longitudine palmam adæquantibus, intus acute dentatis, apicibus uncinatis, decussantibus. Pedes ambulatorii graciles, marginibus ciliatis. Veretra in canaliculo brevi, late aperto sita. Abdomen maris fœminæque triangulare. ♂ Carapacis long. 0·18 ; lat. 0·28.

Hab.—In portu ad insulas "Bonin" ; in fundo limoso prof. 10 org.

Heteroplax, nov. gen. Carapax trapezoides plus minusve transversus, regione faciei quam carapace vix angustiore. Frons sat lata. Oculi longi, pedunculis robustis. Antennæ longæ, graciles ; articulo basali elongato, angusto, mobili, angulo externo hiatum orbitæ occupante. Epistoma amplum. Palatum colliculo ad marginem anticum distinctum. Hectognathopodorum palpus goniarthroideus. Chelopoda robusta mediocris longitudinis, digitis obliquis. Pedes ambulatorii graciles, tertii paris longiores ; dactylis compressis. Sternum, abdomen, veretraque ut in *Pilumnoplace*.

142. Heteroplax dentatus, nov. sp. Carapax paullo transversus, ad dentes laterales parce latior quam ad angulos orbitarum. Superficies glabra ; regionibus inconspicuis. Regio hepatica depressa. Margo lateralis antice dentata, dentibus inæqualibus quatuor ; angulo orbitæ et dente tertio elevato validis, sat remotis ; dentibus secundo quartoque minutis, inconspicuis. Frons recta, non emarginata, margine parce canaliculata. Oculi grandes. Chelopoda brevia, lævia, glabra ; mero prope apicem unidentato ; carpo intus unidentato, extus ad manûs basim lanoso. ♂ Carapacis long. 0·300 ; lat. 0·383.

Hab.—Inter insulas Sinenses prope "Hong Kong" ; e fundis conchosis ad prof. 10–15 org. lectus.

143. Heteroplax transversus, nov. sp. *H. dentato* affinis, carapace multo latiore, angulo orbitæ magis prominente, dente laterali secundo fere obsoleto, tertio minore acutissimo. Oculorum pedunculi longiores. ♂ Carapacis long. 0·26 ; lat. 0·38 poll.

Hab.—In portu "Hong Kong" ; e prof. 10 org.

RHIZOPIDÆ, fam. nov. prope *Gonoplacidas*.

Carapax transversus, antice arcuatus, postice perlatus ; antice longitudinaliter (non lateraliter) plus minusve curvatim declivis. Margo antero-lateralis parce dentatus. Regio faciei dimidiam latitudinis carapacis vix æquans. Antennulæ transversæ. Antennarum parte mobili in hiatu interno orbitæ jacente. Oculi parvi, *immobiles*, firme infixi. Palatum colliculo non divisum. Hectognathopoda ut in *Cancroideis*, palpo goniarthroideo, exognatho sat lato, dentigero. Sternum latum, articulo ultimo multo exposito. Veretra coxalia, in canaliculo sterni angusto ducta, plus minusve exposita. Abdomen maris fœminæque e basi angustum. Pedes ambulatorii tertii paris longiores ; quarti paris dactylo resimo. Species (totæ ?) cæcæ v. myopes. Habitant plerumque in profundis, inter lacunaria subterranea, fundorum argillaceorum aut luteorum ;—e latebris nunquam egredientes (?).

SCALOPIDIA, nov. gen. Carapax postice latior ; antice modice declivis, margine acuto fere continuo. Orbitæ submarginales, non profundæ ; oculis minutis, conglutinatis. Antennæ articulus basalis brevis, frontem non attingens, flagello gracili, nudo. Hectognathopoda maris sat hiantia. Veretra in canaliculis non celata.

144. SCALOPIDIA SPINOSIPES, nov. sp. Carapax longitudinaliter sat convexus, antice regulariter modice declivis, superficie pubescente, punctata, pæne lævi, antice glabra ; ad angulos postero-laterales transversim parce rugulosa. Regio gastrica perlata, sulcis distinctis extra orbitas orientibus circumscripta. Regiones latero-inferiores læves, glabræ ; sutura horizontali pubescente. Margo anterior antero-lateralisque fere continua regulariter semicircularis, acuta ; parte frontali lata, leviter emarginata ; parte antero-laterali cum dente uno mediano minutissimo acuto. Margo postero-lateralis non acutus. Chelopoda maris inequalia, brevia, robusta, extus glabra ; mero trigono, marginibus interno et inferiore acute granulatis, margine superiore ad tertiam anteriorem unidentato ; carpo quadrato, ad apicem unidentato, dente valido acuto ; manu majore grandi, brevi, perlata, compressa, glabra ; digitis gracilibus, valde deflexis, quam palma longioribus, apicibus incurvatis, marginibus internis prope bases irregulariter dentatis, dentibus parvis. Pedes ambulatorii longi, tertii paris quam carapace multo plus duplo longiores ;—spinulosi, parce pubescentes et pilosi ; spinulis seriatis, in articulo penultimo majoribus ; dactylis depressis, marginibus breviter ciliatis. Color albus. ♂ Carapacis long. 0·645 ; lat. ad dentem lateralem, 0·76 ; lat. ad basin pedum amb. tertii paris, 0·87 poll.

Hab.—In sinu oræ Sinensis prope "Hong Kong" ; in fundo luteo prof. quinque org. vulgaris.

RHIZOPA, nov. gen. Carapax antice sat declivis, lateribus postice parallelis. Orbitæ in margine anteriore excavatæ. Oculi minuti ; pedunculis mediocris magnitudinis, in orbitis conglutinatis. Antennæ articulus basalis firme infixus, parte mobili gracili, nuda. Hectognathopoda paullo hiantia. Veretra celata.

145. RHIZOPA GRACILIPES, nov. sp. Corpus pedesque breviter pubescentia· Carapax antice sat declivis, postice parum declivis ; superficie lævi, regionibus medianis sat distinctis, sulcis genitalibus profundis. Regionis frontalis sulcus medianus validus linearis. Latera parallela, marginibus obtusis. Margo anterolateralis parce acutus, postice bi-emarginatus, fissuris inconspicuis. Frontis margo rectus. Oculi paullo tumidi. Chelopoda brevia, marginibus ciliatis ; mero prope apicem unidentato ; carpo ad apicem dente longo instructo ; manu compressa, supra infraque cristata, extus glabra ; digitis latis, intus dentatis. Pedes ambulatorii graciles, parum pilosi, dactylis longioribus. Abdomen fœminæ minuens, acutum, margine ciliato. ♀ Carapacis long. 0·20 ; lat. 0·251 poll.

Hab.—In portu "Hong Kong."

TYPHLOCARCINUS, nov. gen. Carapax antice valde declivis, lateribus postice fere parallelis. Margo antero-lateralis parce dentatus. Orbitæ in margine anteriore excavatæ, parvæ, profundæ, oculorum pedunculos includentes, qui immobiles, quamvis non conglutinati. Oculi obsoleti. Antennæ articulus basalis parvus, brevis, flagello gracili, nudo. Hectognathopoda vix hiantia. Veretra plerumque non celata.

146. Typhlocarcinus nudus, nov. sp. Carapax latus, lateribus parallelis, superficie nuda, fere lævi, glabra; regionibus indistinctis; regione branchiali postice obsolete granulata. Margo antero-lateralis postice leviter 2–3-emarginatus. Orbitæ parvæ, rotundatæ v. breviter ovatæ. Frons angusta, profunde emarginata; angulis externis parum prominentibus. Area buccalis antrorsum minuens. Hectognathopoda minus hiantia; meri angulo externo rotundato; exognatho valde angusto. Chelopoda sat grandia, nuda, pæne lævia; manu oblonga, glabra, superne acuta, crista granulata inferne marginata; digitis longis, gracilibus, apicibus acutis decussantibus; dactylo costato, costis lævibus. Pedes ambulatorii gracillimi, læves, fere nudi. ♂ Carapacis long. 0·21; lat. 0·295 poll.

Hab.—In portu "Hong Kong."

147. Typhlocarcinus villosus, nov. sp. Corpus pedesque supra infraque pubescentia aut villosa. Carapacis latitudo mediana quam posterior major. Superficies pæne æqualis, sparsim granulata. Regiones medianæ solum distinctæ. Margo antero-lateralis extus tridentatus, dentibus parvis granulatis. Frons angusta, sat prominens, margine bilobata. Orbitæ oculique villo celatæ. Regiones antero-inferiores convexæ, turgidæ. Chelopoda robusta, inæqualia, extus subtiliter granulata; granulis in manu subseriatis; digitis brevibus, intus unidentatis, dente parvo, mediano. Pedes ambulatorii breviores, robustiores, ciliati; dactylis longis, gracilibus, acutis. Abdomen maris minuens, extremitate obtusa. ♂ Carapacis long. 0·28; lat. 0·37 poll.

Hab.—In portu "Hong Kong"; e fundo conchoso prof. 8 org. acceptus.

Ceratoplax, nov. gen. Carapax postice latior, antrorsum et retrorsum longitudinaliter declivis; marginibus anteriore et lateralibus acutis, ciliatis. Regiones latero-inferiores excavatæ. Orbitæ in margine anteriore leviter excavatæ. Oculi conglutinati, compressi, margine acuto, ciliato. Frons angusta, deflexa, valde prominens. Antennæ grandes, articulo basali rectangulari, mobili; flagello longo ciliato. Epistoma sat longum. Hectognathopoda parva, antrorsum latiora, non hiantia; meri angulo externo prominente. Pedes compressi, marginibus ciliatis.

148. Ceratoplax ciliatus, nov. sp. Corpus transversim semicylindricum, supra convexum, subtus planatum; sterni dimidia posteriore perpendiculari. Margines carapacis, antennarum et pedum ambulatoriorum ciliati. Carapax subtrapezoides, superficie æquali, nuda, glabra, sparsim punctata, punctis sæpius regiones circumscribentibus. Margo lateralis acutus, non dentatus, post angulum antero-lateralem obtusum fere rectus. Antennæ tertiam partem longitudinis carapacis superantes. Frons emarginata. Regio subhepatica concava. Chelopoda brevia; carpo convexo, punctato, intus unidentato; manu lata, extus glabra, depresso-granulata, inferne crista marginata; digitis brevibus, obliquis, non hiantibus. Pedes ambulatorii lati, compressi, superficie glabra sparsim punctata; dactylis gracilibus parum compressis, quam articulis penultimis vix brevioribus. Abdomen ad medium subdilatatum, extremitate rotundata. Carapax miniatus; pedes albidi; digiti fusci. ♀ Carapacis long. 0·21; lat. 0·242 poll.

Hab.—In mari Sinensi boreali, lat. 22°; e fundo arenoso prof. 20. org.

Macrophthalmidæ.

149. Macrophthalmus telescopicus, Dana; U. S. Exploring Expedition, Crust. i. p. 314. *Gelasimus telescopicus*, Owen; Zool. Beechey's Voy. p. 78, pl.

xxiv. f. 1. *Macr. podophthalmus*, Eyd. et Soul.; Voy. Bonite, Crust. pl. iii. f. 6-7.—In portu "Napa" insulæ Loo Choo"; e fundo luteo prof. 10 org.

150. Macrophthalmus serratus, White; Voy. Samarang, Crust. p. 51. (?) Carapax quadratus, postice latior, superficie confertim granulata; margine laterali acuto, quadridentato, dente posteriore parvulo ad tertiam posteriorem longitudinis partem sito. Pedes ambulatorii villosi non pectinati. ♂ Carapacis long. 0·85; lat. maxima, postice, 1·19 poll.

Hab.—In fretis prope "Hong Kong"; in fundis limosis prof. 4–8 org. vulgaris.

151. Macrophthalmus dentatus, nov. sp. Carapax latus, superne nudus, paullo inæqualis, glaber, costis longitudinalibus plicatis paullo conspicuis prope angulos postero-laterales. Margo lateralis dentatus, dentibus parvulis quatuor fere totam longitudinem occupantis; angulo orbitæ non incluso valde prominente acuto. Frons perangusta. Oculi longi, extremitates orbitarum vix attingentes. Chelopoda angulata, lævia, glabra; digitis brevibus; digito immobili brevissimo, intus dente mediano magno triangulari denticulum unum antice gerente; dactylo intus bidentato, dente uno ad basim, altero minore proximo. Pedes ambulatorii læves vix hirsuti; mero prope apicem unispinuloso. ♂ Carapacis long. 0·31; lat. maxima, (inter angulos orbitarum,) 0·52 poll.

Hab.—In portu "Hong Kong"; fundo limoso, sex org.

152. Macrophthalmus convexus, nov. sp. Carapax latus, latitudine maxima ad angulos orbitarum; postice convexus; superficie lævi, glabra, lateribus paullo granulosis exceptis. Regiones distinctæ. Regio branchialis postice prope marginem turgidulæ, prominentiis duabus granulatis. Margo lateralis carinatus antice bi-emarginatus; incisura posteriore inconspicua; angulo orbitæ valido acuto. Orbita obliqua, margine inferiore serrato. Manus digitique intus pilosi; digitis intus unidentatis; dente prope basim ut in *M. Pacifico*. Pedes ambulatorii læves; mero dente prope apicem minuto. Maris (junioris?) carapacis long. 0·34; lat. 0·59 poll.

Hab.—Ad insulam "Loo Choo."

153. Macrophthalmus Pacificus, Dana; loc. cit. i. 314; pl. xix. f. 4.—Ad insulam "Loo Choo."

Chænostoma, nov. gen. *Cleistostomati* affinis, sed hectognathopodis hiantibus. Ab *Euplace* differt hectognathopodorum mero longitudine ischium adequante; —a *Metaplace*, crista obliqua pilifera nulla.

154. Chænostoma orientale. *Cleistostoma Boscii*, Dana; loc. cit. i. 313; pl. xix. f. 3. (vix *M. Boscii*, Auct.)—Ad insulam "Loo Choo."

155. Chænostoma crassimanus, nov. sp. Carapax quadratus, postice sat convexus;—modice areolatus, sulco profundo mediano in regione pregastrica postice bifurcato; superficie inequali, mediana glabra, laterali rugulosa et pilosa. Margo lateralis post angulum orbitæ leviter emarginata. Oculi longi, crassi, angulos orbitarum vix superantes. Frons lata, deflexa, inferne late subtruncata. Margo infra-orbitalis crenulatus. Areæ buccalis margo anticus valde sinuatus. Hectognathopoda sat lata, rhomboidice hiantia; mero vix longiore quam lato. Chelopoda robusta, extus lævia, intus pilosa; manu crassissima, tumida, rotundata, extus glabra, digitis brevibus acutis; dactylo intus unidentato, dente valido mediano; digito immobili intus crenulato. Pedes ambulatorii compressi, pæne læves, parce canaliculati; mero valde piloso, reliquis vix pilosis. Abdomen maris sat latum, articulo tertio utrinque tumidulo. ♂ Carapacis long. 0·26; lat. 0.341.

Hab.—Ad insulam "Loo Choo."

156. Metaplax longipes, nov. sp. Corpus parvum, pedes grandes. Carapax ad medium latior, superficie paullo inæquali, mediana et antica glabra,

punctata; areolis lateralibus transversis, conspicuis, sulcis ab incisuris marginalibus orientibus. Superficies postero-lateralis pubescens, bistriata, stria anteriore transversa, posteriore obliqua. Regio frontalis lata, longitudinaliter profunde et late excavata. Margo lateralis tri-emarginatus, incisura anteriore profunda, dente valido subelevato separante; reliquis levibus. Oculi mediocres, pedunculis crassis. Margo infra-orbitalis septemlobatus, lobis glabris rotundatis, interno majore curvato. Epistoma amplum, convexum. Regiones antero-inferiores extus pubescentes, intus granulatæ et sulcatæ; rima profunda prope lobum internum marginis infra-orbitalis. Hectognathopodorum crista obliqua pilifera valde prominente. Chelopoda mediocria; meri marginibus serrulatis; manu oblonga lævi, intus tumida; digitis hiantibus intus regulariter denticulatis, apicibus intus excavatis. Pedes ambulatorii longi, ad basim pubescentes; secundi tertiique paris longissimi, robusti, articulo penultimo dense tomentoso; dactylis leviter compressis quinquecostatis, extremitatibus gracilibus acutissimis. Abdominis maris articuli toti distincti, articulus ultimus angustatus, sterno contiguo crista marginato. ♂ Carapacis long. 0·46; lat. 0·61; pedum amb. secundi paris long. 1·38 poll.

Hab.—In portu "Hong Kong."

Ilyoplax, nov. gen. Corpus quadratum crassissimum, tenellum. Frons, antennæ, antennulæ, orbitæque iis *Macrophthalmi* similes; fronte quamvis latiore. Hectognathopoda tumida v. salientia, non hiantia, exognatho celato, palpigero; mero quam ischio longiore; ischio linea pilifera obliqua juxta meri commisura ornato; palpo prosarthroideo. Chelopoda æqualia. Pedes ambulatorii subrobusti, secundi paris longiores; meri faciebus submembranaceis. Sternum et abdomen fere ut in *Macrophthalmo*. Species in aquis subsalinis habitans, limicola.

157. Ilyoplax tenellus, nov. sp. Carapax fere quadrangulus, angulis antero-lateralibus obtusis; latere parce convexo, linea acuta breviter setosa postice bifurcata marginato, furca inferiore ad basim pedum amb. 2di paris decurrente. Superficies superior inconspicue areolata; mediana lævi glabraque; laterali inæquali, striis transversis subtuberculatis setosis ornata. Regio frontalis longitudinaliter late sulcata. Frontis margo inferior ad angulos subdilatatus. Regiones latero-inferiores non sulcatæ, granulis setiferis regulariter obtectæ. Chelopoda majora; manu lævi, digitis deflexis, gracilibus, introrsum curvatis excavatisque, palmam longitudine adequantibus; dactyli dente mediano valido. Pedes ambulatorii superne partim setosi et tomentosi; 2di 3tiique paris meri latere postico dense tomentoso. ♂ Carapacis long. 0·27; lat. 0·415 poll.

Hab.—In fluvio prope urbem Sinensem "Canton"; littoralis, limicola, in aquis subsalinis.

Dotillidæ.

"Doto" nomen De Haanii præoccupatum est; (vide *Doto*, Oken, Moll., 1815;)—appelatio nova "Dotilla" proposita est.

158. Dotilla myctiroides. *Doto myctiroides*, M. Edwards; Melanges Carcinologiques, p. 116, pl. iv. f. 24.—In freto "Gaspar."

159. Scopimera tuberculata, nov. sp. Carapax ad bases pedum ambulatoriorum antici paris sat latus, dorso multo angustiore, margine laterali ciliato. Superficies inæqualis, prominentiis tuberculisque ornata; sulcis inter regionibus medianis et lateralibus validis, irregularibus; latere longitudinaliter sulcato, sulco submarginali. Regiones laterales granulis setiferis obtectæ, inferne confertis. Orbita ampla, obliqua, bene excavata, extus dente parvulo instructa. Hectognathopoda convexa, mero dimidiam ischii longitudine superante, commisura obliqua; palpo fere exarthroideo. Chelopoda æqualia, elongata, carapace plus duplo longiora, sed quam pedes amb. primi paris breviora. Pedes ambulatorii minuentes, subtus setis rigidis nigris sparsim fimbriati; meri

tympanis ut in *S. globosa*. Abdomen ei *S. globosæ* simile. ♂ Carapacis long. 0·36; lat. 0·6 poll.

Hab.—In portu "Simoda" Japoniæ; littoralis, fossores in vadis luteis.

MYCTIRIDÆ.

160. MYCTIRIS LONGICARPUS, Latreille; M. Edwards; Hist. Nat. des Crust. ii. 37; Mel. Carcin. p. 118.—In sinu "Botany Bay"; Australiæ.

161. MYCTIRIS BREVIDACTYLUS, nov. sp. (An = *M. deflexifrons*, De Haan, White, cujus descriptionem nullam invenio.) Carapax brevis, globosus, pæne lævis; regionibus branchialibus minus inflatis, subtilissime granulatis; regione genitali depressa, lineis longitudinalibus duabus impressis parallelis marginata. Spina brevis, gracilis, obtusa, prope angulum orbitæ externum. Chelopoda iis *M. longicarpi* similia, paullo robustiora. Pedes ambulatorii robustiores, dactylis brevibus, crassis; dactylo pedum ultimi paris resimo, trigono, angulis ciliatis. *M. longicarpo* affinis, sed corpore crassiore, dactylisque brevioribus. ♂ Carapacis long. 0·682; lat. 0·639 poll.

Hab.—Ad oras meridianas Sinenses et ad insulam "Loo Choo"; littoralis, vulgaris.

162. MYCTIRIS PLATYCHELES, M. Edwards; Mel. Carcin. p. 118.—In sinu "Botany Bay" Australiæ.

OCYPODIDÆ.

163. GELASIMUS VOCANS, M. Edwards; Mel. Carcin. p. 109. pl. iii. f. 4. *Cancer vocans*, Rumph. *Gelasimus nitidus*, Dana; loc. cit. i. 316, pl. xix. f. 5.—In portu "Hong Kong," et ad insulam "Loo Choo"; littoralis, in locis arenosis.

164. GELASIMUS DUBIUS, nov. sp. Carapax et frons ut in *G. vocante*, nisi carapace retrorsum angustato. Orbitæ magis obliquæ. Anguli antero-laterales acute prominentes. Margo infra-orbitalis crenulatus, extremitate externa angulata. Chelopodi grandis mero superne spinuloso; manu valida, palma extus granulata v. tuberculata, intus crista ei *G. vocantis* simili sed minus prominente; digitis latiusculis, extus sulcatis, marginibus internis fere rectis, irregulariter denticulatis, dentibus 2–3 majoribus. Pedum ambulatorium merus sat dilatatus; dactylis ut in *G. vocante*. ♂ Carapacis long. 0·522; lat. 0·82; manûs long. 1·22; lat. 0·44 poll. *G. acuto* parce affinis, sed regionibus distinctioribus, et dactylis compressis pilosisque. Forsitan *G. forcipato*, White, affinis, sed lineis marginalibus carapacis indistinctis.

Hab.—Ad insulam "Loo Choo."

165. GELASIMUS ACUTUS, nov. sp. Carapax retrorsum valde angustatus, angulis antero-lateralibus prominentibus, acutissimis; lineis marginalibus distinctis. Frons sat angusta, non constricta. Margo infra-orbitalis versus angulum externum acutum crenulatus; lobo suborbitali interno convexo. In regione subhepatica crista sat distincta ad marginem infra-orbitalem parallela, superficie interjacente lævi. Manus major extus valide granulata, intus cristis tuberculatis armata; digitis quam palma non longioribus, extus sulcatis, marginibus internis dentatis, dente mediano majore, dente valido subterminali nullo. Pedes ambulatorii læves, nudi; mero sat dilatato sed minus quam in *G. brevipede;* dactylis parvis gracilibus. Color albus. ♂ Carapacis long. 0·39; lat. 0·67; manûs majoris long. 0·83; lat; 0·36 poll.

Hab.—Prope portum "Macao," Sinensem.

166. GELASIMUS SPLENDIDUS, nov. sp. Carapax longitudinaliter perconvexus, antice perlatus, angulis antero-lateralibus validis, prominentibus; lineis marginalibus distinctis; fronte lata, subtruncata. Margo infra-orbitalis crenulatus, angulo externo late rotundato. Manus major maris grandis, pæne lævis, intus leviter armata, crista obliqua serie unica granulorum ornata; crista ad basin digiti pæne obsoleta; digitis longis gracillimis leviter denticulatis; digito immobili ad apicem excavato. Carapax ianthinus, transversim nigro-fasciatus et

maculatus. Manus grandis pallide-rubra. Pedes amb. purpureo-variegati. ♂ Carapacis long. 0·49; lat. 0·78; manûs long. 1·35; lat. 0·48 poll. *G. Gaimardi* affinis, fronte minus producta, et subtruncata.

Hab.—Ad oras insulæ "Hong Kong"; palustris.

167. Gelasimus pulchellus, nov. sp. *G. annulipedi* affinis, sed manu maris majore intus cristis duabus tuberculatis ad basin digitorum ornata; extus lævi, cicatrice triangulari prope basin digiti immobilis. ♂ Carapacis long. 0·398; lat. 0·605; manûs long. 0·89; lat. 0·33 poll.

Hab.—Ad insulam "Tahiti"; in æstuariis arenosis.

168. Gelasimus lacteus, De Haan, Fauna Japonica, Crustacea, p. 54, pl. xv. f. 5. M. Edwards; Mel. Carcin. p. 114. pl. iv. f. 16. In freto "Cum-sing-moon" et in portu "Macao" Sinensibus; littoralis in locis limosis lapidosisque.

169. Ocypode cursor, De Haan; loc. cit. p. 29; M. Edwards; Mel. Carcin. 106. *Cancer cursor*, Belon. *Ocypode ippeus*, M. Edw.; Hist. Nat. des Crust. ii. 47.—Ad insulas "Cape de Verdes."

170. Ocypode ceratophthalma, Fabr.; Suppl. 347. M. Edwards; Mel. Carcin. 105. *Cancer ceratophthalmus*, Pallas. *Ocypode brevicornis*, Dana; loc. cit. i. 326. pl. xx. f. 3.—Ad insulas "Hawaii," "Loo Choo," "Ousima," "Bonin" et "Tahiti," etiam in portu "Hong Kong," Sinensi.

171. Ocypode convexa, nov. sp. Carapax turgidus, postice et supra pedum posticorum bases dilatatus; angulo antero-laterali prominente, acuto, post quem margine laterali recto vel paullo concavo; superficie pæne lævi, granulis depressis confertis. Oculi ad apicem non producti. Margo suborbitalis prope medium leviter emarginatus. Dens suborbitalis internus conicus, bifurcatus vel denticulatus. Area buccalis grandis, lateribus convexis. Hectognathopoda paullo hiantia, superficie glabra, partim inæquali, non granulata; mero vix sulcato. Manus major brevis, inferne dilatata, superficie leviter granulata, marginibus leviter dentatis, digitis compressis. Manûs minor digiti producti valde compressi, subtruncati. Pedes ambulatorii vix rugulosi. Abdominis fœminæ articulus penultimus profunde sinuatus. ♀ Carapacis long. 0·92; lat. inter angulos orbitarum, 0·96 poll.

Hab.—In portu "Simoda."

172. Ocypode cordimana, Desmarest; Consid. sur les Crust. p. 121. M. Edwards; Hist. Nat. des Crust. ii. 45.—In portu "Hong Kong" et ad insulam "Loo Choo."

173. Ocypode lævis, Dana; loc. cit. i. 325, pl. xx. f. 2.—In portu "Hilo" insulæ "Hawaii."

Gecarcinidæ.

174. Cardisoma Guanhumi, Latr.; M. Edw. Hist. Nat. des Crust. ii. 24; Illust. Cuv. R. A. pl. xx. f. 1.—Ad insulam "St. Jago," archipelagi "Cape de Verdes."

175. Cardisoma obesum, Dana; loc. cit. i. 375, pl. xxiv. f. 1. *C. Urvillei*, M. Edwards; Mel. Carcin. 190.—Ad insulam "Tahiti."

176. Cardisoma hirtipes, Dana; loc. cit. i. 376, pl. xxiv. f. 2.—Ad insulam "Loo Choo"; palustris.

Bosciadæ.

177. Potamocarcinus armatus, M. Edwards; Arch. du Mus. vii. 174. pl. xiii. f. 3.—In lacu "Nicaragua."

Thelphusidæ.

Geothelphusa, nov. gen. *Thelphusæ* affinis, crista post-frontali obsoleta, margine antero-laterali integro. Species terrestres.

178. GEOTHELPHUSA DEHAANI. *Thelphusa Berardi*, De Haan, loc. cit. 52, pl. vi. f. 2. *T. Dehaani*, White; Cat. Brit. Mus. 1847, p. 30; M. Edwards; Mel. Carcin. p. 178 (1852).—Ad insulas "Amakirrima."

179. GEOTHELPHUSA OBTUSIPES, nov. sp. Carapax antice declivis, lobulis pregastricis paullo prominentibus; postice planulatus; superficie confertim punctata. Sutura transversa mediana profunde impressa. Superficies posterolateralis transversim ruguloso-striata. Margo antero-lateralis cristata, crista denticulata vel tuberculata. Chelopoda mediocria carpo superne rugoso, intus bidentato, dente inferiore inconspicuo; manu sparsim tuberculata. Pedes ambulatorii graciles, articulo penultimo supra infraque spinuloso, dactylis usque ad extremitates dense spinulosis, quasi obtusis. ♀ Carapacis long. 0·722; lat. 0·915 poll. *G. Dehaani* sat affinis.

180. THELPHUSA PERLATA, M. Edwards; Hist. Nat. des Crust. ii. 13; Krauss; Sudafr. Crust. 37.—In rivulis prope vicum "Constantia," ad Promontorium Bonæ Spei.

181. PARATHELPHUSA SINENSIS, M. Edwards; Arch. du Mus. vii. 173, pl. xiii. f. 2.—Prope urbem "Canton" Sinensem; in aquis subsalinis fluvii.

GRAPSIDÆ.*

182. METOPOGRAPSUS THUKUHAR, M. Edwards; Mel. Carcin. p. 131. *Grapsus*

* Characteres subgenerum GRAPSI.

GONIOPSIS, De Haan, M. Edw. *Goniograpsi* pars, Dana. Latera recta, dente marginali uno post angulum orbitæ. Frons perpendicularis, dimidiam carapacis latitudinis superans. Lobus suborbitalis internus frontem attingens. Antennæ subfrontales. Hectognathopoda gracilia, mero longitudine ischium adæquante. Species palustres, in æstuariis habitantes. *G. cruentatus.*

METOPOGRAPSUS, M. Edwards. *Grapsi* pars, De Haan; *Pachygrapsi* pars, Randall; *Goniograpsi* pars, Dana. Latera recta, dente uno vel nullo post angulum orbitæ. Frons valde deflexa, dimidiam carapacis latitudinis superans. Lobus suborbitalis internus brevis, latus, frontem fere attingens. Antennæ subfrontales, articuli basalis angulo externo vix producto. Hectognathopodorum merus brevis, multo latior quam longus. Littorales, in locis lapidosis portuum protectorum habitantes. *G. thukuhar, messor, oceanicus,* etc.

PACHYGRAPSUS, Randall, restrictum. *Grapsi* pars, De Haan; *Goniograpsi* pars, Dana; *Leptograpsi* pars, M. Edwards. Carapax postice subangustatus, lateribus pœne rectis, dentibus duobus, uno, vel nullo, post angulum orbitæ. Frons dimidia carapacis non angustior, modice deflexa. Lobus suborbitalis internus parvus, dentiformis, frontem non attingens; hiatu lato. Antennæ laterales, articuli basalis angulo externo valde producto, apicem lobi suborbitalis attingente v. superante. Hectognathopoda latiora, mero quam ischio multo breviore. Littorales, inter lapides habitantes.
G. marmoratus, crassipes, plicatus, etc.

LEPTOGRAPSUS, M. Edwards, restrictum. *Grapsi* pars, Dana. Latera arcuata, dentibus duobus post angulum orbitæ. Frons dimidia carapacis latitudinis angustior, vix deflexa. Lobus suborbitalis internus parvulus, dentiformis, frontem non attingens; hiatu lato. Antennæ laterales, articuli basalis angulo externo producto sed apicem lobi suborbitalis non attigente. Hectognathopodorum merus æque longus ac latus, quam ischio brevior. Littorales, rupicolæ ad oras oceanicas. *G. variegatus, planifrons,* etc.

GRAPSUS, Lamarck, restrictum. *Goniopsidis* pars, De Haan. Latera arcuata, dente uno post angulum orbitæ. Frons dimidia carapacis latitudinis angustior, valde deflexa. Lobus suborbitalis internus elongatus, subspiniformis, fronti non junctus. Antennæ in rimis inter frontem et lobum jacentes; articuli basalis angulo externo parum producto. Hectognathopoda gracilia, mero oblongo. Littorales, rupicolæ ad oras oceanicas. *G. pictus, strigosus,* etc.

GEOGRAPSUS, nov. gen. *Grapsi* pars, M. Edwards, Dana; *Goniopsidis* pars, De Haan. Latera antice convexa, postice recta; dente uno post angulum orbitæ. Frons dimidia carapacis latitudinis angustior, et valde deflexa. Lobus suborbitalis internus sat grandis, dentiformis, frontem attingens. Antennæ breves, articuli basalis angulo externo non producto. Hectognathopoda gracilia, mero quam ischio vix breviore. Pulvinuli ad bases pedum ambulatoriorum medianorum validi. Species terrestres, sepius prope ripas rivulorum habitantes.
G. lividus, crinipes, etc.

NAUTILOGRAPSUS, M. Edwards. *Planes*, Bell, Dana. Carapax angustus, lateribus parce *thukuhar*, Owen; Zool. Beechey's Voy. 80, pl. xxiv. f. 3.—Ad insulas "Bonin," "Hawaii" et "Tahiti"; littoralis, in portubus protectis.

183. METOPOGRAPSUS QUADRIDENTATUS, nov. sp. Carapax quadrangulus, postice sat angustatus, lævis, glaber, antice et lateraliter modice striatus. Lobulæ pregastricæ minus prominentes. Regio frontalis concava, lævis; fronte lata modice deflexa, margine undulato, acute crenulato. Margo lateralis dente uno, acutissimo, post angulum orbitæ. Chelopodorum meri margo internus dentibus 3—4 parvis tuberculiformibus prope basim, et dentibus quatuor acutis ad angulum anticum armatus, dente externo compresso valde prominente; margo exterior convexus; carpus superne subsquamosus, angulo interno compresso 2–3 dentato; manus superne intus infraque obsolete tuberculosa, extus lævis. Pedes ambulatorii sparsim hirsuti, meri spinis v. dentibus terminalibus validis. ♂ Carapacis long. 0.74; lat. 0.90 poll. *M. oceanico* affinis, differt carapace manibusque levioribus.

Hab.—In freto "Cum-sing-moon" prope "Hong Kong"; littoralis.

184. PACHYGRAPSUS MARMORATUS. *Cancer marmoratus*, Fabr. *Grapsus varius*, Latr. *Leptograpsus marmoratus*, M. Edwards; Mel. Carcin. 137.—Ad insulam Madeiræ.

185. PACHYGRAPSUS CRASSIPES, Randall; Jour. Acad. Nat. Sci. Philad. viii. 127.—In portu "Simoda," Japoniæ, et ad oras Californiæ.

186. PACHYGRAPSUS SIMPLEX. *Goniograpsus simplex*, Dana; loc. cit. i. 344, pl. xxi. f. 8.—Madeira.

187. PACHYGRAPSUS INNOTATUS. *Goniograpsus innotatus*, Dana; loc. cit. i. 345, pl. xxi. f. 9.—Ad insulam Madeiræ; littoralis inter rupes.

188. PACHYGRAPSUS LÆVIMANUS, nov. sp. *P. innotato rugulosoque* affinis sed carapace angustiore, læviore; carpo pæne lævi, manûs crista extero-inferiore obsoleta. Antennæ articulus basalis latior; hiatu interno orbitæ majore. Carapax transverse confertim nigro-lineatus et maculatus. ♂ Carapacis long. 0.54; lat. 0.65 poll.

Hab.—In portu "Jacksoni" vel "Sydney" Australiæ; inter lapides.

189. PACHYGRAPSUS PLICATUS. *Grapsus plicatus*, M. Edwards; Hist. Nat. des Crust. ii. 89.—Ad insulam "Loo Choo."

190. LEPTOGRAPSUS VARIEGATUS, M. Edwards; Mel. Carcin. 137. *Grapsus variegatus*, Latr.—In portu Jacksoni Australiensi.

191. GRAPSUS RUDIS, M. Edwards; Hist. Nat. des Crust. ii. 87. *G. hirtus*, Randall.—Ad insulas "Bonin."

192. GRAPSUS STRIGOSUS, Latreille; M. Edwards; Hist. Nat. des Crust. ii. 87; Mel. Carcin. p. 135.—In freto "Gaspar;" in portu "Hong Kong"; et ad insulam "Loo Choo."

193. GRAPSUS WEBBI, M. Edwards; Mel. Carcin. p. 133. *G. strigosus*, Brullé. —Ad insulas "Madeira" et "Cape de Verdes."

194. GRAPSUS LONGIPES, nov. sp. *G. strigoso* valde affinis, sed pedibus ambulatoriis gracilioribus, quam latitudine carapacis plus duplo longiores. A *G. longitarsis* differt fronte magis dilata, regione gastrica minus tuberculata, dactylis magis spinulosis. ♂ Carapacis long. 1.22; lat. 1.34 poll.

Hab.—In portu "Hong Kong," et ad insulam "Kikaisima."

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convexis, dente uno rudimentari post angulum orbitæ. Frons dimidia carapacis latior, vix deflexa. Lobus suborbitalis internus parvulus, frontem non attingens,—hiatu perlato. Antennulæ grandes. Hectognathopoda sat lata, mero latiore quam longo. Pedes postici compressi. Pelagicæ inter algas natantes habitantes.

G. minutus, cyaneus, etc.

195. Grapsus subquadratus, nov. sp. *G. strigoso* affinis. Carapax subquadratus, antice latus, lateribus minus arcuatis; striis transversis branchialibus validis, extensis, in media parte angusta carapacis solum interruptis. Regio gastrica antice valde tuberculata, tuberculis numerosis subcristiformibus. Frons brevis, partim tuberculata, margine crenulata. Carpi spina interna longa gracilis acuta. Pedes ambulatorii quam latitudo carapacis accurate duplo longiores; meri spinis validis; dactylis longioribus. ♀ Carapax long. 1·11; lat. 1·26 poll. In frontis dactylorumque characteribus *G. longitarsis* affinis, sed striis branchialibus longioribus.

Hab.—Ad insulas Hawaienses.

196. Geograpsus rubidus, nov. sp. *G. crinipede* affinis, dactylis longis; sed lateribus convexis, et striis infernis manûs validioribus et minus numerosis. ♂ Carapacis long. 1·12; lat. 1·31 poll.

Hab.—Ad insulas "Bonin"; inter folia putrida et sub lapidibus prope rivulo montano.

197. Nautilograpsus minutus, M. Edwards; Hist. Nat. des Crust. ii. 90. *Cancer minutus*, Linné. *Grapsus cinereus*, Say. *Planes minutus*, Dana.—In mari Atlantico boreali; vulgaris in *Sargasso.*

198. Nautilograpsus angustatus, nov. sp. Carapax angustus, glaber; lateribus parallelis; regione branchiali leviter striata; lobulis gastricis paulo distinctis; regione frontali parce concava. Frons valde prominens, margine leviter sinuato. Margo lateralis fere rectus, antice acutus, postice obtusus, dente uno parvulo post angulum orbitæ. Pedes ambulatorii compressi, non latissimi. A *N. minuto, cyaneoque* diversa, carapace angustiore, superficie minus æquali. A *N. pusillo*, carapace angustiore et dente laterali minus prominente. ☿ Jun. (?) carapacis long. 0·24; lat. 0·21 poll.

Hab.—In mari Pacifico, lat. bor. 34°, long. occ. 155°.

199. Plagusia tomentosa, M. Edwards; Hist. Nat. des Crust. ii. 92.—Ad Promontorium Bonæ Spei, in sinu "Simon's Bay."

200. Plagusia dentipes, De Haan; loc. cit. p. 58, pl. viii. f. 1.—In portu "Simoda."

201. Plagusia squamosa, Dana; loc. cit. i. 268. *Cancer squamosus*, Herbst. —Ad insulam Madeiræ.

202. Plagusia orientalis. *P. squamosus*, M. Edwards; Mel. Carcin. p. 144. —Prope portum "Hong Kong"; et ad insulas Hawaienses.

203. Plagusia depressa, Latreille; M. Edwards; Hist. Nat. des Crust. ii. 93, Dana; loc. cit. i. 369. *Cancer depressus*, Fab.—In freto "Gaspar" vulgaris; etiam in portu "Hong Kong," ad insulas "Loo Choo" et "Tomboro" vel "New Ireland."

204. Acanthopus planissimus, Dana; loc. cit. i. 137. *Cancer planissimus*, Herbst. *Plagusia clavimana*, Desm., M. Edwards.—Ad insulas "Madeira" in mari Atlantico, et "Bonin" et "Hawaii" in mari Pacifico.

205. Varuna litterata, M. Edwards; Dict. class. d'Hist. Nat. xvi. 511. (1830.) *Cancer litteratus*, Fabr.; Herbst; loc. cit. ii. 58, pl. xlviii. f. 4. *Trichopus litteratus*, De Haan, 1835; Dana; l. c. i. 336.—Prope urbem "Canton" Sinensem; in æstuarium natans; etiam in freto "Gaspar," et ad insulam "Loo Choo."

206. Eriochirus Japonicus, De Haan; loc. cit. 59, pl. xvii. M. Edwards: Mel. Carcin. 142.—In sinu "Hakodadi" insulæ "Jesso" Japoniæ; in æstuariis.

207. Eriochirus rectus, nov. sp. Carapax depressus, antice angustatus; superficie subinæquali, lævi, confertim punctata. Lobulæ epigastricæ parum prominentes. Frontis margo undulatus, obscure quadrilobatus, sinu mediano

lævi. Margines laterales pæne recti, convergentes, dentibus utrinque quatuor ut in *E. Japonico*, dente postico fere obsoleto. Manus extus dense lanosa; digitis valde sulcatis. Pedes ambulatorii sat graciles; mero superne ciliato; dactylis brevioribus minus curvatis. ♀ Carapacis long. 0.92; lat. maxima, 0.975 poll. *E. Japonico* affinis, sed lateribus non convexis, fronteque minus sinuata.

Hab.—In æstuario prope portum Sinensem "Macao."

208. Heterograpsus penicillatus. *Eriocheir penicillatus*, De Haan; loc. cit. 60; pl. xi. f. 6.—In sinu prope "Hong Kong"; littoralis, sub lapidibus in arenis. In portu "Simoda" Japoniæ; vulgatissimus in æstuario limoso, inter lapides.

209. Heterograpsus Oregonensis. *Pseudograpsus Oregonensis*, Dana; loc. cit. i. 334, pl. xx. f. 6.—In portu "San Francisco."

210. Heterograpsus sanguineus, M. Edwards; Mel. Carcin. 159. *Grapsus sanguineus*, De Haan; loc. cit. 58, pl. xvi. f. 3.—Ad oras freti "Tsugar" Japoniæ; etiam prope portum "Hong Kong"; oceanico-littoralis, inter lapides.

211. Heterograpsus nudus. *Pseudograpsus nudus*, Dana; loc. cit. i. 335, pl. xx. f. 7. *Heterograpsus marmoratus*, M. Edwards; Mel. Carcin. 159.—In portu "San Francisco."

212. Pseudograpsus albus, nov. sp. Parvulus. Carapax valde planatus, lævis, glaber, lobulis epigastricis distinctis; regione cardiaca postica circumscripta; fronte lata, depressa, fere horizontali, sat prominente, margine incrassato, recto vel paullo convexo. Margo antero-lateralis post angulum orbitæ leviter bi-emarginatus. Hectognathopodorum meri angulo externo dilatato, rotundato. Chelopoda brevia, lævia, glabra; carpo intus acuto; manu inter bases digitorum lanosa. Pedes ambulatorii depressi læves, versus extremitates subtus subpilosi; dactylis sulcatis, minuentibus. Abdomen maris sat angustum, minuens, articulo penultimo subpentagono; articulo ultimo oblongo. Color albus, sparsim punctatus. ♂ Carapacis long. 0·27; lat. 0·282 poll.

Hab.—In portu insulæ "Kikaisima"; littoralis in sabulis.

213. Platygrapsus depressus. *Platynotus depressus*, De Haan; loc. cit. 63, pl. viii. f. 2. M. Edwards; Mel. Carcin. 165. (Nomen "Platynotus" præoccupatum est.)—Vulgaris ad oras Japonicas et Sinenses; in portu "Hakodadi," "Simoda" et "Kagosima"; ad insulas "Bonin," "Kikaisima," "Ousima" et "Loo Choo"; etiam in portu "Hong Kong." Species marina, (non fluviatilis,) littoralis in sabulis.

214. Platygrapsus convexiusculus, nov. sp. *P. depresso* valde affinis, carapace latiore, minus depresso, superficie partim inæquali, glabra, lobulis gastricis prominulis. Frons latior, magis declivis, minus prominens, sinu mediano latiore. Dens lateralis secundus acutus, magis prominens, a primo bene separatus; margo infra-orbitalis crasse crenulatus. ♂ Carapacis long. 0·42; lat. 0.51 poll.

Hab.—Ad insulam "Loo Choo."

Ptychognathus, nov gen. *Platygrapso*, *Pseudograpsoque* affinis. Carapax planus, fronte horizontali continua, margine antero-laterali acuto, emarginato. Hectognathopoda latissima, postice angustata, crista nulla; exognatho amplissimo, quam ischio non angustior; mero quam ischio breviore sed duplo latiore, commisura transversa; auriculo ad angulum meri antero-externum grandissimo, quam corpore articuli vix minore; palpo prosarthroideo. Pedes ut in *Pseudograpso*, etc.; manu non pilifera. Sterni articulus ultimus multo expositus. Abdomen *maris* sat angustum; *fœminæ* articulo ultimo libero.

215. Ptychognathus glaber, nov. sp. Carapax exacte planus, nulla parte declivi, lateribus postero-lateralibus exceptis; superficie lævi, punctata; sutura mediana H-formi profunde impressa; lobulis gastricis obsoletis. Frons lata, margine paullo undulato, canaliculato. Margo antero-lateralis post angulum

orbitæ emarginatus. Lobus suborbitalis externus obsoletus. Margo infra-orbitalis obscure crenulatus. Hectognathopodorum exognathus lævis ; ischium merumque interdum pubescentes. Chelopoda grandia, lævia ; meri marginibus ciliatis ; carpo intus obtuso ; manu lata minus convexa, intus lævi, digitis sat hiantibus, intus denticulatis. Pedes ambulatorii sparsim hirsuti, versus extremitates tomentosi ; dactylis robustis, sulcatis. Color niger. ♂ Carapacis long. 0·56 ; lat. 0·68 poll.

Hab.—In portu "Lloyd" ad insulas "Bonin;" littorales, in ripis æstuariorum sabulosis fossores.

ACMÆOPLEURA nov. gen. Carapax, orbitæ, antennæque, iis *Cyclograpsi* similes, marginibus lateralibus integris. Orbitæ inferne fere completæ. Hectognathopoda fere ut in *Heterograpso*, mero subquadrato ischio longitudine pæne adequante ; lateribus rectis ; palpo prosarthroideo ; exognatho angusto. Manus inter bases digitorum lanosa.

216. ACMÆOPLEURA PARVULA, nov. sp. Carapax planatus, ad angulos antero-laterales latior, lævis ; antice declivis, subtiliter rugosa ; sulco mediano gastrico distincto. Frons sat prominens, margine paullo convexo. Margo antero-lateralis acutus. Margo infra-orbitalis 3-4-lobatus, lobis lævibus. Chelopoda æqualia, extus lævia ; manu intus 3-4-tuberculata, extus lanosa inter bases digitorum. Pedes ambulatorii graciles setosi ; setis brevibus seriatis. Abdomen maris minuens, articulo peuultimo pentagono. Color pallide ruber ; chelopoda nitida. ♂ Carapacis long. 0·19 ; lat. 0·21 poll.

Hab.—Ad insulam "Ousima" ; oceanico-littoralis inter lapillos.

217. CYCLOGRAPSUS LONGIPES, nov. sp. Carapax subtrapezoides, antice multo angustatus, superne planatus, lævis, glaber, ad margines anteriores paullo rugulosus ; lobulis epigastricis sat distinctis. Orbitæ infra pæne completæ ut in *C. integro*. Margo infra-orbitalis extus 3-4-lobatus. Hectognathopodorum crista obliqua in ischio submarginalis. Chelopoda brevia, manu inflata, intus lævi. Pedes ambulatorii valde graciles, carapace plus duplo longiores ; mero transversim ruguloso ; articulo penultimo dactyloque setosis ; dactylo longo, cylindrico, vix minuente, sulcato. Abdomen maris angustius, sed minus quam in *C. punctato* minuens. ♂ Carapacis long. 0·28 ; lat. maxima, 0·34 ; pedum amb. 2di paris long. 0·63 poll.

Hab.—In portu "Lloyd" ad insulas "Bonin" ; in sabulis coraliorum, ad prof. 1 org.

218. CYCLOGRAPSUS PUNCTATUS, M. Edwards ; Hist. Nat. des Crust. ii. 78. *Gnathochasmus barbatus,* Mac Leay.—In sinu "Simon's Bay" Promontorii Bonæ Spei ; et in portu "Hong Kong" Sinensi : ad litora sabulosa et lapidosa.

219. CYCLOGRAPSUS ANDOUINI, M. Edwards ; Hist. Nat. Crust. ii. 78 ; Mel. Carcin. 163.—In portu Jacksoni Australiæ.

220. CHASMAGNATHUS CONVEXUS, De Haan ; loc. cit. 56, pl. viii. f. 5.—Ad insulam "Loo Choo" ; palustris.

221. HELICE TRIDENS, De Haan ; loc. cit. 57, pl. xi. f. 2, et pl. xv. f. 6. —In portu "Simoda" et ad insulas "Ousima" et "Loo Choo" ; in aquis marinis æstuariorum.

222. SESARMA INTERMEDIA, M. Edwards ; Mel. Carcin. 162. *Pachysoma intermedium,* De Haan ; loc. cit. 61, pl. xvi. f. 5.—In portubus "Simoda" et "Hong Kong," etiam ad insulam "Ousima" ; in aquis dulcibus fossarum, in pratis oryzæ.

223. SESARMA SINENSIS, M. Edwards ; Mel. Carcin. p. 152.—In portu "Hong Kong."

224. SESARMA BIDENS, Dana ; loc. cit. i. 353 ; M. Edwards ; Mel. Carcin. 161. *Pachysoma bidens,* De Haan ; loc. cit. 60, pl. xvi, f. 4 et pl. xi. f. 4.—In portu "Simoda."

225. Sesarma Dehaani, M. Edwards; Mel. Carcin. 150. *Pachysoma quadratum*, De Haan; loc. cit. 62, pl. viii. f. 3.—Ad insulas "Bonin" et in portubus "Simoda" et "Hong Kong"; in æstuariis; interdum in aquis dulcibus.

226. Sesarma picta, M. Edwards; Mel. Carcin. 150. *Pachysoma pictum*, De Haan; loc. cit. 61, pl. xvi. f. 6.—Ad insulam "Ousima."

227. Sesarma rupicola, nov. sp. Carapax quadratus, multo longior quam latus, depressus; superficie valde inæquali, antice rugulosa; lobulis epigastricis validis, medianis ad apices quasi paulo erosis. Regio frontalis partim tuberculata; margine frontali undulato. Margo lateralis rectus, integer, interdum obsolete 2-3-dentatus, deutibus superne non conspicuis. Chelopoda fœminæ mediocria, mero dente acuto ad apicem marginis interni armato; carpo superne ruguloso; manu extus partim lævi, intus granulis sparsis ornata; palma superne cristis 3-4 granulatis obliquis pæne longitudinalibus non pectinatis ornata, et dente parvulo acuto serrato ad basim dactyli; dactylo superne longitudinaliter costato, costis medianis granulatis. Pedes ambulatorii sat longi, setis brevibus rigidulis modice præditi; mero paullo dilatato. Carapax niger, maculis parvis subcœruleis dispersis. ♀ Carapacis long. 0.78; lat. 0·92 poll. *S. affini*, *quadratæ* que affinis, mero pedum posticorum minus dilatato. Differt a *S. picta* manu supra non pectinigera, intus non oristata, dactyloque non plicato.

Hab.—Ad insulam "Ousima"; inter rupes ad litora maris.

228. Sesarma angustipes, Dana; loc. cit. i. 353; pl. xxii. f. 7.—Ad oras orientales Americæ Centralis, prope urbem "Greytown"; littoralis.

229. Sesarma vestita, nov. sp. Depressa. Corpus pedesque superne pilosa, setis transversim subseriatis, sordidis. Carapax quadratus, paulo inæqualis, lævis, ad angulos orbitales valde prominentes acutos, latior. Lobulæ epigastricæ convexæ, læves; medianæ majores. Latera subconcava rotundata integra, crista lævi marginali. Frons brevis, inæqualis, glabra, margine undulato. Hectognathopoda parva. Chelopoda maris parva; meri margine interno lævi, angulo anteriore prominente vix denticulato; carpo fere lævi; manu parva, palma superne cristis 2-3 lævibus fere transversis ornato, crista prope basim dactyli validiore; digitis extus lævibus; dactyli margine superiore acuto. Pedes ambulatorii mediocris longitudinis; mero magno dilatato, superficie subscabrosa, angulis infero-externis rotundatis, denticulatis; articulis reliquis gracilibus; dactylis gracillimis, lævibus, prope apices acutos paulo curvatis. ♀ Carapacis long. 0·29; lat. 0·30 poll.

Hab.—Ad insulas "Ousima" et "Kikaisima"; littoralis, in sinubus sabulosis.

230. Holometopus hæmatocheir, M. Edwards; Mel. Carcin. 154. *Pachysoma hæmatocheir*, De Haan; loc. cit. 67, pl. vii. f. 4.—In portubus "Simoda" et "Hong Kong"; ad insulam "Ousima" quoque.

Camptandriidæ.

Camptandrium, nov. gen. Carapax subhexagonus. Regio faciei carapace per tertiam latitudinis partem angustior. Frons quartam partem carapacis latitudinis vix superans; margine in plano perpendiculari valide undulato. Margo antero-lateralis obliquus, rectus v. parce concavus, tridentatus, dentibus parvis, dente postico prominente, lateraliter porrecto. Margo postero-lateralis convexus. Margo posterior regionem faciei longitudine subæquans. Superficies inæqualis; costis transversis interruptis tribus æquidistantibus in maribus, vix distinctis in fœminis; regione gastrica parvula, lobulis epigastricis medianis sat prominentibus; regione hepatica ampla; regione genitali cardiacaque latissimis. Oculi longiusculi; orbitis transversis, sat completis, sinu extero-inferiore magno; lobo suborbitali interno parvo, dentiformi, frontem non attingente; marginibus suborbitali et infra-orbitali approximatis, ultra angulum externum orbitæ non productis. Antennulæ obliquæ, fossis profundis. Antennæ breves; articulo basali parvulo rotundato; articulo tertio in hiatu orbitæ interno jacente. Epistoma mediocre. Regiones antero-inferiores læves. Margo anterior areæ buccalis profunde undulatus; septo mediano prominente. Palatum breve, læve. Hectognathopoda brevia, sat lata, lævia, quadrata, non hiantia; exognatho palpigero, non dentigero, semicelato, prope ischium solum exposito; endognatho non sulcato, lateribus internis rectis; ischio quadrato; mero ischium longitudine adæquante, multo latiore quam longo, ad angulum externum late auriculato, auricula rotundata, antrorsum porrecta; palpo prosarthroideo, in sinu inserto. Chelopoda debilia, inermia, fœminæ digitis iis fœminæ *Gelasimi* similibus. Pedes ambulatorii graciles, inermes, ad bases pubescentes; mero costa laterali ad marginem superum parallela ornato; dactylis gracilibus, oblique compressis, breviter ciliatis. Sternum latum, margine anteriore prominente, laminiformi, arcuato; articulo ultimo utrinque multo exposito. Abdomen maris ad basim non dilatatum, paullo minuens, prope medium valde constrictum v. sinuatum, articulo ultimo ad basim quam penultimo non angustiore. Appendices abdominis maris primi paris graciles, geniculatæ, versus extremitates contortæ, papillam prope geniculum gerentes; secundi paris minutæ, graciles. Abdomen fœminæ latum, sternum totum tegens angulis postero-lateralibus exceptis; articulo ultimo lato, vix libero. Maricola.

231. Camptandrium sexdentatum, species unica. ♀ Carapacis long. 0·265; lat. 0·320 poll.

Hab.—In sinubus prope portum "Hong Kong" Sinensem; in fundis limosis ad prof. 6 org.

Asthenognathidæ.

Asthenognathus, nov. gen. Formâ *Pinnixiam* fere simulans. *Fœminæ* carapax transversus, postice perlatus, antice subtruncatus, angulis rotundatis, marginibus integris, superficie lævissima, subtillissime granulata. Regio faciei dimidiam carapacis latitudinis adequans. Frons deflexa, mediocris. Oculi parvuli mobiles, pedunculis crassis, orbitis non profundis. Lobus suborbitalis internus fere obsoletus. Crista infra-orbitalis sat remota, prominens, lævis. Antennulæ transversæ, in fossis profundis. Antennæ sat longæ, gracillimæ, hiatum internum orbitæ occupantes. Epistoma mediocre. Palatum læve, septo mediano nullo. Area buccalis mediocris, antice arcuatus. Hectognathopoda debilia, gracilia, valde remota; exognatho exposito; endognathi ischio quam mero majore; mero subquadrato, leviter sulcato; palpo exarthroideo magis quam prosarthroideo; dactylo minuto ciliato. Chelopoda parvula, mero superne prominentia mediana setigera instructo; manu leviter compressa, gracili, superne acuta, subtus crista marginata; digitis compressis acutis, sulcatis, palmam longitudine paullo superantibus, intus vix dentatis. Pedes ambulatorii 2di 3tiique paris crassissimi; iis *Pinnixiæ* fere similes; quarti paris graciles merum præcedentium vix superantes. Sternum latum, abdomine tectum, marginibus et angulis postero-lateralibus exceptis. Abdominis articulus ultimus parvulus, rhomboidalis.

232. Asthenognathus inæquipes, species unica. ♀ Carapacis long. 0·270; lat. 0·375 poll.

Hab.—Prope oras orientales insulæ "Niphon"; lat. bor. 38°; in fundo arenoso prof. 30 org.

Xenophthalmidæ.

233. Xenophthalmus pinnotheroides, White; Ann. and Mag. Nat. Hist. xviii. 177; Voy. Samarang, Crust. 63, pl. xii. f. 3. M. Edwards; Mel. Carcin. p. 187. Antennulæ minutæ. Antennæ robustæ. Oculi minuti, mobiles, longitudinales in rimis profundis; pigmento nullo (?). Epistoma nullum distinctum. Hectognathopoda sulcata, ischio merum longitudine adequante; palpo spiraliter semitorto, articulis ultimis iis *Pinnotheræ* similibus. Chelopoda maris debilia. Abdomen maris oblongum, ad basin non dilatatum, ad articulum quintum paullo constrictum, extremitate obtusa.

Hab.—In portu "Hong Kong"; in fundo argillaceo prof. 6 org.

PINNOTHERIDÆ.

234. PINNOTHERES OBSCURUS, nov. sp. Carapax latus subtrapezoides, angulis rotundatis. Regio hepatica paullo depressa. Frons parce prominens, valde deflexa, subtus truncata. Hectognathopoda mediocria, mero valde obliquo, curvato, superficie glabra, margine interno antice ciliato; palpo minuto, piloso, angulum internum meri non superante; carpo crasso; dactylo cylindrico, gracili, cum articulo penultimo ultra medium juncto et ejus extremitatem multo superante. Pedes ambulatorii fere aquales, tertii et ultimi paris parce longiores; dactylis primi secundique paris brevibus; tertii paris longis, curvatis; ultimi paris quam articulo penultimo non brevioribus, fere rectis, styliformibus, gracillimis, minuentibus, ciliatis. Color obscure fuscus. ♀ Carapacis long. 0·33; lat. 0·45 poll.

Hub.—In portu "Hong Kong."

235. PINNOTHERES BONINENSIS, nov. sp. Carapax sat latus, antice subtruncatus, nudus: fronte non prominente. Hectognathopoda setosa, setis plumosis; palpo brevi; articuli penultimi extremitate fere acuto; dactylo minuto, cum art. penultimo ad medium juncto et ejus extremitatem non superante. Pedes ambulatorii tertii paris longiores; dactylis fere ut in *P. obscuro;* tertii paris longioribus, acutissimis. ♀ Carapacis long. 0·168; lat. postice, 0·211 poll.

Hab.—Ad insulas "Bonin"; in ostreis.

236. PINNOTHERES PARVULUS, nov. sp. *P. piso* affinis, carapace angustiore. Hectognathopoda sat pilosa, articulo penultimo quam præcedente duplo longiore, dactylo gracili, extremitatem art. penultimi non superante. Pedes ambulatorii versus extremitates paullo pilosi; tertii quartique paris longiores et dactylis longioribus. ♀ Carapacis long. 0·14 poll.

Hab.—In mari Sinensi, lat. bor. 23°; in *meroe quadrata* e fundo sabuloso, prof. 26 org.

237. PINNIXIA TUMIDA, nov. sp. Corpus transversim cylindricum. Carapax valde turgidus, superficie lævi, cristis nullis; medio leviter depresso. Frons angusta. Hectognathopoda apta, palpo grande; dactylo cum basi art. penultimi juncto, et ejus extremitatem parum superante; articulis utrisque dense ciliatis. Chelopoda fœminæ sat valida; mero carpoque intus dense pilosis; manu extus lævi; digitis hiantibus; dactylo obliquo, intus dente uno, mediano; digiti immobilis margine serrulato, dente uno subterminali. Pedes ambulatorii pilosi, tertii paris longiores; primi secundique paris graciles; tertii quartique paris robusti; dactylis gracilibus, 5–6-carinatis. Color nigrescens. ♀ Carapacis long. 0·30; lat. 0·55 poll.

Hab.—In portu "Hakodadi" insulæ Jesso; ad littora arenosa in latebris *Caudinæ* speciei.

238. PINNIXIA PENULTIPEDALIS, nov. sp. Corpus depressiusculum. Carapax glaber, crista posteriore paullo prominente, obtusa, totam latitudinem carapacis transiente. Frons non deflexa. Chelopoda pilosa; manu parva, gracili, minuente; digitis rectis, non deflexis, gracilibus, non hiantibus. Pedes ambulatorii secundi paris quam primi paris vix majores; mero piloso; reliquis nudis; penultimi paris portentosæ magnitudinis valde, crassi, mero per quintam partem longiore quam lato, superne acuto, subtus partim granulato; pedes ultimi paris parvuli, ciliati. Abdomen fœminæ linea transversa ciliata ad articulum secundum ornatum. ♀ Carapacis long. 0·132; lat. 0·28 poll.

Hab.—In portu "Hong Kong"; e fundo luteo conchosoque ad prof. 10 org.

HYMENOSOMIDÆ.

239. HYMENOSOMA ORBICULARE, Leach; Desm.; Consid. sur les Crust. 163. pl. xxvi. f. 1. M. Edwards; Hist. Nat. des Crust. ii. 36.—In portu "Simon's Bay" ad Promontorium Bonæ Spei; in fundo arenoso; prof. 10 org. vulgaris.

240. HYMENOSOMA GEOMETRICUM, nov. sp. *H. orbiculari* sat affine, sed hectognathopodorum ischio multo graciliore, quam mero vix breviore. Regio

hepatica dente v. spina laterali acuta, parva, post angulum orbitæ. ♂ Carapacis long. 0·318; lat. ad bases pedum amb. primi paris, 0·318 poll.

Hab.—In portu "Simon's Bay" cum præcedente.

241. Halicarcinus ovatus, nov. sp. Carapax subovatus, æque longus ac latus, antice angustatus; superficie superne lævi, in maribus planulata, in fœminis paullo convexa. Regiones sat distinctæ, sulcis linearibus. Margo lateralis bi-angulatus, angulo utroque dente minuto acuto gerente. Frons prominens, tridentata, dentibus depressis æqualibus profunde separatis, approximatis; margine supra-frontali non elevato, recto. Antennulæ grandes. Epistoma sat amplum. Area buccalis mediocris magnitudinis, antice completa; hectognathopodis turgidulis. Chelopoda maris subclavata, lævia, intus sparsim hirsuta; meri apice dentigero; manûs palma tumida rotundata, digitis gracilioribus intus serratis. Pedes ambulatorii longi (2di paris quam carapace plus duplo longiores,) graciles, nudi; mero dente parvulo acuto ad apicem; dactylis e basi gracilibus, falciformibus. Abdomen maris prope extremitatem contractum, articulo ultimo subcordato, obtuso. ♂ Carapacis long. 0·251; lat. 0·252 poll.

Hab.—In portu Jacksoni Australiæ.

242. Trigonoplax truncatus, nov. sp. Corpus tenellum. Carapax orbiculato-ovatus, lævis, planatus v. parce convexus. Regiones vix distinctæ. Margo lateralis 2–3-angulatus, angulis æquidistantibus parum conspicuis, raro dentigeris. Margo posterior rectus v. paullo convexus. Margines acuti, valde prominentes, antice oculos, antennæ, antennulas, basesque pedum celans. Frons late truncata. Septum interantennularium validum. Antennulæ parvæ. Area buccalis in fœminis parvula. Hectognathopoda iis *T. unguiformis* similia. Chelopoda maris longa, lævia, rotundata; mero gracili; manu oblonga, turgida; digitis intus subexcavatis. Pedes ambulatorii graciles, læves, nudi; meri carpique apice dentigero; dactylis compressis bene falciformibus. Abdomen maris elongato-triangulare. Color purpureus; postice albo-quadrimaculatus. ♂ Carapacis long. 0·21; lat. 0·225; ♀ carapacis lat. 0·362 poll.

Hab.—Ad insulas "Ousima" et "Loo Choo"; sublittoralis in rupium fissuris.

Rhynchoplax, nov. gen. *Trigonoplaci* affinis. Corpus triangulatum, minus depressum. Margo lateralis bidentatus. Rostrum ad basim submarginale, tridentatum; dente mediano valido, elongato, sursum flexo; dentibus lateralibus minutis, acutis. Antennulæ majores, approximati, septo non separatæ. Oculi non retractiles. Spina extraorbitalis parvula. Regio subhepatica acute prominens. Epistoma magnum. Hectognathopodorum ischium quam merus vix major. Chelopoda maris valida, quam pedes ambulatorii vix breviora. Pedes ambulatorii primi paris longiores; dactylis totis falciformibus valde curvatis. Abdomen maris oblongum, versus extremitatem leviter contractum.

243. Rhynchoplax messor, nov. sp. Corpus sat induratum. Carapax triangulatus, paullo convexus; superficie paullo inæquali, lævi, setis paucis sparsis; regionibus gastrica cardiacaque paullo prominentibus, branchialibus sæpius depressis. Dentes laterales parvuli, sed acute-prominentes. Rostri dens medianus spatulatus, oblique porrectus, quintam carapacis longitudinis partem adequans. Chelopoda clavæformia, sparsim setosa; mero superne 4–5-dentato; carpo superne dentibus v. tuberculis 3–4 parvis obtusis armato; manu rotundata, superne dente parvulo uno, mediano armata, intus ad bases digitorum lanosa. Pedes ambulatorii graciles, articulis totis (dactylis exceptis) superne bi-dentatis, dente uno mediano, altero terminali; dactylis valide falciformibus, longitudine mediocribus. ♂ Carapacis long. 0·241; lat. 0·22; chelop. long. 0·42; pedum amb. primi paris, 0·455 poll.

Hab.—In portu "Simoda" Japoniæ.

244. Rhynchoplax setirostris, nov. sp. Corpus tenellum. Carapax ovatus, depressus, fere lævis, sparsim et inconspicue setosus; regionibus medianis sat distinctis, sulcis linearibus. Margo lateralis cristata; dente postico spiniformi, antico vix prominente. Frontis margo superior distinctus. Rostri dens

medianus styliformis, gracilis, setosus; dentes laterales acuti. Chelopoda fœminæ gracilia; mero ad apicem dentigero; manu gracili; digitis palmam longitudine adæquantibus. Pedes ambulatorii gracillimi, fragiles, subtiliter setosi, ut in *R. messori* dentigeri, dentibus acutioribus; dactylis longioribus, gracillioribus, ultimi paris quam reliquis magis curvatis. ♀ Carapacis long. 0·19; lat. 0·175 poll.

Hab.—In portu "Hong Kong."

Contributions to Helminthology.

BY JOSEPH LEIDY, M. D.

COTYLASPIS, Leidy.

Body curved infundibuliform, anteriorly cylindro-conical, posteriorly expanding into a subcircular or oval ventral disk with numerous acetabula arranged in a triple series. Month infero-terminal, with a prominent upper lip, and protractile into a cup- or disk-like acetabulum. Intestinal apparatus as in *Aspidogaster*. Eyes two, distinct, black, situated on each side of the head. Generative apertures inferior, between the head and ventral disk.

COTYLASPIS INSIGNIS, Leidy. Proc. Nat. Sc. 1857, 18.

Translucent white or pink white. Upper lip snout-like, conical. Ventral disk crenate at the margin; acetabula 29, oblong quadrate, the outer rows continuous in front and behind so as to form a circle. Length from $\frac{1}{2}$ to 1 line; ventral disk from $\frac{1}{4}$ to $\frac{1}{2}$ a line in diameter.

Habitation.—Found adhering to the outer surface of the renal organ, and the upper margin of the foot, within the cleft of the upper branchial cavity of *Anodonta fluviatilis* and *A. lacustris.*

Remarks.—This curious parasite, though allied to *Aspidogaster conchicola*, is certainly distinct; and it never occupies the locality of the latter, which also is found in the pericardium of *Anodonta fluviatilis* and *A. lacustris.* It is an interesting fact that in accordance with its exterior position *Cotylaspis* possesses well developed eyes, while the imprisoned *Aspidogaster* is blind. It has occurred to me that perhaps these two genera may represent two different stages of existence of the same animal.

RHOPALOCERCA TARDIGRADA, Diesing.

Attached to the mantle of *Anodonta fluviatilis;* specimens also obtained by Mr. Lea from *A. lacustr s.*

HETEROSTOMUM ECHINATUM, Filippi.

From oviduct of *Paludina decisa.* Quite common.

CERCARIA AGILIS, Leidy.

Body, when elongated, narrowed pyriform; when shortened, obcordate; posteriorly emarginate; anteriorly triangular. Mouth acetabuliform, large, globular. Acetabulum little larger than the mouth, nearly central in the shortened condition of the body, at the posterior third of the latter when elongated. Sporocerca as long as the body, long clavate, transversely plicated. Color white.

Exceedingly active; found in the Delaware river, quite commonly in company with *Planorbis*, *Paludina*, and *Lymnea.*

DIPLOSTOMUM GRANDE, Diesing.

Head oblong oval, a little oblique; margin entire, inflated. Mouth small, round. Male aperture small, round; female aperture large, prominent, longitudinally oval. Body conical. Ovaries dusky yellowish. Length 1 line; breadth $\frac{1}{4}$ line; head $\frac{3}{4}$ line long; body $\frac{1}{4}$ line long.

Twenty specimens were obtained from the intestines of *Strix nivea.*

MONOSTOMUM AFFINE, Leidy.

Body spatulate, narrowest anteriorly, flat; posterior end obtuse, with an excretory orifice communicating with a well marked canal traceable as far forward as the commencement of the oviduct. Mouth round, oral acetabulum small, followed by a smaller pharyngeal bulb. Intestine simple, traceable on each side to the posterior end of the body. Testes four, posterior to the position of the distended oviducts. Ovaries finely lobulated, situated on each side external to the position of the intestine; oviduct transversely tortuous and distended with brown ova. Penis ensheathed, long, tortuous, echinate. Generative aperture small, acetabuliform. Ova oval and prolonged at one pole, or sub-pyriform. Length of body 6½ lines; breadth 1 line.

Four specimens were obtained by Dr. J. M. Corse from the bile ducts and gall-bladder of the musk-rat (*Fiber zibethicus.*) Closely allied to *M. hippocrepis*, Diesing, but has no trace of the horse-shoe-like collar to the head.

Monostomum spatulatum, Leidy.

Body flat, oblong ovate, narrowing anteriorly, obtuse posteriorly; color white, with brown tortuous lines indicating the course of the oviduct. Mouth acetabuliform, circular. Testes three, alternating on each side posteriorly with the oviduct. Ovaries on each side finely lobulated. Generative aperture small, a short distance behind the mouth. Penis undistinguishable. Length 3 to 4 lines; breadth ½ line.

Twenty-three specimens were obtained, by Prof. Jeffries Wyman, from the gall-bladder of a fish, the species of which has been forgotten.

Distomum biliosum, Leidy.

Body ovoid, anteriorly compressed conical and incurved, posteriorly robust and obtuse. Mouth subterminal transversely semicircular or crescentic. Acetabulum much larger than the mouth, sessile, subcircular, with a large transversely elliptical and bi-polar aperture. Generative aperture a little in advance and to the left of the acetabulum, and provided with a prominent circular lip. Length from 1 to 2½ lines; breadth ⅓ to 1 line; thickness ¼ to ¾ line.

Several hundred specimens were obtained from the gall bladder of a fish, by Prof. Wyman, but the species has likewise been forgotten.

Tetrabothrium barbatum, Leidy.

Body delicate, filiform, quadrilateral, anteriorly narrowing, and then slightly widening again towards the head, posteriorly three or four times the breadth of the thickness; anterior segments quadrate, with the posterior angles projecting into barb-like lobes; posterior segments transversely oblong quadrate, with the posterior margin on each side projecting into a festoon-like lobe. Neck none, or a mere constriction. Head larger than the commencement of the body, conical. Bothria four, oblique, marginal, subcircular, large, fornicate, and folded at the border. Mouth at the summit of a globular papilla, unarmed. Length from 1 to 5 inches; breadth anteriorly 1-5th line, posteriorly ⅔ line.

Numerous individuals were obtained from the intestine of a large *Odontaspis punctata ?* caught on the coast of New Jersey.

Dibothhrium speciosum, Leidy.

Head gradually narrowing to its extremity which is funnel-shaped and truncated. Bothria two, long, marginal, as wide as the head. Neck none. Anterior articuli short, subcuneate, those succeeding transversely sub-reniform, those posterior more equally quadrate, with convex margins, except the back one which is emarginate. Length 1½ inches; breadth anteriorly 1-10th line, posteriorly 2-5th line. Head ½ line long, 1-10th line wide. Generative apertures lateral.

Obtained by Mr. Noah Kollar from the intestine of *Boleosoma Olmstedi.*

Acanthorhynchus reptans, Diesing.

Obtained from the Drum fish, *Pogonias chromis.* Smallest individuals, from ¼ to 1 inch long by ½ line broad, were contained in cysts, adhering to the intestines, in the peritoneal cavity. One 3 inches long, with the head 2 lines long, was found in the liver. The largest ones were coiled up in oval masses, imbedded among the muscles of the tail. Two masses measured each about 3 inches long by 10 lines in diameter. The worm was several feet in length, by 1½ to 2 lines thick, white and soft. Head oval ½ inch long by ¼ wide. Tail end obtuse.

Filaria solitaria, Leidy: Syn. of Entozoa, Pr. A. N. S. viii. 56.
Agamonema papilligerum? Diesing, Leidy: Ibid. 55.
Filaria quadrituberculata, Leidy: Ibid. 56. In error, described posteriorly foremost.
?*Filaria nitida*, Leidy: Ibid. 56. Probably the young.

Body cylindrical, slightly narrowed towards the extremities, rose-red in color. Head sub-acute; mouth with two series of four or six minute, conical, pointed papillæ. Caudal extremity obtuse; anus terminal, transverse, elliptical, bordered by a prominent lip. Length up to 6 inches; breadth to ½ a line.

A not unfrequent position for this worm, of full size, is beneath the skin of the back of *Rana pipiens*. Found also in the peritoneum and abdominal muscles of *Chelonura serpentina*, not unfrequently in the muscles of the Eel, *Murœna macrocephala*, of the Delaware river. In the peritoneum of *Emys serrata*, and *Esox reticulatus*.

Œsophagus tortuous, white, one-sixth the length of the body; intestine straight or slightly tortuous, translucent.

This parasite is most frequently found during the winter and spring. It is generally bright rose-red in color, with the extremities tinged more deeply red.

Filaria spirocauda, Leidy.

Body long, filiform, most narrowed posteriorly. Head obtuse, unarmed; mouth a minute circular pore, neither armed nor labiated. Tail short, conical, rather obtuse, or subacute; anus just above the tail. Caudal extremity of female recurved; of male wound into a spiral of three or four turns. Length of female 6 to 8 inches, breadth ⅓ of a line; length of male 4 inches, breadth 1-5th of a line.

Seven females and four males were obtained by Prof. Wyman from the heart of a seal, *Phoca vitulina*.

Filaria insignis, Leidy.

Body cylindrical, narrowed posteriorly. Head obtuse; mouth quadrate ovoidal, with a brownish papilla above and below it, and two almost obsolete ones on each side. Caudal extremity abruptly attenuated into an unciform tail. Length 1 foot, breadth ¾ of a line.

A single specimen was obtained by Prof. Wyman from a cyst beneath the integument of the foot of a Raccoon, *Procyon lotor*.

Prosthecosacter inflexus, Diesing.

Prosthecosacter minor, Diesing.

A large number were obtained from the bronchia and lungs of ***Delphinus phocœna*** by Prof. Wyman.

Gordius varius, Leidy.

Trans. Amer. Philos. Soc., vol. x., pl. 11, fig. 48. An embryo of this species from *Lumbriculus limosus*.

Ascaris spiculigera, Rud.

Body narrowed anteriorly, inflexed; head naked; tail short, conical, acute. Mouth with large prominent lips. Caudal extremity of the male furnished with a row of minute tubercles on each side. Length of female 8 to 16 lines; breadth to ¾ line; length of male 5 to 8 lines; breadth ⅓ line.

From the stomach of *Pelicanus americanus;* Mr. S. Ashmead, Florida. The crested cormorant (*Carbo dilophus*); obtained by Mr. Robert Kennicott, Illinois.

Ascaris depressa, Rud.

From the intestine of *Strix nivea*.

Spironoura gracile, Leidy.

From the Axolotl (*Siredon mexicanus*).

May 4th.

Vice President Bridges in the Chair.

Thirty-two members present.

The following papers were presented for publication in the Proceedings:

Notes on American Land Shells, No. 3, by W. G. Binney.

Description of a new Phyllostome Bat from California, in the Museum of the Smithsonian Institution, by Spencer F. Baird.

And were referred to Committees.

Mr. Taylor stated that, at a meeting of the Academy, on the 16th of February, he made a verbal communication, announcing the discovery of a probably new mineral in crystals, which had been brought from the cave of Las Piedras, Honduras, by his friend, Dr. John L. LeConte. By a qualitative analysis, he found it to be an anhydrous Sulphate of Potash, containing Ammonia. Prof. Dana, of New Haven, to whom he had sent two of the crystals, very kindly measured them, and found a difference in the angle of the trimetric prism sufficient to separate it from Glaserite, to which it was first referred. The difference of angle being about in ratio to that existing between Barytes, Anhydrite, Celestine, Anglesite, &c., isomorphous anyhydrous sulphates. He hoped soon to show, by a quantitative analysis, that it is worthy of being considered a new species. He regretted very much that this preliminary notice, which is recorded in the rough minutes of the meeting referred to, should not have appeared in the printed Proceedings for that month.

Mr. Foulke asked the attention of the Academy to the fact that in the published Proceedings, under date of 16th February last, his name had been accidentally printed in connection with remarks which had never been made by him.

May 11th.

Mr. Vaux in the Chair.

Thirty-one members present.

A communication was read from Dr. Isaac I. Hayes, announcing his desire to attempt a further exploration of the Arctic regions, and asking for such suggestions from the Academy as might assist in carrying out the project.

Whereupon the following resolutions were adopted:

Resolved, That the Academy has heard with great interest the communication of Dr. Isaac I. Hayes, of his purpose to attempt a further exploration of the Arctic regions.

Resolved, That the Academy will hereafter give to Dr. Hayes such recommendations respecting the subjects proposed by him, as shall be deemed most likely to promote the objects of the Academy.

Resolved, That a committee of seven be appointed to co-operate on behalf of the Academy with Dr. Hayes.

The Committee was then appointed, as follows: Messrs. J. F. Frazer, T. B. Wilson, I. Lea, W. P. Foulke, J. L. LeConte, J. Leidy, and W. S. W. Ruschenberger; subsequently, on motion, Messrs. E. Durand and J. Carson were added to the Committee.

Authority was given to the Committee in charge of Say's Conchology to sell copies of impressions of the plates of that work.

May 18*th.*

Vice President BRIDGES in the Chair.

Forty-five members present.

Mr. Lea exhibited some remarkable specimens of UNIONIDÆ, six to eight inches wide. Some of these had the soft parts, and he called attention to two fine specimens of *Margaritana complanata*, and *Unio multiplicatus*, both females, with the oviducts fully charged with embryonic shells, ready to be discharged by the parents. There were two important points he wished to be noticed. 1st. The enormous quantity of young in the mass of the outer branchiæ of the *Margaritana*, (the branchiæ were $3 \times 1\frac{1}{4} \times \frac{1}{2}$ inches,) each specimen containing probably several millions of individuals. 2nd. That the *Unio multiplicatus* was peculiar in having *both lobes* on *both sides*, charged with embryonic shells, containing no doubt several millions of individuals. This species of *Unio* is the *only one* Mr. Lea had ever observed furnished with oviducts in *all the four leaves* of the branchiæ. It is very probable that half a dozen of these *Mollusca* would produce individuals equal in number to the population of the whole United States.

Mr. Cassin announced the death of Dr. Robert Hare, late a member of the Academy.

May 25*th.*

Vice President BRIDGES in the Chair.

Twenty-six members present.

The Proceedings of the Biological Department for the current month were presented.

The following papers were ordered to be published in the Proceedings:

Notes on American Land Shells. No. 3.

BY W. G. BINNEY.

The following species of Helicidæ, now first described, were collected by Dr. F. V. Hayden, of the Yellowstone Ex. Ex., (Lieut. G. K. Warren), Dr. T. S. Newberry, of the Colorado R. Ex. Ex., (Lieut. Ives), Mr. Robert Kenicott, during a recent visit to the Red River of the North, and in Mexico by the late Mr. Berlandière, whose valuable collections were bought and presented to the Smithsonian Institute by Lieut. Couch. Specimens of all the species are deposited in the collection of that Institution, and also in that of the Academy, through the kindness of Prof. Baird, and the gentlemen named above. Figures of these, and all species described by me, will be published at some subsequent time.

SUCCINEA HAYDENI.—Testa elongato-ovalis, tenuis, pellucida, succinea; spira parva, acuta; anfr. 3 convexi, ultimus rugis levibus incrementalibus et sulcis crassis spiralibus, interruptis, inequaliter notatus; sutura mediocris; columella callo levi induta, apicem interiorem a basi testæ mostrans; apertura obliqua, ovalis, 5-7 long. testæ æquans, ad basin expansior. Long. 21; diam. 9 mill.

Habitat in provinciâ Nebraskâ, frequens inter flumina "Loup Fork," et "L'eau qui court" Dr. F. V. Hayden! (Yellowstone Ex. Ex.)

Var. MINOR.—Long. 15 mill. ad "Red River of the North," legit R. Kennicott.

Shell elongate-oval, thin, shining, amber-colored; spire short, acute; whorls three, convex, the last marked with the wrinkles of growth, and irregular, heavy, spiral furrows; suture moderate; columella covered lightly with callus; and allowing all the interior whorls to be seen from below to the apex; aperture oblique, oval, 5-7ths the length of the shell, the lower portion of its margin considerably expanded.

Mr. Say describes *S. ovalis* as showing the interior apex from the base of the shell; in other respects his description does not apply to this shell. Its aperture is nearer that of *S. ovalis*, Gould non Say, but the peristome is much more flexuose, and the upper third of the shell becomes gradually attenuated, so as to give a sharp pointed appearance, though the spire itself is short. The revolving lines are sometimes continuous over the whole body whorl, but generally interrupted, or confined to the interstices of the incremental striæ or wrinkles. It shares this peculiarity with *S. concordialis*, Gould, and *S. lineata*, nob.

Named in honor of Dr. F. V. Hayden.

HELIX COOPERI.—Testa umbilicata; elevato-globosa: solida; striis obliquis incrementi et lineis spiralibus leviter intercidentibus notata; alba, ad peripheriam fasciâ unicâ, angustâ, rufâ, cincta, aut fasciis et lineis rufis, volventibus, variê dispostis, ornata; sutura impressa; spira elevata; anfr. 5 convexi, ultimus rotundatus, ad aperturam valde descendens; umbilicus mediocris, pervius, 1-5 diam. maj. testæ æquans; apertura perobliqua, circularis; perist. simplex, incrassatum, ad umbilicum reflexiusculum, marginibus valde approximatis, callo albo, crasso, conjunctis. Diam. maj. 15; min. 13; alt. 9 mill.

Habitat, Black Hills, provinciâ Nebraskâ, frequens. Dr. F. V. Hayden! (Yellowstone R. Ex. Ex., Lieut. Warren.)

Shell umbilicated; elevated, globose; solid, with oblique incremental striæ intersected with delicate spiral lines; color white, variously marked with a single narrow band, or broader longitudinal and spiral patches of reddish-brown; suture impressed; spire elevated; whorls five, convex, the last rounded, very decidedly deflected at the aperture; umbilicus moderate, pervious, 1-5th the greater diameter of the shell; aperture very oblique, circular; perist. simple, thickened, reflected at the umbilicus, with its extremities very nearly approached, and joined by a heavy white callus.

Resembles nearly no described American species. Has an elevated spire like *H. pennsylvanica*, Green, and somewhat approaches *H. solitaria*, Say. It is, however, very much smaller, has rougher striæ and revolving lines; the umbilicus is different, as is also the circular aperture, with nearly approaching ends like *H. vittata*, Mull., of Ceylon. There is a curious variety of *H. solitaria*, Say, found by Lieut. Bryan at Bridger's Pass, which may be compared with this in size, but the only specimen I have examined has no revolving lines, and wants the characteristic aperture. Some specimens of this species have a more flattened spire.

Named in honor of Dr. J. G. Cooper, of P. R. R. Survey.

HELIX NEWBERRYANA. Testa latè umbilicata; orbiculato-depressa; solida; striis tenuibus incrementi et lineis subtilissimis, spiralibus, leviter granulato-decussata; nigra, aut rufo-brunnea, sub epiderme alba; sutura valdè impressa; spira depressa; anfr. 6, regulariter accrescentes, superi plani, ultimus convexus, subtus rotundatus, ad aperturam descendens; umbilicus latus, perspectivus, anfr. omnes ad apicem mostrans; apertura obliqua, transverso-lunaris; in exemplis junioribus, paries aperturalis, sculpturâ anfr. præcedentis, callo levi obliteratâ, eleganter notata est lineis elevatis, numerosis, confertis, spiralibus; in exemplis maturis, hæc sculptura occulta est callo incrassato, sed intus in anfr. omnibus remanet; perist. simplex, acutum, intus callosum, marginibus subconvergentibus, callo albo conjunctis. Diam. maj. 37; min. 20; alt. 13 mill.

Habitat in Californiâ. Specimina plurima collegit Dr. J. S. Newberry, (Colorado Ex. Ex. Lieut. Ives.)

Shell broadly umbilicated; orbicularly-depressed; solid; lightly decussated by incremental striæ, and numerous fine spiral lines: color black or reddish brown, under the epidermis white and shining; suture deeply impressed; spire depressed; whorls 6, regularly increasing, the upper ones flattened, the last convex, rounded below, and slightly deflected at the aperture; umbilicus broad, showing all the volutions clearly; aperture oblique, transversely-lunar; in young specimens the decussated sculpturing of the shell on the parietal wall of the aperture is covered with a light callus as the animal grows, and elegantly marked with numerous fine, crowded, spiral lines; in mature specimens this beautiful marking is entirely obliterated by the deposition of callus, but on breaking the shell, the lines will be found to exist within; peristome simple, acute, thickened within, ends slightly approximated, joined with a white callus.

This species bears no close resemblance to any known American *Helix*. It belongs to the same group as *H. vancouverensis*, Lea, but differs in size, color, number of whorls, umbilicus, want of peculiar depression of the lip, by its beautifully decussated surface, and peculiar parietal wall of the aperture. I know of no species sharing this last beautiful peculiarity. In form alone, dead specimens may be compared with *H. algira*, Lin., of Europe, but the spire is flatter and umbilicus larger.

Named in honor of Dr. J. S. Newberry, the Geologist of the Colorado Ex. Ex.

Bulimus patriarcha.—T. perforata, ovata, solidissima, alba, rugosa; anfr. 6 convexi, ultimus ventricosus, 5–7 long. testæ æquans; apertura ovata; perist. simplex, intus incrassatum, marginibus callo albo crasso junctis, columellari reflexo, umbilicum subtegente. Long. 35; diam. 19, aperturæ long. 19; diam. 13 mill.

Habitat in republicâ Mexicanâ. Specimina plurima et matura et nondum adulta, collegit Berlandiére in Buenâ Vistâ.

Shell perforate, ovate, heavy, white and wrinkled; whorls 6, convex, the last ventricose, equalling in length 5–7 of the shell; aperture ovate; peristome simple, thickened within, the extremities joined by a heavy white callus, the columellar extremity slightly reflected so as partially to conceal the umbilicus.

Belongs to the same group as *Bul. dealbatus*, Say, *alternatus*, Say, *lactarius*, Mke., *liquatilis*, Reeve, *Schiedeanus*, Pf., &c. The characteristics which form its differences are alike present in young and old specimens, and constant in all from the locality. I therefore consider it as well entitled to specific distinction as those named.

Named from its greater size and more antiquated appearance, as compared with the allied species.

Description of a Phyllostome Bat from California, in the Museum of the Smithsonian Institution.

BY S. F. BAIRD.

Macrotus Californicus Baird. California Leafed-nosed bat.

The ears of this species are very large, scantily haired, ovate and rounded at the tip. Their outer edge extends forward to a little behind and below the eye; the inner edge is partially free. The two ears are connected by a membrane, which takes its rise about one-twentieth of an inch behind the anterior free edge of the ear, and is united to the corresponding strip of membrane of the opposite side, so as to form a kind of roof over the middle of the head, the entrance posterior. The tragus is narrow, lanceolate, naked and one-third the height of the ear. The nasal appendage is short, but rather higher than wide, and extending on the side and beneath the nostrils as a narrow margin. It is coated rather closely with short hairs. The lower jaw is slightly fissured anteriorly, with a small narrow wart on each side of the fissure; a groove or furrow extends from the fissure along each side the lower jaw.

The feet are entirely free; the spur about as long: the membrane extending between the spurs is slightly concave, leaving the extremity of the tail free for the last joint, or for about one-sixth of its total length. The general color is a pale brownish gray, darker above than below.

Length to occiput	1.00	Length of tragus	.42
" to root of tail	2.60	" of leaf of nose	.30
" of tail	1.50	Wing, from carpal joint	3.00
" of ears	1.10	Fore-arm	2.00

This species closely resembles the *M. Waterhousii*, of Gray, from the West Indies. It differs, however, in the longer tail and shorter appendage of the nose, as well as in the widely different locality.

It is to the genus *Macrotus*, of the subfamily *Megadermata*, that the first leaf-nosed bat ever positively known as an inhabitant of the United States belongs. It was discovered at Fort Yuma, California, by Major G. H. Thomas, U. S. A. It is true that the *Brachyphyllum cavernarum* of the *Phyllostomata* has been given as occurring in South Carolina, but the statement has never been verified by any of the numerous corps of excellent naturalists resident in that State, and is probably an error.

Descriptions of two new species of Birds from the vicinity of Fort Tejon, California.

BY JOHN XANTUS DE VESEY.

Tyrannula hammondii De Vesey. Tail moderately forked; the feathers acutely pointed. Third quill longest, second and then fourth a little shorter. First much shorter than fifth, a little longer than sixth. Bill very narrow, dark brown. Above dark olive green, considerably darker on the head. Breast and sides of the body light olive green, the throat grayish white; the rest of the under parts bright sulphur yellow. A whitish ring around the eye. Wings and tail dark brown, the former with two olivaceous grey bands across the coverts, the latter with the outer edge a little paler than elsewhere, but not at all white. Length 2½ inches.

This species is named after Dr. W. A. Hammond of the United States Army.

Vireo cassinii De Vesey. Third and fourth quills nearly equal, fifth shorter, second longer than seventh. Spurious primary very narrow, falcate, acute, less than one third the second quill and a little more than one-fourth the third. Above, including edge of wing and tail feathers, clear olive green, becoming dusky ashy on the top and side of head. Beneath fulvous white, tinged with dull olive green on the sides (scarcely on the crissum.) Two broad bands on the wing coverts, and the outer edge of the innermost secondaries greenish-white; the outer edge of outer tail feathers and a broad ring round the eyes, extending to a frontal band, dull white. Length 5 inches.

Descriptions of new Birds from Fort Thorn, New Mexico.

BY DR. T. CHARLTON HENRY, U. S. ARMY.

Toxostoma crissalis Henry. Second quill about as long as the secondaries. Bill much curved; longer than the head. Above olive brown, with a faint shade of gray. Beneath nearly uniform brownish gray, much paler than the back, passing insensibly into white on the chin, but the under tail coverts dark brownish rufous abruptly defined. There is a black maxillary stripe, cutting off a white one above it, but there do not appear to be any other stripes about the head. There are no bands on the wings, and the tips and outer edges of the tail feathers are very inconspicuously lighter than the remaining portion. Length 11 inches; wing 4·00 inches; tail 5¾ inches.

Junco dorsalis Henry. Bill black above, bright brownish below.

Above, including the entire upper surface of the wings and scapulars, bright grayish ash, the inter-scapular region reddish chestnut-brown. Beneath ashy white, the middle of the belly almost pure white. Lores abruptly black. Quills and tail feathers nearly black; two outer entirely white; the third with brown on the inner edge. Length 6·25; wing 3·05; tail 3·10 inch.

Hab. Fort Thorn, New Mexico.

This species differs from JUNCO CINEREUS, (*Fringilla cinerea*, Sw.) in the absence of chestnut-brown on the wing coverts and tertials.

Description of Four New Fresh-water Molluscs, from the Isthmus of Darien and Honduras.

BY ISAAC LEA.

UNIO CALDWELLII. Testâ sulcatâ, ellipticâ, subinflatâ, posticè obtusè angulatâ, inæquilaterali; valvulis subcrassis; natibus subelevatis, ad apicès minutè undulatis; epidermide luteo-fuscâ; dentibus cardinalibus compressis, elevatis crenulatisque; lateralibus sublongis subrectisque; margaritâ salmonis colore tinctâ et iridescente.

Hab.—Isthmus of Darien. H. C. Caldwell, M. D., U. S. Navy.

UNIO GOASCORANENSIS. Testâ lævi, ellipticâ, subcompressâ, posticè obtusè angulatâ, valdè inæquilaterali; valvulis subcrassis, anticè crassioribus; natibus prominulis; epidermide fuscescente, transversè striatâ; dentibus cardinalibus parviusculis, suberectis crenulatisque; lateralibus sublongis subrectisque; margaritâ albâ et iridescente.

Hab.—River Goascoran, Honduras, Pacific Slope. J. L. LeConte, M. D.

ANODONTA LUTEOLA. Testâ lævi, obovatâ, subcompressâ posticè et anticè rotundatâ, inæquilaterali; valvulis subtenuibus; natibus prominulis; epidermide luteo-oliva, transversim striatâ; margaritâ albâ et valdè iridescente.

Hab.—Isthmus of Darien. H. C. Caldwell, M. D., U. S. Navy.

MELANIA PLANENSIS. Testâ lævi, subfusiformi, magnâ, crassâ, tenebroso-fuscâ; obsoletè maculatâ; spirâ elevatâ, conoideâ; suturis paulisper impressis; anfractibus instar novem, convexiusculis, striis transversis exilissimis impressis; aperturâ grandi, ovatâ, supernè angulatâ, intus fuscatâ; labro acuto; columellâ albidâ, supernè inspissatâ.

Operculo tenebroso-fusco.

Hab.—Plan and Omoa, Valley of Ulua River, Atlantic slope, Honduras. J. L. LeConte, M. D.

Memoranda of the effects of Carburetted Hydrogen Gas upon a collection of exotic Plants.

BY GEORGE W. FAHNESTOCK.

During the prevalence of severe cold weather in the latter part of January, and first few days in February, 1857, the earth was frozen to an unusual depth. Beneath the stone pavements in the streets of Philadelphia, the frost penetrated to a depth of more than three feet. In the neighborhood of Arch and Eighteenth streets, and along both those streets for the distance of nearly one hundred yards, the escape of gas from the main pipes under the street had been remarked for several weeks. Leaks at the joints had probably existed for months, although the porous nature of the soil had allowed the gas to diffuse itself, and find numerous vents at the surface. But the solid crust of frozen earth forced it to seek other channels of escape.

At this time, with the thermometer ranging from zero to 10° or 15° Fahrenheit, a current of gas, penetrating the imperfectly secured joints of the main pipes, made its way beneath the eastern foundation wall of the greenhouse of B. A. Fahnestock, on the southwest corner of Arch and Eighteenth Streets.*

When entering the houses on the morning of the first of February, the odor of gas was perceptible, which, on examination, was found issuing in a tolerably strong current through the ground near the north eastern corner of the greenhouse. It came up through a prepared border of soil between the wall of the house, and the flagging of the greenhouse floor. Although somewhat relieved by ventilation during the day, it was impossible to prevent its accumulation through the night; and by the following morning the work of destruction was accomplished. A choice and beautiful collection, numbering over three thousand plants, was, for the time being, almost utterly ruined. Many of the specimen plants were unique, and but rarely found in American collections. The house, which a day or two before had given promise of an abundant succession of winter flowers, now presented the desolate appearance of tender vegetation after a severe frost. In some parts of the premises, scarcely a single plant retained a leaf or bud. By the universal diffusion of this gas through the houses, many of the severest sufferers were those farthest removed from the point of its ingress.

That the plants had been absorbing carburetted hydrogen for some time was evident from the fact, hitherto unaccountable to the gardener and ourselves, that they had been occasionally shedding buds and leaves. Had there been no plants in the house, the peculiar odor of gas would doubtless have been perceptible for some days before the accident. Its volume proved to be much greater than we at first supposed. Those plants placed upon or near the floor, or upon the lower tiers of staging, suffered less than the taller specimens, or than such as were near the upper sash. This was especially the case with the Camellias, and other hardwooded plants.

The *full extent* of the damage was not apparent at first. Many plants maintained their fresh greenness without becoming shrivelled, or withering; yet although *seemingly* in fine health, they shed every leaf at the slightest touch. Syringing was resorted to with the hope that the absorption of water might, in some degree, counteract, or neutralize the noxious effects of the gas; but in most instances, the leaves and buds fell off when treated with gentle streams of water from a finely perforated syringe.

As no plant suffered unless in leaf at the time, it seems evident that the injury was effected and sustained by absorption through the medium of the foliage alone. The volume of gas was too small to be absorbed to any extent by the earth, or roots of the plants. Bulbs, and other plants, dry and at rest, were distributed in considerable number through the houses, both upon the upper shelves and beneath the staging.

A row of grape vines (not in leaf) stood against the eastern wall within the greenhouse, growing in a prepared border of earth under the table. The gaseous current passed directly through their roots. Saturated as the ground seems to have been with fresh gas, which was strongly manifest on taking up a handful of the earth, they do not appear to have sustained any injury thereby. A row of maple trees along the outer edge of the footwalk on Eighteenth street were also directly in the way of the current. They were not more than eight feet from the leaking pipes. Owing to the depth of frost it is probable that the flow of gas passed beneath their roots; nevertheless the ground within a few feet was black with the "*dead gas.*" They sustained no apparent injury,

* In order to convey as correct an idea as possible of the relative positions of the plants within the houses, it may be proper to observe briefly that the greenhouse is one hundred feet in length by twenty-five in breadth, runs north and south, and is substantially constructed of brick, with a span roof of sash. The western side is also of glass from within four feet of the ground. The span commences about eight feet from the floor, with the apex about seventeen feet in height. Included within the same range is the hot house, separated from the greenhouse by a sash partition, and communicating by two sash doors. At the extreme end, farthest from the leak, a small orchid house opens into the hot-house.

put forth their leaves in the spring, and grew through the season with their usual vigor.

As a general rule the hardwooded plants fared the worst. Succulents were the first to wither, and the first to recover. Large numbers of both hard and softwooded lost their tender twigs and young wood, which withered and required pruning as far back as the sound growth. While some showed signs of life, and began to put forth leaves within a few weeks, others lingered for months; some died after a sickly existence, and many were killed outright. Some plants near the leak, and under the full influence of the gas, manifested no apparent injury; others in the remote orchid house were violently affected, exhibiting an astonishing sensibility. It seems rather anomalous, that of the Orchidaceæ, whose sustenance is derived mainly from the atmosphere, every individual should have exhibited a total indifference to the gaseous influence. Several large specimens of *Bletia Tankervilliæa*, as well as plants of *Cypripedium venustum*, and *insigne*, passed unscathed through the heat of the battle.

That plants in general are peculiarly sensitive to this gas, even when it is almost consumed by combustion, seems to be well established. The experience of florists who supply blooming plants at entertainments, is, that the plants having been thus exposed are often in a sickly condition for some time thereafter. This is especially the case with Camellias. They frequently shed their foliage, and have been known to die after an exposure of a few hours in rooms where many gas lights were burning. This has no doubt been caused *in part* by the heated and impure air arising from crowded assemblages, but, if so, similar effects would be alike apparent in Horticultural exhibitions when open only by daylight.

No experiment similar to that which we are about to record has ever, to our knowledge, taken place upon so great a scale, or included within its range so large a number of genera. Solitary instances have been occasionally noted in which a limited number of species have been brought within the influence of acid and inflammable gases. Examples are not wanting, indeed, to confirm the destructive effects of carburetted hydrogen on vegetable organism. Many of the fine old elms in the streets of New Haven have been killed by leaks from the neighboring main gas pipes. Similar effects have been observed in Boston, Albany, and other cities in the United States.

In a review of a paper entitled "*Ueber Gasfabrikation und Gasbeleuchtung vom sanitätspolizeilichen Standpunkte; von Dr. Innhauser.* (*Wien. Wochenbl.* 35, 1856,)" the author quotes the observation of M. Ulex, of Hamburg, as follows: "In this city there are a great many linden and elm trees. In 1851, one hundred and fifty-nine of these trees had to be cut down because they had died. It was found that the bark immediately above the ground, often as far up as eight to ten feet, was quite loose, and completely separated from the wood; the roots soft and red, the fibres of the roots soft and rotten. The interior of the trees were perfectly sound. This injurious effect upon the trees is not only caused by the gas which escapes unburnt in the flame, but more particularly by that gas which leaks through the pipes in the ground. It was sometimes perceived at a distance of fifteen to twenty-five paces from the pipes. The same observations were made in Paris, Bordeaux, Düsseldorf, Mannheim, Basle, and Vienna. Professor Bertulus, of Marseilles, thinks that the combinations of sulphur and ammonia in the gas saturated the ground with hydrosulphate of ammonium, which also causes the black color of the soil."* (See Schmidt's Jahrbucher der gesammten Medicine. Band. 96, 1857. No. 11.)

* Although not strictly within the range of the subject at present under consideration, it may not be out of place to remark that many instances are on record which show that vegetation has been seriously injured by *acid* gases from manufactories, especially in Belgium and Prussia. The same causes are said to have produced similar effects in a modified form in the vicinity of Philadelphia. This may account for the unusual mortality among the *Liriodendron tulipifera*, and other indigenous forest trees, killed from time to time in Penn Square, in the neighborhood of the United States Mint.

In reviewing these simple facts several questions naturally arise which possess more than ordinary interest for the vegetable physiologist, and may lead one step towards eliciting new developments in the chemical organization of plants.

Although no narrow nor definite limits can be drawn, still, the general characteristics tend to prove that a sympathy does often exist between genera of the same natural order. In glancing over the following memoranda of the effects of carburetted hydrogen gas upon each genus, this sympathy is frequently apparent throughout the various members of a family.*

Without venturing on further comment or attempting more than a brief outline, these facts are presented with the hope that the attention of chemists in their experiments upon vegetable organism may be directed towards further researches. It may be well enough to remark that the enumeration of the species under each genus was not deemed necessary. Wherever they were differently affected they have been so specified.

The natural classification of Lindley's Vegetable Kingdom has been adopted in the arrangement which follows, and the remarks are as much condensed as practicable.

In the Transactions of the Society for the encouragement of Industry in Prussia, (1857) is published an interesting extract from a report by Prof. Dr. E. L. Schubarth, of Berlin, to the Belgian government, " on the acid gases which escape from the manufactories of sulphuric acid and of soda, and the means to render them innoxious." It seems that " numerous complaints of the farmers that the vapors from the chemical manufactories in Belgium injured the vegetation of the fields and gardens, induced the government (of Belgium,) to appoint a commission to examine this matter. This commission consisted of chemists, botanists and farmers. During the summer of 1855, the excitement among the people, who even ascribed the potato-rot to the influence of the chemical factories, had so much increased that several attacks were made upon the factories. The government, therefore, increased the number of the commissioners, and at the end of the year, they made a report which was published under the title " Fabriques de produits Rapport a M. le ministre de l'Interieure par la commission d'enquetre, Bruxelles, 1856." They say it was an admitted fact that vegetation is injured by the acid gases from chemical works, but this influence is often overrated; the spots on the leaves, and injuries of the flowers ascribed to acid gases, are very frequently the result of other causes, as frost, microscopic, vegetable, and animal parasites, deposits of foreign matter upon the leaves, very intense sunlight, etc. The potato-rot is certainly neither caused nor increased by these gases. On the other hand, chemical investigations proved the presence of traces of hydrochloric acid in spotted leaves, and in the dew upon the plants. Similar spots could be artificially made by moistening the leaves with dilute hydrochloric acid, the presence of which could be proved after an interval of eight days. The report contains a list of trees injured by these gases.

* Several chemists of high reputation have made examinations of the gas of the Philadelphia Gas Works, but, from some cause, their results are at variance. In order to facilitate the further researches of such as may desire to investigate its effects on vegetable organism, I insert the analysis of Dr. C. M. Wetherill, made in 1852, for the engineer of the Philadelphia Gas Works. This is probably as nearly correct as can at present be determined.

Percentage by volume, gases dry, at 0° centigrade, and 1000 Millimetres Barometer.

	A.	B. 1	B. 2
Carbonic Acid,	00.000		
Olefiant gas and hydrocarbon vapors,	8.157	8.963	9.023
Oxygen,	0.052	0.136	0.120
Hydrogen,		44.168	
Light carburetted hydrogen,		41.620	
Carbonic oxide,		5.081	
Nitrogen,		0.059	
		100.000	

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ACROGENS.

LYCOPODIACEÆ.

Lycopodium were not visibly affected. Large plants of *L. Willdenovii*, *L. cæsium arboreum*, and *L. umbrosum* were within a short distance of the green-house door.

Selaginella. About twelve species were in the orchid house, none of which were affected.

POLYPODIACEÆ.

In a collection embracing nearly one hundred and fifty species of foreign and tropical Ferns, and comprising many hundred seedlings within the pots of orchids and other plants, no special change was observable. In some instances they became slightly yellow in the fronds, but their growth and health were not affected.

ENDOGENS.

ARACEÆ.

Caladium. A fine plant of *C. pictum* was killed. It withered to the root at once, and never recovered.

Philodendron was not affected.

Dieffenbachia. A plant of *D. seguina picta* was very slightly affected.

PANDANACEÆ.

Pandanus. Several fine specimens of *P. Javanicus fol. variegat.* in the hot-house were killed. The foliage became yellow, and withered, and the plants soon died. A plant of *P. graminifolius*, also in the hot house, was much injured, lost a part of its leaves and recovered slowly. Several plants of *P. Javanicus fol. var.* in the orchid house were not injured.

PALMACEÆ.

Chamœrops *humilis* became yellowish and sickly for some weeks, but did not lose its foliage, and gradually recovered.

Phœnix *dactylifera* was not affected.

BROMELIACEÆ.

Aechmea, Billbergia, Pitcairnia, Vriesia, Tillandsia, Dyckia, Melinonia, Pourretia, Puya. With the exception of *Puya Altensteinii*, which turned yellowish for a few weeks, no perceptible change was apparent in any of the Bromeliaceæ. A large number of individuals of this family were growing in the hot and orchid houses.

HÆMODORACEÆ.

Barbacenia *Rogierii* was not sensibly affected.

AMARYLLIDACEÆ.

Amaryllis, Brunsvigia, Crinum, Hæmanthus, Hymenocallis, Alströmeria. The greater number of bulbs, being dry and at rest, were not affected. Such as were in leaf, including *Crinum amabile*, showed yellow leaves, but were not otherwise injured.

Agave. Several specimens of *A. Americana* and *A. variegata* changed color. Their leaves turned yellowish, assuming a somewhat flaccid appearance. They recovered gradually through the spring.

IRIDACEÆ.

Dietes, Witsenia, were not affected. Ixia lost the flowers.

MUSACEÆ.

Heliconia *angustifolia* turned somewhat yellow, but soon recovered.

MUSA. Some plants turned slightly yellow; the genus was very lightly affected.

STRELITZIA *regina* passed through the ordeal without injury.

ZINGIBERACEÆ.

ZINGIBER, dry and unaffected. CURCUMA were not affected. KŒMPFERIA, not affected. AMOMUM, dry and not affected. HEDYCHIUM, not affected. ALPINIA, not affected.

None of the genera in this order were visibly injured. Some few were in leaf at the time, but the greater part were dry and not growing.

MARANTACEÆ.

MARANTA. None of this genus were affected.

CALATHEA *zebrina* was not injured.

ORCHIDACEÆ.

BLETIA, CYPRIPEDIUM. These two genera were the only plants of this order directly exposed to the influence of the gas. They were not injured; nor could any effect be perceived in such orchids as happened to be in the hot house near the door of the orchid house. Of the collection within the orchid house not one exhibited any change.

COMMELYNACEÆ.

TRADESCANTIA *discolor* has spread itself for a distance of more than twenty feet beneath one of the side tables in the hot house. No visible effects were observable.

ORONTIACEÆ.

CALLA turned slightly yellow.

POTHOS *crassinervis* was not visibly injured.

LILIACEÆ.

LILIUM all turned yellow. GLORIOSA, dry and unharmed. AGAPANTHUS all turned yellow.

VELTHEMIIA *viridiflora* was in flower at the time. The leaves turned yellow, but the plant soon recovered.

ALOE. None of the genus were affected. ORNITHOGALUM, dry and unaffected.

LACHENALIA *tricolor* lost all its leaves and flowers; recovered slowly.

CORDYLINE *congesta* was not injured.

DRACÆNA. Of several species in the hot house, none showed any change except *D. Brasiliensis*, which turned yellowish, but soon recovered.

GYMNOGENS.

CYCADEACEÆ.

CYCAS *revoluta* was not perceptibly affected.

ZAMIA were not sensibly affected.

PINACEÆ.

THUJA were considerably injured in their entire loss of foliage; they recovered slowly.

LIBOCEDRUS *Chilensis* was not affected.

TAXACEÆ.

TAXUS lost all their foliage, being near the leak. Their recovery was very gradual.

TORREYA were not affected.

EXOGENS.

MORACEÆ.

Ficus. A very large specimen of *F. elastica* was somewhat injured. A portion of the foliage dropped off, and the remaining leaves exhibited a yellowish, sickly appearance for several months.

EUPHORBIACEÆ.

Euphorbia *jacquiniflora* was powerfully affected. All the individual plants of this species lost every leaf and flower, and recovered very gradually.

Poinsettia *pulcherrima* was affected in the same manner; not a leaf or bractea remained.

Croton. All the species lost their foliage, taking the spring and nearly all summer to recover.

BEGONIACEÆ.

Begonia. All the plants of this genus, embracing many species, suffered in the loss of flowers, and a part of the foliage. They all recovered, however, in the course of a few week

PASSIFLORACEÆ.

Passiflora, were but slightly affected.

Tacsonia, of several species, all lost their leaves and young twigs, but recovered.

CRASSULACEÆ.

Crassula. This genus seemed peculiarly sensitive to the gaseous influence. They all withered down to the root at once, and were killed outright.

Rochea, were not visibly injured.

TURNERACEÆ.

Turnera *elegans* lost all its foliage, and recovered again.

CISTACEÆ.

Cistus. Every individual of this family was immediately affected. They shed all their foliage, and such as were in flower dropped their bloom: they all recovered.

BRASSICACEÆ.

Alyssum lost all their blossoms and foliage—recovered.

RESEDACEÆ.

Reseda lost both leaves and flowers, and recovered.

BYTTNERIACEÆ.

Mahernia *odorata*, and varieties, were quick to lose all their leaves and flowers. They remained for some time to all appearances *dead*, but slowly recovered, with the loss of all the young wood.

TROPÆOLACEÆ.

Tropæolum. Some fine specimens of *T. azureum*, *T. tricolorum*, *T. Jarrettii*, and other varieties were killed at once to the ground. Although a year has elapsed, they have not yet exhibited signs of vegetating, although still alive.

MALVACEÆ.

Althæa, Malva, Abutilon, Hibiscus. Every individual in this order lost its entire foliage and flowers. In those of the genus *Abutilon*, the young wood was killed. They all recovered after some weeks.

TILIACEÆ.

SPARMANNIA. A large old specimen of *S. Africana* lost all its leaves and flowers. It had to be cut back, and recovered slowly.

TREMANDRACEÆ.

TETRATHECA *Hugelii* lost all its leaves—recovered slowly.

TREMANDRA *ericoides* dropped both leaves and flower-buds—recovered slowly.

POLYGALACEÆ.

POLYGALA *oppositifolia*, P. *Dalmasiana*, and others, were quick in feeling the deleterious influence of the gas. They lost all their leaves and flowers, had to be closely pruned, and were slow in regaining their strength.

MURALTIA *Heisteria*, quickly lost all its leaves and flowers; it never recovered, but lingered a short time, and died.

ACERACEÆ.

ACER. A row of silver maples (*A. dasycarpum*,) planted along the pavement on Eighteenth street, stood directly in the way of the current of escaping gas. They vegetated as usual in the spring, and grew vigorously through the season. The depth of frozen earth enveloping their roots, caused the gas to flow beneath, without doing them any injury.

MALPIGHIACEÆ.

MALPIGHIA *coccigera* was stripped of every leaf, but recovered.

STIGMAPHYLLON *ciliatum* lost all its leaves, recovering slowly.

TERNSTROMIACEÆ.

LAPLACEA was powerfully affected. It lost all its leaves, and after lingering awhile with feeble vitality, died.

CAMELLIA. These were in the full glory of bloom. About one hundred and twenty varieties were distributed through the green-house, embracing many large old plants upon the upper staging. In a day or two after the entrance of the gas, not a leaf, bud, flower, or wood-bud remained upon the largest and finest plants. The leaves did not shrivel, nor did they change color. At the slightest touch they fell off in showers. Those nearest the roof suffered most severely. A plant, which to an observer would seem to be in healthful vigor, would lose every vestige of greenness in a moment, upon being slightly shaken, and appear like a naked dead shrub. They had to be cut back extensively, some to the main stem, but the largest and noblest specimens were too much injured ever to put forth again. Others vegetated feebly, and revived slowly. The nurture of years will be requisite to restore them to their former condition and appearance.

THEA *viridis* was affected in the same manner, but recovered more readily.

CLUSIACEÆ.

MAMMEA *Americana* lost all its leaves, and was so badly injured that it died.

MAGNOLIACEÆ.

MAGNOLIA *pumila* and *M. fuscata* lost all their foliage, but recovered through the summer.

TASMANNIA lost all its leaves, and recovered again.

FUMARIACEÆ.

DIELYTRA *spectabilis* suffered considerably in the loss of its leaves and flower buds, but finally recovered.

BERBERIDACEÆ.

BERBERIS *Darwinii* lost all its leaves and buds; recovered slowly.

VITACEÆ.

Cissus *discolor*, although far removed frcm the source of the mischief, was unusually sensitive. The whole plant withered, leaf, tendril, and branch, and was almost immediately killed.

Vitis. A row of foreign grape vines, planted in a prepared border inside of the green-house, and trained up the wall and along the rafters, were not in leaf at the time. *The gas passed directly through their masses of fibrous roots.* On stooping down, the strong odor of gas was encountered for some distance. This was more apparent on taking up handfuls of the fresh earth, which was unmistakably fœtid. Notwithstanding these facts, the vines vegetated early in the Spring, and grew vigorously, although they bore no fruit. As their roots lay directly within the gaseous influence, it is reasonable to attribute their preservation to their state of inaction at that time.

PITTOSPORACEÆ.

Pittosporum. Large old specimens were considerably injured. They lost not only all their foliage, but the young wood. *P. Mayii* lost its leaves. They all recovered slowly.

Sollya *heterophylla* lost all its foliage—recovered.

EPACRIDACEÆ.

Epacris. The collection embraced many new and rare varieties, some recently imported. Being in good health, the greater part were in bloom, but they were denuded of leaf and flower. Some died ; the majority struggled for life through the summer, and finally recovered. This genus was most severely injured.

FRANCOACEÆ.

Francoa *sonchifolia* lost all its foliage—recovered.

ERICACEÆ.

Erica. They were somewhat slow in manifesting their injuries. No positive change was apparent for some days, after which they shed their leaves. They have never recovered entirely, and some have died.

Andromeda lost all the leaves and flowers, and recovered.

Clethra were bared of every leaf, and had to be cut back ; they recovered shortly afterwards.

Azalea. A large number of fine specimen plants, including about seventy hybrid varieties, were upon a latticed table immediately over the leak. They lost nearly all their foliage, and dropped their flower buds. A few lingered on and died, but the greater part recovered entirely.

Rhododendron. Numerous large specimens, embracing many hybrids, were in different parts of the green-house. They did not show any change for some days, then gradually dropped their flower buds, and a portion of the foliage. They recovered gradually.

AURANTIACEÆ.

Limonia, Citrus. These plants were keenly sensitive. Large old specimens, growing in tubs on the upper platform, were stripped at once. The stage was covered with leaves, and oranges and lemons in all stages of growth, from fruit just formed to that fully matured. The tender wood was blackened and killed, so that they had to be cut back to the main branches. Attention, and careful nursing restored them somewhat, although they are very slow in recovering their former vigor.

RUTACEÆ.

Almeidea *macropetala* lost its foliage, and recovered.

Zieria *macrophylla* lost all its foliage, was much affected, and recovered but slowly.

Boronia. All the members of this genus were considerably injured. They sustained the loss, not only of all their foliage and flower buds, but of the tender twigs. Ever since the accident they have been feeble and sickly, and it is not likely that they will ever recover.

Eriostemon. Although they all lost leaves and flowers, and were entirely denuded, they were not long in recovering, and began to put forth new leaves in a short time.

Crowea. They quickly lost every leaf, were considerably injured, and finally recovered.

Correa. A fine collection of large specimen plants of this genus, were in the green-house, just opening into full bloom. Leaf and flower at once fell off; they had to be pruned largely, and were long in showing signs of life. Many were too severely injured to recover, and died soon after the accident.

Adenandra *fragrans* was killed outright.

Coleonema lost all the foliage, but gradually recovered.

Diosma dropped all their leaves immediately, and were slow in recruiting.

LINACEÆ.

Linum *trigynum*. A fine large specimen plant in full flower lost every leaf and blossom. It required close pruning, and recovered in a few weeks.

OXALIDACEÆ.

Oxalis suffered the loss of foliage and flowers, but speedily regained their health.

BALSAMINACEÆ.

Impatiens lost their flowers and foliage—recovered.

GERANIACEÆ.

Pelargonium. Several hundred choice plants were in training as specimens, and placed upon hanging shelves near the sash. The effect upon them was most powerful. It involved the entire loss of leaves and branches. They presented the appearance of plants after being scalded or severely frozen, and of course were killed.

PORTULACACEÆ.

Calandrina *brevipes* lost all its leaves, but recovered.

THYMELACEÆ.

Daphne. Numerous specimens of *D. odora* and *D. Indica* lost flowers and foliage entirely, since which time they have been sickly, and have not fully recovered.

Pimelea *spectabilis*, a splendid plant, perhaps one of the finest specimens of its kind in the country, was ruined. It shed all its leaves and flower buds, but from its vigorous habit put forth again. After lingering a few months, it withered and died.

PROTEACEÆ.

Grevillea. Of three species in the Green-house, *G. lavendulacea*, *G. Thelemanniana*, and *G. Sternbergii*, not one survived. They were too much injured to make any effort toward resuscitation, and were killed outright.

Hakea *mucronata* was entirely stripped of its foliage, but gradually recovered.

LAURACEÆ.

Laurus *camphora* shed a portion of its foliage. *L. cassia* and *L. cinnamomum* were not affected.

FABACEÆ.

Brachysema lost their foliage and flowers—recovered.

Oxylobium. Of several species, every one was stripped of foliage, but they all recovered.

Podolobium also lost all their foliage and recovered.

Chorozema. Fine large specimen plants were just coming into bloom. They suffered greatly in the loss of all their flowers, and a large portion of the foliage. Their recovery was slow.

Burtonia *conferta* was killed. *B. pulchella* was greatly injured, but seems in a fair way to recover.

Aotus *gracillima* lost all its leaves and flowers. It put forth after a considerable interval, and recovered.

Dillwynia *elegans* lost its foliage and flowers—recovered.

Eutaxia lost both leaves and flower buds—recovered.

Gastrolobium dropped their foliage entirely, and were slow and feeble in recovering.

Pultenæa shed all their leaves and flower buds—recovered.

Mirbelia lost all the leaves and flower buds—recovered gradually.

Hovea *purpurea longiflora* lost every leaf and flower—recovered slowly.

Bossiæa were greatly injured. They lost their foliage and the young wood, and recovered slowly.

Goodia lost all their foliage—recovered.

Templetonia lost all their leaves, and recovered slowly.

Genista recovered, with the loss of leaves and young wood.

Cytisus *onsspermum* was considerably injured. It lost flowers and leaves, and was slow in recovering.

Indigofera suffered the loss of all the foliage—recovered.

Clianthus *magnificus* and *C. puniceus* were both killed. They never put forth again after losing their leaves.

Swainsonia lost all their leaves, had to be pruned back, and were slow in recovering.

Coronilla *glauca* was killed. It showed no vitality after losing its leaves.

Kennedia were quick to lose all their foliage and flowers. They all recovered.

Zichya shed all the foliage—recovering slowly.

Fagelia *bituminosa* lost its leaves, and recovered.

Poinciana *Gilliesii* lost its leaves and recovered.

Mimosa *sensitiva arborea* was in flower at the time. It was stripped of all verdure, had to be cut back, and was rather slow in recovering.

Acacia. About forty species were in the green-house, many of them large plants. They were covered with flower buds, and just coming into bloom. Not a leaf, bud, nor wood-bud remained. As a general thing, the young wood was so injured as to render it necessary to cut them back to the main trunk. Several very large specimens of *A. pubescens* had to be entirely topped. In a few weeks they showed signs of life, grew with vigor, and at this time seem as healthy as before the accident.

Calliandra *brevipes* lost its foliage, and recovered.

Inga were very sensitive. They lost their foliage amongst the first, but with commendable vitality were as quick in putting forth again.

ROSACEÆ.

Rosa lost all their flowers and foliage; owing to close pruning, which was necessary, they recovered slowly.

Spiræa. They were in full flower. Every leaf and blossom dropped off: after a few weeks they put forth again.

HYDRANGEACEÆ.

HYDRANGEA. Though near the leak, as they were not in leaf, they sustained no injury.

ADAMIA. Of several varieties in the hot-house, all were greatly injured. They suffered, not only in the loss of their foliage, but in the wood also, which had to be closely cut back. Their recovery was slow.

BAUERA were also severely affected. They lost all their leaves immediately, and recovered slowly.

LYTHRACEÆ.

CUPHEA. They were quick to lose all their leaves and flowers, their branches looked withered for a while, but they finally put forth on the old wood.

RHAMNACEÆ.

CEANOTHUS *divaricatus* suffered the loss of all its foliage; recovered gradually.

CELASTRACEÆ.

EUONYMUS *fimbriata*, although a plant of apparently hardy growth, was one of the first to suffer. Being near the leak it dropped every leaf immediately, and was long in recovering.

APOCYNACEÆ.

ALLAMANDA. Numerous large specimen plants of *A. cathartica*, *A. neriifolia*, *A. verticillata*, *A. grandiflora*, *A. Schottii*, &c., were growing in the hot house. Every plant was seriously injured in the loss of wood-buds and leaves. Although their recovery seemed doubtful for some time, they slowly regained their foliage and former vigor.

ARDUINA *bispinosa*, lost part of its leaves, but was not much injured.

ALYXIA lost all the foliage, and recovered again.

VINCA lost all their leaves and flowers—recovered.

PLUMIERIA *rosea* shed its foliage—recovered.

STROPHANTHUS lost their leaves and recovered.

BEAUMONTIA lost all their foliage and buds—recovered slowly.

RHYNCOSPERMUM *jasminoides* was sensitive to the influence of the gas. It recovered slowly after the total loss of leaves and flowers.

ECHITES *Harrisii* lost all its leaves, although growing in the orchid house. Had it been nearer the leak, it would no doubt have been killed. *E. picta*, although much nearer the leak, was not so sensibly affected.

DIPLADENIA *crassinoda* was strongly affected, as was the case with *D. urophylla*. They lost their leaves and young branches.

ROUPELLIA recovered after the loss of all the foliage.

GENTIANACEÆ.

CHIRONIA lost all their leaves and flowers, recovering very slowly.

OLEACEÆ.

OLEA *fragrans* was specially sensitive. Of numerous specimens in different parts of the house, all lost every leaf and flower, and were very slow in recovering.

SOLANACEÆ.

BRUGMANSIA *Knightii* sustained the immediate loss of all its foliage, and quickly recovered.

Solandra lost all foliage, and was considerably injured—recovered with the loss of young wood.

Juanulloa lost all its leaves and recovered.

Cestrum. All the species lost their leaves and flowers, and recovered.

Habrothamnus lost part of their foliage, and dropped all the flowers. They recovered without sustaining permanent injury.

Fabiana lost foliage and flower buds, and recovered.

ASCLEPIADACEÆ.

Schubertia *graveolens* lost all its leaves, and was too severely injured to survive. It died soon afterwards.

Physianthus lost all the foliage, and recovered slowly.

Asclepias *curassavica* lost flowers and leaves—recovered.

Dictyanthus *Pavonii* was considerably injured by the loss of leaves, but recovered very slowly.

Pergularia *odoratissima* lost only a portion of the foliage, and recovered.

Stephanotis *floribunda*, as well as *S. Thouarsii*, were fine large healthy plants. They lost their foliage and died, although considerably removed from the leak.

Cryptolepis *longiflora* lost its flowers and the greater part of the leaves. It suffered greatly, and its ultimate recovery was for a long time a matter of uncertainty.

Cyrtoceras *multiflorus* and *C. reflexus*, although in the hot-house, were both killed at once.

Hoya. Numerous specimens of a dozen species were distributed through all the houses. No decided effect was observable in any individual. They did not shed their leaves.

Ceropegia *elegans* lost all its foliage, and recovered.

Stapelia were not affected in any perceptible degree.

CONVOLVULACEÆ.

Ipomœa *Horsfalliæ* although far remote in the orchid house, lost all its leaves and flowers. It showed itself to be unusually sensitive.

POLEMONIACEÆ.

Cantua lost all their leaves, and recovered.

PLUMBAGINACEÆ.

Plumbago lost all their flowers and foliage; were not long in recovering.

PRIMULACEÆ.

Primula. They were all cut down to the ground, but in a short time grew out again.

Cyclamen lost all their flowers, but were not otherwise injured.

MYRSINACEÆ.

Ardisia *crenulata* and *A. crenulata fruct. alb.* were entirely stripped of leaves and berries. Being powerfully affected, they were some months in recovering.

JASMINACEÆ.

Jasminum of several varieties lost all their flowers and leaves. They grew out, after lying prostrate several months.

EHRETIACEÆ.

Heliotropium. Many plants of this genus were in flower. Strange to say, they were but slightly affected, and lost neither flowers nor foliage. This seems the more remarkable, as their peculiar sensibility to the smoke of tobacco renders it necessary to remove them from the houses, when fumigating to destroy the aphides, or green fly. In this instance they grew on and flowered, entirely regardless of the destruction around them.

LAMIACEÆ.

Salvia suffered in the loss of all their foliage and young wood; they had to be cut back and recovered slowly.

Gardoquia *Hookerii* was one of the most sensitive. It lost every leaf, and was a long time time in recovering.

Scutellaria lost all their foliage, and recovered.

Prostanthera *retusa* was powerfully affected; it lost all its foliage and was killed.

Westringia lost all the foliage, and recovered.

VERBENACEÆ.

Verbena were not much injured.

Lantana were dry, and uninjured.

Clerodendron were mostly dry, and unaffected. *C. splendens* was in leaf, and suffered considerably in the loss of foliage, but recovered.

GESNERIACEÆ.

Columnea were stripped of their foliage, but recovered slowly.

Hypocyrta *strigulosa* lost all its leaves, and put forth in a very short time.

Nematanthus shed all their leaves immediately—recovered in a short time.

Alloplectus lost all their leaves and wood-buds—recovered in a few weeks.

Gesnera lost all their foliage and blossoms—recovered.

Achimenes were dry, and not affected.

Gloxinia, dry and uninjured.

Liebigia lost all its foliage, and recovered slowly.

Æschynanthus. Of numerous species, all were much injured. They not only lost their flowers and entire foliage, but a portion of the wood. Before the leaves dropped off they presented the usual appearance of plants badly frozen. They all recovered during the summer.

Agalmyla *staminea* was in nowise affected.

Moussonia lost all its leaves and flowers, and recovered.

Chirita parted with all their foliage, and were slow in recovering.

Isoloma were not sensibly affected.

BIGNONIACEÆ.

Bignonia *venusta* was planted in the open ground in the hot house. It twined over the rafters for a great distance, and was just coming into bloom. Not a leaf, wood-bud, or flower remained, and many months elapsed before it recovered.

Adenocalymna *comosum* lost all its foliage—recovered.

Spathodea lost all the leaves, and recovered.

Tecoma *capensis* lost all its leaves, and recovered.

ACANTHACEÆ.

HENFREYA *scandens* lost all its leaves, and recovered.

HEXACENTRIS *Mysorensis* was in the orchid house, side by side with *Ipomœa Horsfalliæ.* While the latter was seriously injured, the former exhibited no evidence of being affected.

RUELLIA *formosa* lost all its foliage, and was slow in regaining its strength.

GEISSOMERIA lost all their flowers and foliage, but recovered rapidly.

APHELANDRA had to be cut back with the loss of all their leaves and flowers. They grew out in a short time.

THYRSACANTHUS *rutilans* lost all its leaves and flowers: it had to be cut back, and soon grew again.

PORPHYROCOMA *lanceolata* lost all its foliage, which grew out rapidly in a short time afterwards.

CYRTANTHERA lost all its foliage, and recovered.

JUSTICIA lost all their leaves and flowers—grew out again.

ERANTHEMUM recovered slowly after the entire loss of leaves and flowers.

SCROPHULARIACEÆ.

BROWALLIA *Jamesonii* was killed. A young plant in a distant part of the hot house was saved.

BRUNSFELSIA lost all its leaves, and was thrown back for some months: recovered slowly.

FRANCISCEA. Of half a dozen species in the hot house every plant immediately shed all its leaves and flower buds. A large specimen of *F. confertiflora* was just coming into bloom. After being totally denuded, it put forth leaves and flower buds, and was covered with blossoms. They all recovered without serious injury.

RUSSELLIA *juncea* lost all its leaves, and was rather tardy in putting forth again.

DIPLACUS *elegans* lost all its leaves, and recovered without further injury.

MIMULUS. All of this genus were killed. They withered to the root at once, and showed no sign of life afterwards.

TORENIA *asiatica* lost both leaves and flowers—recovered rapidly.

BUDDLEA lost all the leaves and flowers—recovered.

VERONICA lost all their foliage and flowers—recovered.

LOBELIACEÆ.

SIPHOCAMPYLOS lost all their leaves; had to be cut back, and grew shortly afterwards.

CENTROPOGON *fastuosus* lost all its foliage, and soon recovered.

GOODENIACEÆ.

LESCHENAULTIA suffered greatly in the entire loss of leaves and tender wood: they were slow in recovering.

ASTERACEÆ.

AGERATUM *cœlestinum* lost all its leaves and flowers, and had to be cut back to the mature wood. They were very slow in recovering.

STEVIA lost all their leaves and flowers, requiring close pruning; they grew again.

Conoclinium lost part of their foliage, and all their flowers. They had to be cut back, and grew again.

Aphelexis. Although slow to exhibit any change, they were sufficiently affected to retard their growth.

Cineraria were very sensitive; they lost their foliage immediately, and recovered.

Barnadesia *rosea* lost all its flowers and leaves, and recovered.

Stifftia lost all the foliage, and was slow in recovering.

COMBRETACEÆ.

Poivrea recovered after the loss of all their leaves.

Combretum lost all their foliage, and required some months to recover.

Quisqualis, dry, and not affected.

ONAGRACEÆ.

Fuchsia. Over fifty specimen plants, some of them more than eight feet in height, were in the green and hot-houses, coming on for exhibition of the Pennsylvania Horticultural Society. They were ruthlessly stripped of all foliage, and the branches injured almost to the root. Nearly all had to be thrown away, and the few which remained were useless for the season.

Lopezia lost all its foliage, and recovered.

MELASTOMACEÆ.

Centradenia, although remote from the leak, were among the first to feel the effects of the gas. Leaves and flowers were all killed, and the plants recovered very slowly.

Lasiandra *splendens* lost all its flowers and foliage, but recovered.

Melastoma, although not much affected, did not flower as usual.

Medinilla. Of this genus, comprising a number of species, all suffered very severely in the entire loss of leaves. Though remote from the leak, they required close pruning, and were many months in recovering.

MYRTACEÆ.

Callistemon suffered the loss of all the foliage, and recovered.

Metrosideros lost all their foliage and flower buds; they soon grew out again.

Leptospermum lost all their buds and flowers, with every leaf—recovered.

Psidium. These were severely handled. They lost all the foliage, had to be cut back closely and were a long time in reviving.

Myrtus were denuded of all foliage—recovered with scarcely an effort.

Eugenia were slow in recovering after the loss of foliage and young wood.

CACTACEÆ.

Epiphyllum. In common with all the family of *Cactacea*, these suffered considerably. Of a large number placed upon shelves in the hot-house, all were violently affected. The whole substance of the plant quickly turned yellow, and became soft and flaccid, as a frosted or scalded vegetable. The greater part were thrown away; the remainder were long in recovering.

ESCALLONIACEÆ.

Escallonia lost all their leaves, and recovered slowly.

PHILADELPHACEÆ.

Deutzia lost all its flowers and leaves with severe struggling for life, and was long recovering.

CINCHONACEÆ.

Serissa *fœtida* dropped all its leaves and flowers, and recovered with great rapidity.

Coffœa *arabica* was unusually sensitive. Although it stood far aloof from the leak, it shed every leaf, and remained leafless for some time. Its growth has been feeble ever since, and it may never fully recover.

Rogiera were severely injured, they all lost every leaf and flower, required close pruning, and were long recovering.

Pavetta *indica* lost all its foliage, and recovered.

Ixora. This genus suffered severely. Not a flower or leaf remained on any individual, and had they been nearer the leak it is probable they would have been killed. They were cut back closely; and have not yet fully recovered.

Oldenlandia *deppeana* lost all its leaves and flowers—recovered.

Pentas lost all their leaves and flowers, had to be cut back, and were not long in recovering.

Rondeletia lost all their leaves, and recovered.

Bouvardia lost all their leaves and flowers; recovered.

Manettia lost all their leaves and flowers, and recovered.

Luculia *gratissima* lost all its leaves and buds, and withered slowly away. It finally died.

Gardenia lost all their foliage, and were slow in recovering.

Oxyanthus lost all the foliage, and recovered slowly.

Posoqueria *longiflora* was badly injured. It lost all its foliage, had to lose all its branches, even to within a short distance of the main trunk, and was very slow in recovering.

Mussænda *frondosa* lost all its leaves, flowers and bracteæ; it recovered slowly.

Burchellia *capensis* lost every leaf and flower bud—recovered slowly.

Campylobotrys lost all its leaves and recovered.

CAPRIFOLIACEÆ.

Abelia. Some were not in leaf; such as were in foliage lost every leaf, and recovered slowly.

CORNACEÆ.

Benthamia lost all its foliage, and recovered.

Aucuba lost all their leaves, had to be considerably pruned, and recovered slowly.

ARISTOLOCHIACEÆ.

Aristolochia lost all their leaves, grew again, but have not done well since.

June 1st.

Vice-President Lea in the Chair.

Twenty-nine members present.

Mr. Slack exhibited two living specimens of Argulus catostomi, and stated that this animal had been described at length by Messrs. Dana and Herrick in the 31st volume of Silliman's Journal. They, however, had found it only in brackish water, and upon the operculæ or gill covers. These had been found in a creek at least fifty miles from salt water, and upon the gills themselves, which were highly congested, apparently from the attacks of these animals.

June 8th.

Vice President LEA in the Chair.

Twenty-nine members present.

Announcements were made of the death of Dr. Johannes Müller, a Correspondent, and of Robert A. Caldcleugh, late a member of the Academy.

June 15th.

Dr. T. B. WILSON in the Chair.

Thirty-three members present.

Mr. Lea exhibited a specimen of *Unio rubiginosus* Lea, and remarked that, at a late meeting, he had called the attention of the Academy to a specimen of *Unio multiplicatus* Lea, which had *both leaves* of the branchiæ on *both sides* charged with young shells, which he then supposed to be peculiar to that species. Within a few days he had received from Cincinnati a number of species in a living state; and he was surprised to find, in a fine female *rubiginosus*, which he exhibited to the Academy, *both leaves on both sides* fully charged, the whole width, with sacks of *ova* of a deep rose color. These were not matured into the perfect shell, but each ovum was filled with *red granulations*, which gave a clear red tint to the whole of the four masses. On making an incision into the abdominal mass, he found the ovary fully charged with red eggs, which, passing out of the cut made by the scalpel, gave the appearance of arterial blood. The mass of the soft parts of this species is usually salmon-color or orange, but it is sometimes white, and this female was of the latter color.

June 22d.

Vice President BRIDGES in the Chair.

Thirty-one members present.

The following papers being presented for publication in the Proceedings, were referred to Committees:

Prodromus descriptionis Animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus, observavit et descripsit W. Stimpson. Pars. VI. Crustacea Oxystomata.

Descriptions of seven new species of Margaritana, and four new species of Anodonta, by Isaac Lea.

Notes to a second edition of a Geological Map of Nebraska and Kansas, by F. V. Hayden, M. D.

A letter from Mr. Edward Harris was read, containing the following statements regarding specimens of Salmo Gloverii *Girard*, presented this evening:

In the first place I would remark, that Mr. Girard's description of the color of the belly (yellowish) has doubtless arisen from his description being taken from the specimen as preserved in spirits, as it accorded with the coloring of my fish, which had been only two weeks in spirits; whereas, when put in. they were bright silvery below the medial line and over the belly, as is the case with all the fish taken at the outlet of the Grand Lake, on the western branch of the St. Croix River, as I also found them many years since on this stream as well as the eastern branch, in the fall of the year. These fish are taken also in moderate quantities lower down the stream, but in the waters below Lewey's Island, which are of a darker color, and constantly filled with sawdust from the mills, the fish lose their silvery brightness and have the appearance of having been immersed in a yellowish dye; these fish, too, are always in poor condition. In the young state, say from six to eight inches in length, they have almost invariably an irregular row of bright red spots placed along the medial line, some on one side, and some on the other. It was considered a very remarkable circumstance by the fishermen on the spot, that a fish so large as the smaller of these two should have the red spots, which this one had very distinctly before it was put in the spirits.

It has been heretofore considered by those who were acquainted with this fish, that they were entirely confined to the waters of the St. Croix, including its two branches and their lakes, in fact confined almost entirely to the lakes and their outlets; and it is only on this trip that I have heard of specimens having been taken, as a rarity, in three small lakes which empty into the lower St. Croix, and into the Passamaquoddy Bay. The fish described by Mr. Girard, as found in Union River, would have but a short distance farther to travel in the salt water before entering that river. It is therefore pretty certain that they are, as far as yet known, confined to the waters of the St. Croix and streams of easy access therefrom by sea. They appear not to be known in New Brunswick, except in one of the small lakes alluded to, which empties its waters on that side of the river. Mr. Perley is said to be unacquainted with the fish, except from report. I will mention another fact in regard to the Union River, which may throw some light on the history of this fish. I met accidently at Bangor with a gentleman of that place, an ardent sportsman, who told me he had caught in a small lake tributary to that river, a *small salmon;* that the waters of this lake had been dammed for saw mills about thirty years ago, shutting off as he supposed, the return of some salmon which had entered it for the purpose of spawning, and, that they had continued to breed there since, and had from want of access to the sea, deteriorated in size, and said also that several had been taken since. Now this gentleman had never seen the salmon trout (its universal name there,) of the St. Croix. Now taking into consideration that Agassiz has pronounced this fish the true Salmo Salar, which has at some former time, by some convulsion of nature, been shut up in these St. Croix Lakes, and only had the access to salt water restored by another geological change after the fish had been bred there so long as to lose its habits of migration, we need not be surprised that this gentleman should take this fish to be a small salmon.

These fish, as taken, may be said to run from one to five pounds in weight, as it is very rare to take fish of a size intermediate between the small fish with the red spots and those of the size of these specimens. I regret that I did not procure the small fish. I took a number of them at Lewey's Island, but could procure no spirits to preserve them, and after returning from Calais, I could catch none of the fish.

As a game fish, affording fine sport to the fly fisher, I doubt whether it has its equal on this continent, with the exception of the true salmon. Its strength and agility are surprising; when hooked it will frequently make a succession of leaps of two and three feet clear of the water. It is most readily taken with the fly in the most rapid waters above the dam at the foot of the Grand Lake, which has been made for the purpose of running logs. They are readily taken while the gates are up, but as soon as they are closed and the water becomes still, they decline the fly, but will still take the bait; at this time it is necessary to fish below the dam, where there is still a very rapid current from leakage and overflow. The brook trout, S. fontinalis, is taken in the same waters, and in the stiller waters above, a large lake trout, there called the Togue, which differs from the Salmo confinis of the northern lakes, by having a more deeply forked tail like the *S. siskewet* of Lake Superior.

Another striking characteristic in the history of this fish, is the remarkable development, in the male, of the point of the lower jaw, or chin, whereby it becomes elongated and hooked, during and previous to the seasons of sexual connexion and spawning, which are simultaneous in fishes. This peculiarity, which, so far as I am aware, has been heretofore considered to belong to the type of the genus alone, the *Salmo salar*, adds much force to the theory of Mr. Agassiz to which I alluded before, (and I believe I am correctly informed that he has advanced such a theory). This fact, which I can vouch for from personal observation as well as other undeniable testimony, will show the necessity of a very close and searching examination of the structure and anatomy of this fish, comparing it with the true salmon, before its new name is confirmed. This sexual development, so strictly analogous to the swelling of the neck in the genus *Cervus* among quadrupeds, seems to point to further research among other species of the genus, that is to say, whether there is not a similar development, though less marked, through the whole family, as at present arranged, or if found wanting in that portion of the genus *with very minute scales*, whether it may not characterise that portion consisting of *Salmo salar*, this fish and all those having *large scales*. I was struck the other day in looking over the figures of Richardson's Trout of the Arctic Regions, that there was more than one with the projecting lower jaw. Were not these fish taken during the spawning season? And may they not have received another name in the normal state? Of course the facts at present known are too scanty to found a theory upon, but should this suggestion ultimately prove to have a foundation in fact, it would be sufficient to authorise a division of the genus.

Dr. Morris mentioned in connection with this subject, that he had observed in the common brook trout (*Salmo fontinalis*) a similar elongation of the lower jaw in the spawning season.

June 29th.

Vice President Bridges in the Chair.

Twenty-nine members present.

The Report of the Secretary of the Biological Department was presented.

The by-laws reported by the Committee appointed March 30th, to draft a series of by-laws for the government of the Committee on Proceedings, were read for the third time, and passed.

Whereupon Dr. Fisher offered the following:

Resolved, That all previous resolutions of the Academy, prescribing the constitution, duties and powers of the Committee on Proceedings, be, and the same are hereby repealed.

Which was considered and adopted.

Dr. Leidy, by permission of the Academy, communicated the fact, that about one half of the chrysalides of the canker-worm (*Endalimia*), which had recently proved so destructive to the foliage of our shade trees, were infected by two species of *Ichneumon*. One of the latter is comparatively large; and a single individual occupies the body of a canker-worm chrysalis. The other species is minute; and numerous individuals occupy the interior of a chrysalis.

The death of Hon. J. R. Tyson, a member of the Academy, was announced.

The following papers were ordered to be printed in the Proceedings.

Descriptions of seven new species of Margaritanæ, and four new species of Anodontæ.

BY ISAAC LEA.

Margaritana Elliottii.—Testâ lævi, ellipticâ, inflatâ, posticè subrotundâ, inæquilaterali; valvulis subtenuibus, anticè crassioribus; natibus prominulis, ad apices paulisper undulatis; epidermide micante, radiatâ, vel viridi vel tenebroso-fuscâ; dentibus cardinalibus parvis, tuberculatis, in utroque valvulo singulis; margaritâ cœruleâ et iridescente.

Hab.—Chatahoochee River, near Columbus, Georgia. Bishop Elliott.

Margaritana triangulata.—Testâ lævi, triangulari, valdè inflatâ, posticè angulatâ, subæquilaterali; valvulis subtenuibus, anticè crassioribus; natibus prominentibus, tumidis, ad apices rugoso-undulatis; epidermide tenebroso-castaneâ, valdè radiatâ; dentibus cardinalibus parvis, erectis, crenulatis, in utroque valvulo singulis; margaritâ vel albâ vel salmonis colore tinctâ et iridescente.

Hab.—Upper Chatahoochee, Georgia, Bishop Elliott. Columbus, Georgia, Dr. Boykin, and J. Postell. Potato Cr., Georgia, Rev. G. White; and Sawney's Creek, S. Carolina, Dr. Blanding.

Margaritana connasaugaensis.—Testâ lævi, obovatâ, posticé inflatâ, anticè, et posticè rotundatâ, valdè inæquilaterali; valvulis pertenuibus; natibus prominulis, ad apices rugoso-undulatis; epidermide viridi luteâ, posticè obsoletè radiatâ; dentibus cardinalibus parvis, tuberculato-compressis, in utroque valvulo singulis; margaritâ cœruleo-alba et iridescente.

Hab.—Connasauga River, one of the head waters of the Alabama River, in Gilmer Co., Georgia. Bishop Elliott.

Margaritana etowahensis.—Testâ lævi, ellipticâ, subcompressâ ad lateris planulatis, inæquilaterali; valvulis tenuibus, anticè paulisper crassioribus; natibus prominulis, ad apices rugoso-undulatis; epidermide luteolâ, posticè obsoletè radiatâ; dentibus cardinalibus parvissimis, erectis, tuberculato-compressis, in utroque valvulo singulis; margaritâ cœruleâ et iridescente.

Hab.—Tennessee, Dr. Troost; Etowah River, Georgia, Rev. G. White.

Margaritana Gesnerii.—Testâ sulcatâ, quadratâ, inflatâ, posticè obtusè angulatâ, subæquilaterali; valvulis subcrassis, anticè crassioribus; natibus subprominentibus; epidermide tenebroso-fuscâ, micante, obsoletè radiatâ; dentibus cardinalibus parvis, lævibus, subcompressis, in utroque valvulo unicis; margaritâ albâ.

Hab.—Uphaupee Creek, Alabama, below Columbia, Georgia. W. Gesner and G. Hallenbeck.

Margaritana tombecbeensis.—Testâ lævi, ellipticâ, inflâtâ, posticè obtusè angulatâ, anticè rotundatâ, subæquilaterali; valvulis subtenuibus; natibus prominentibus, tumidis, ad apices undulatis; epidermide tenebroso-olivâ, obsoletè radiatâ; dentibus cardinalibus parvis, tuberculatis; margarita albâ.

Hab.—Tombecbee River, near Columbus, Mississippi. Wm. Spillman, M. D.

Margaritana Spillmanii.—Testâ lævi, obovatâ, anticè valdè inflatâ, posticè subbiangulatâ, inæquilaterali; valvulis subtenuibus, anticé crassioribus; natibus prominentibus, tumidis, ad apices rugoso-undulatis; epidermide rufo-fuscâ, eradiatâ; dentibus cardinalibus parvis, tuberculato-compressis, in utroque valvulo singulis; margaritâ albâ et iridescente.

Hab.—Tombecbee River, near Columbus, Mississippi. Wm. Spillman, M. D.

Anodonta Hallenbeckii.—Testâ sulcatâ, arcuatâ, valdè inflatâ, posticè et anticè rotnndatâ, inæquilaterali; valvulis subtenúibus, anticé paulisper crassioribus; natibus prominentibus, tumidis; epidermide micante, vel luteâ vel tenebroso-olivâ; eradiatâ; margaritâ albâ et iridescente.

Hab.—Uphaupee Cr., Macon Co., Geo. W. Gesner.

Anodonta Gesnerii.—Testâ lævi, ellipticâ, valdè inflatâ, posticè sub-angulatâ, valdè inæquilaterali; valvulis subcrassis, natibus prominentibus, tumidis; epidermide politâ, vel viridi vel luteâ, obsoletè radiatâ; margaritâ vel albâ vel aureâ et iridescente.

Hab.—Uphaupee Cr., Macon Co., Alabama. W. Gesner, of Milledgeville, Georgia.

Anodonta Dariensis.—Testâ lævi, ellipticâ, ventricosâ, inæquilaterali, posticè obtusè angulatâ; valvulis subtenuibus, anticè crassioribus; natibus elevatis, tumidis, ad apices minutè undulatâ; epidermide tenebroso-olivâ, striatâ, obsoletè radiatâ; margaritâ cœruleo-albâ et iridescente.

Hab.—Hopeton, near Darien, Geo., J. Hamilton Couper; and Swift Creek, near Macon, Geo.; Bishop Elliott, and J. C. Plant.

Anodonta Danielsii.—Testâ lævi, ellipticâ, compressâ, posticè obtusè angulatâ, valdè inæquilaterali; valvulis subtenuibus; natibus prominulis, ad apices undulatis; epidermide tenebroso-fuscâ, micante, obsoletè radiatâ; margaritâ cœruleo-albâ et iridescente.

Hab.—Topeka, Kansas. Prof. Edward Daniels.

Explorations under the War Department.—Explanations of a second edition of a Geological Map of Nebraska and Kansas, based upon information obtained in an Expedition to the Black Hills, under the command of Lieut. G. K. Warren, Top. Engr. U. S. A.

BY F. V. HAYDEN, M. D.

Geologist to the Expedition.

In May of 1857, by permission of the War Department, I prepared and read before the Academy of Natural Sciences at Philadelphia, a few brief notes on the geological structure of the vast region drained by the Missouri River, with a section showing the different formations from Fort Benton to the mouth of the Platte. The geology, as far as it was known at that time, was represented by colors, on a topographical map constructed by Lieut. Warren. Since that time the expedition to the Black Hills under his command, has brought back many additional facts and much new material, which render a second edition of the map necessary, and enables me not only to add some geological formations, not previously known to exist in the West, but to enlarge to a considerable extent the boundaries of others. In my notes explanatory of the geological portion of the map, I shall endeavor, as far as possible, to avoid the repetition of material already made known, through numerous publications, in connection with Mr. Meek. A much larger surface might have been colored on the map with a good degree of confidence, but I have preferred to confine myself, for the most part, to the results of my own observations in the field, leaving the blank portions to be filled up by future explorations.

The rocks of Nebraska, as far as they are at present known, are referrible to the following geological systems:

I. Metamorphosed azoic rocks, including clear granite.
II. Lower Silurian. (Potsdam standstone.)
III. Devonian?
IV. Carboniferous.
V. Permian.
VI. Jurassic.
VII. Cretaceous, Upper, Middle and Lower (including Wealden?)
VIII. Tertiary.
IX. Post Pliocene or Quaternary.

I. Granitic and Metamorphosed Azoic Rocks..

From the mouth of the Platte to Fort Laramie we meet with no indications of those disturbing influences from the subterranean forces which have wrought such changes in the physical features of the country in the vicinity of the mountain chains. But proceeding north and west from Fort Laramie, we soon find the different formations, older than the Tertiary, distorted and dipping at various angles. We observe, at first, a series of elevations in the form of isolated conical hills with rounded summits, varying from fifty to two hundred feet in height, for the most part, capped with Carboniferous limestones, which incline at various angles from 5° to 30°. Toward the main axis we find the elevations in the form of oblong ridges, frequently interrupted by narrow valleys, and presenting a full series of the formations known in this region, from the granite to the carboniferous limestones.

Winding around these conical peaks and ridges are numerous streams of pure water, margined with birches, poplars, and other trees, of the same species as those found in far northern latitudes. Not unfrequently the valleys formed by these streams are of considerable width, with a soil composed of the debris of the granitic and metamorphic rocks which sustains a quite luxuriant growth of vegetation. Laramie Peak,* the highest elevation in the Laramie range of mountains, is composed mainly of a coarse red feldspathic granite, surrounded by a series of azoic strata composed of gneiss, hornblende, micaceous and clay slates and quartz more or less pure, standing vertical, and inclining against the older granitic rocks. Raw Hide Peak, which is about 1,000 feet high, is also composed principally of granite which has been protruded upward through the overlying rocks, while all around the base of the peak, in regular sequence outward, may be seen the different azoic strata in a nearly or quite vertical position. Proceeding northward from Fort Laramie, the granitic and metamorphosed rocks cease to appear after passing the head of the Niobrara river, and from thence to the Black Hills we observe only slight local disturbances, sufficient to expose the Cretaceous beds down to No. 1, but showing most conclusively that the same subterranean forces that elevated the Laramie Mountains, raised the Black Hills also.

Arriving at the base of the Black Hills, we ascend by a series of stair-like ridges to the central or highest portion, and find that it is composed of a similar coarse red feldspathic granite as a nucleus, with a series of azoic strata resting against the granite. At the foot of the Black Hlls, Cretaceous bed No. 5 is but slightly disturbed ; dipping, perhaps, at an angle of 5°, and forming the first of a series of upheaved ridges which surround the principal axis. Passing over the first ridge we descend somewhat abruptly into a valley, and gradually ascend a second ridge, composed of Cretaceous beds Nos. 5 and 4, from eighty to one hundred feet in height, inclining at a still greater angle. The third ridge is formed of Nos. 4 and 3, and so on through all the different formations to the Potsdam sandstone, which is sometimes nearly vertical, and at others so elevated as to hold a nearly horizontal position. The granite of the Black Hills contains much more mica than that forming the nucleus of the Laramie Mountains, and might perhaps be more properly called a micaceous granite.

The Black Hills furnish the only examples on our route of the outburst of trappean rocks. Stone Peak, on the north eastern side of the Black Hills, is an isolated protrusion, composed of every variety, from a most cellular or vesicular porphyritic lava, to a rather compact rock, which sounds under a blow of a hammer like clink-stone. The highest portion of the peak is composed of trap rock of greater age than that above described, very compact, contains much iron, and assumes the form of pentagonal columns very similar to those described in Dr. Owen's report as occurring around Lake Superior. Near Bear

* Elevation unknown.

Peak, on the north-eastern side of the Black Hills, is another example of the protrusion of these basaltic columns which are also five-sided, the sides varying from eight to twenty inches in width. Some of the columns lie in a nearly horizontal position, the greater portion, however, inclining at an angle of 20° to 40°. Bear Peak is an outburst of porphyritic trappean rocks, specimens of which closely resemble the Tertiary lavas of the Pacific coast. All the Cretaceous beds and all the Jurassic to the blue limestone *E* of vertical section* are upheaved around Bear Peak.

From the foregoing examinations I am led to the conclusion, that the main body of the Black Hills and the Laramie range is composed of granite of very ancient date. That it is older than the oldest fossiliferous rocks is obvious from the fact that in both localities several hundred feet of stratified azoic rocks are interposed between it and the Potsdam sandstone. I am also of the opinion that the azoic strata overlying the granite on the eastern slope of the Rocky Mountains are similar in lithological characters, and hold the same geological position as the azoic rocks so largely developed around Lake Superior and in Canada.

II. Lower Silurian Rocks—Potsdam Sandstone.

The evidence of the existence of this formation in the region of the Rocky Mountains was ascertained, for the first time, in the summer of 1857, during Lt. Warren's Exploration of the Black Hills, as has already been shown in a paper read before the Acad. Nat. Sci., in March 1858. Its largest developement and only fossiliferous condition is found in the Black Hills, where by upheaval it is exposed in the form of a narrow belt or zone engirdling the azoic and granitic rocks which form the central axis of elevation. I observed no positive indications of this formation in the Laramie Mountains or at Raw Hide Peak, but in most places the Carboniferous strata rested unconformably upon the metamorphic rocks, except in a few localities, where a quartzose limestone which may be of Devonian? age was interposed. But at the head of the Niobrara river, a series of horizontal beds were exposed, resting upon the vertical edges of the metamorphosed rocks, which from their lithological characters I have considered as belonging to the Potsdam sandstone.

The following section will show the descending order of the beds.

c.—A yellow and reddish yellow, heavy bedded, friable sandstone, composed of an aggregation of quartz grains, cemented by calcareous matter, sometimes becoming a conglomerate, consisting of rounded quartz pebbles, ... 22 feet.

b.—Fine compact, reddish clay slate, ... 5 feet.

a.—Very nearly like bed *c*, only more compact and heavy bedded, of a light gray color, sometimes yellow with a reddish tinge, . . 37 feet

A series of metamorphic vertical strata, consisting of gneiss with silvery mica in large plates, micaceous and talcose slates, white quartz, &c.

Proceeding on our route northward, this formation was not again seen until we arrived at the main axis of elevation of the Black Hills. Near our camp, of September 24th, on the southeastern side, I observed resting unconformably upon gneiss, hornblende, mica slate, &c., a variegated, gray and reddish gray quartzose sandstone filled with small plates of mica. Some parts of it were compact and silicious, others a coarse friable grit, and at this locality seldom becoming a conglomerate, but containing seams almost entirely composed of comminuted fragments of shells, cemented with a fine grit. The more compact masses contained some fossils that were quite well preserved, among which were species of *Lingula*, *Obolus* and *Trilobites*, similar to, or identical with, those found in the Potsdam sandstone in other well known localities.

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* See vertical section of rocks in the Black Hills, in a paper by F. B. Meek and F. V. Hayden, Proc. Acad. Nat. Sci., March, 1858.

The following section at this point may serve to render more clear the order of succession of the beds.

c.—Yellow magnesian limestone, ...	50 feet.
b.—Yellowish gray arenaceus limestone, ...	40 feet.
a.—Potsdam sandstone, as described, ...	30 to 50 feet.
Azoic rocks standing vertical.	

Beds *b* and *c* are Carboniferous and conformable to bed *a.* We continue to see this formation whenever we approach the central portion of the Black Hills, and in some localities the greater part assumes the character of a coarse conglomerate composed of worn fragments from all the varieties of rocks beneath. Sometimes the lines of lamination are very irregular, as if the materials had been deposited by ocean currents. I observed this bed on the northeastern side of the Black Hills near Bear Peak, dipping at an angle of 20° to 30°.

Inasmuch as we have no paleontological evidence of the existence of this formation in the Rocky Mountain range, we must depend upon the somewhat uncertain data of lithological resemblance and position, for its geographical distribution. Prof. Hall, in Stansbury's Report, often describes a bed of sandstone corresponding in its lithological characters and geological position to the Potsdam sandstone in the Black Hills. Stansbury's Island, (Great Salt Lake) the summit of which is three thousand feet in height, is capped with carboniferous limestone, which also rests upon a coarse sandstone and conglomerate. Again, north of Great Salt Lake City, the "limestone overlies a coarse sandstone or conglomerate, which almost invariably accompanies it." "In several localities, as at Promontory Point, and near Mud Island, the metamorphic strata appear to be overlaid by a coarse conglomerate or coarse sandstone, which is partially altered and assumes the character of a quartz rock." Marcou, in the third volume of Pacific R. R. Reports, page 156, speaks of a sandstone occurring near the Aztec Mountains. He says: "We travelled seven miles upon the granite, and on our right we found a cliff twelve hundred feet high. From the base to the middle we found the granite, then a band of red sandstone, (Devonian or Old Red.) Above this, the beds of limestone and gray sandstone, belonging to the mountain limestone." The following day "we travelled three miles on the granite, the remainder on the Old Red Sandstone."

The diagram given, showing the order of the superposition of the different rocks, would apply equally well to the similar beds in the Black Hills. Many other less evident indications along the base of the Rocky Mountains might be cited from published Reports, but what has been said will be sufficient to show what we may hereafter expect with regard to its geographical distribution in the far west.

III. Devonian ? Formation.

The evidence of the existence of the Devonian formation near the eastern slope of the Rocky Mountains, is, as yet, quite obscure. Owing to the metamorphosed condition of the rocks, the fossils have been wholly obliterated, or only indistinct traces of them remain. About twelve miles west of Fort Laramie, the Platte river cuts through a series of strata three to four hundred feet in thickness, resting unconformably upon metamorphosed azoic rocks. The upper members of the series contain undoubted carboniferous fossils, which are sufficient to fix, with a good degree of precision, their age; but resting upon the azoic rocks, is a very hard, compact quartzose limestone, evidently metamorphosed to some extent, which, from its position and lithological character, I am disposed to refer to Devonian, though it may be of Silurian age. On the Platte river, it holds a horizontal position for the most part, but in a few localities the underlying azoic rocks are thrust up through it, distorting it at every angle. About ten miles north of Fort Laramie, near Raw Hide Peak, it is again exposed, the strata being vertical, alternating with soft, dark, blue clay slate. I did not see any indications of it in the vicinity of Laramie Peak, or in the Black Hills.

In regard to the geographical distribution of the formation, very little can be said. Mr. Englemann, geologist to Lieut. Bryan's Expedition to the South Pass, often mentions a similar rock occurring at various localities between Fort Laramie and the South Pass.* Dr. Shumard, after an examination of some specimens placed in his hands by Mr. E., says: "The specimens from the metamorphosed silicious strata, on the north side of Medicine Bow Butte, are Paleozoic types, belonging to the genera *Spirifer*, *Chonetes*, *Orthis*, *Orthoceras*, *Conocardium*, &c. They were very badly preserved, and their specific characters almost wholly obliterated. From their general appearance, however, I am strongly of the opinion that they represent the Devonian period." The evidence of its existence in the vicinity of Fort Laramie and other localities is so slight, that I have thought it not prudent to color any portion of the map as Devonian.

IV. Carboniferous System.

This system, as it is developed in the region of Fort Laramie, has been discussed so fully by Mr. Meek, and the writer in our paper published in March last, that I need only refer to it in a very brief manner. The town of Desoto is the highest point known on the Missouri where these limestones are exposed. Ascending the valley of the Platte river, we find them quite well developed as far as the mouth of the Elkhorn, when they pass beneath the bed of the river, and the sandstone No. 1 occupies the country. Several small seams of coal have been found in these limestones at Bellevue and other localities; and in the valley of the Platte, about ten miles above its mouth, I noticed a bed of very dark carbonaceous shale two feet in thickness, cropping out near the water's edge. This was considered by the inhabitants as a sufficient proof of the existence of a workable bed of coal in the vicinity. The evidence now points to the conclusion, that, though these limestones belong to the true coal measures, they hold a position above the workable beds of coal, and that it is not probable a valuable seam of coal will be found north of the southern line of Nebraska. A bed of coal, of inferior quality, has been wrought near Leavenworth City, Kansas Territory, but it holds a lower geological position than the limestones of the southern portion of Nebraska, the dip of the strata being toward the northwest.

The exact position in the Carboniferous system, to which the limestones around Fort Laramie and in the Black Hills belong, is not sufficiently clear from the evidence yet obtained. They do not seem to be the equivalents of the beds above described along the Missouri, though they may be. The texture of the rock is quite unlike that of any of the limestones of the coal measures with which we are acquainted, and there seems to be an absence of the fossils characteristic of the coal measure limestones on the Missouri, and in northeastern Kansas. The latest opinion, however, of my associate, Mr. Meek, is, that they belong to the true coal measures.

The following sections may serve to show the relations of the limestones at Fort Laramie with those in the Black Hills.

d.—Vertical section of carboniferous rocks near Fort Laramie.
Yellow magnesian limestone, hard and rather granular in its structure; contains several species Rhynconella, ... 50 feet.

c.—Very compact bluish gray limestone, with a deeply sinuate Productus, and a Productus like *P. cora* in the fineness of its striæ, . . . 20 feet.

b.—Rather friable, flesh colored, arenaceous limestone, with an abundance of a smooth Terebratula, like *T. subtileta*, ... 4 feet.

a.—Yellowish and whitish arenaceous limestone, containing *Spirifer*, *Rocky montani*, (Marcou) allied to Lower Carboniferous forms; a second species very much like, perhaps identical with, *S. cameratus;* a third, with a high area like *S. cuspidatus;* also a species of Productus very closely allied to *P. semirettculatus*, ... 30 to 40 feet.

* President's Message and Documents, 1857, page 417.

Vertical section of Carboniferous rocks in the Black Hills.

2.—Yellow magnesian limestone, rather hard and compact, passing down into a somewhat friable arenaceous limestone, underlaid by a bluish limestone, very hard, and containing a Productus like *P. cora*, and a Rhynconella.

1.—Yellowish gray arenaceous limestone, with a reddish tinge, splitting into thin slabs parâllel with the lines of stratification ; containing a Spirifer, perhaps identical with *S. cameratus;* a Productus like *P. cora;* corals, a Zaphrentis, Syringopora, &c. In the middle of this bed there is an eight foot layer of very hard compact bluish limestone, filled with comminuted crinoidal remains.

The lower portion of bed (1) is the same as bed *a* of the Laramie section, and contains fossils at both localities which are similar to Lower Carboniferous types, along with some well marked Carboniferous species. In the Black Hills it contains a species of Euomphalus, resembling a species common in the Encrinital or Burlington limestone of the Lower Carboniferous series of the Western States, but perhaps distinct.

Bed 2 includes beds *a* and *b*, of the Laramie section, bed *c* being absent in the Black Hills section.

From the geological position, texture of the rocks, similarity, and in some cases identity of species of fossils, I think it quite certain that the limestones at Fort Laramie and in the Black Hills are the same as those so well developed in the vicinity of Salt Lake, in Utah Territory.

V. Permian Rocks.

Although but a short period has elapsed since, through the collections of Maj. Hawn, the evidence of the existence of this system of rocks in the West has been given to the world, it has already been shown to occur over a wide geographical area. In addition to Maj. Hawn's discoveries in northeastern Kanzas, which were announced in February last, and the paper published March 2d, by Mr. Meek and the writer, Dr. Shumard stated, at a Meeting of the Academy of Natural Sciences, at St. Louis, March 8th, that he had been studying a group of fossils from a white limestone in the Guadalupe Mountains, of New Mexico, and arrived at the conclusion that they were of Permian age. He also says, that several of the species are identical with Permian forms from England and Russia ; also identical with species obtained from the Permian rocks in Kanzas. It is now known to occur in a number of localities in the central portions of Kanzas ;* also along the Missouri River and opposite the northern boundary of the State of Missouri, and the evidence is quite conclusive, that it is developed in the Black Hills. Many stray masses of compact silicious rock were found in and around the Black Hills, containing fossils identical with those described from Kanzas. This question has already been discussed in a former paper, and I have considered the two beds E and F of the Section as Permian, with a query, the evidence not being sufficient to establish its existence with certainty. In a letter to the Academy of Sciences at St. Louis, dated March 31st, Dr. Norwood announced the discovery of Permian fossils in Illinois, and at the Meeting of the American Association for the Advancement of Science at Baltimore, Mr. A. H. Worthen, State Geologist of Illinois, read a paper on the Permian rocks of that State, and exhibited a fine collection of fossils, which he considered as belonging to that system. We have, therefore, reliable evidence of the existence of these rocks in Kanzas, Nebraska, New Mexico and Illinois, and future investigations will, I think, prove them well developed in Missouri and other Western States.†

* I have endeavored to represent this formation on the map, in Kansas, from information derived from Major Hawn's explorations.

† In our remarks of the 2d of March, upon the discovery of supposed Permian rocks in the West, both Mr. Meek and myself wish to be understood as referring to their existence in Kanzas and Nebraska. Our object being simply to announce our conclusions derived from the study of fossils col-

lected from these rocks in the West, we did not refer to their supposed prior discovery in Pennsylvania and on the Atlantic coast, nor were we able to judge of the evidence of their existence in those localities, it being based, for the most part, upon the remains of Vertebrata, which are out of our line of investigation. We also merely wished to announce the existence in the West of rocks which were on a parallel with the so-called Permian system of Europe, without touching the great question whether or not there is actually a Permian *system* distinct from the Carboniferous.

VI. Jurassic System.

The Black Hills has, up to this time, afforded the most satisfactory evidence of the existence of this system in the West. It is there brought to the surface by the upheaval of the older rocks in the form of a belt or zone, five to fifteen miles in width, engirdling the principal axis of elevation. None of the organic remains already discovered, which are quite numerous in species, are known to be positively identical with those found in the same system in the old world, but they belong to the same genera, and many of the species are so closely allied to forms characteristic of the Jura of Europe, that we cannot now hesitate to admit this system into our series. I will here repeat the palæontological evidence, which was read before the Academy in March last by Mr. Meek and myself, with such additional proof as we have been able to secure by our investigation of the undescribed fossils in the collection, up to the present time.

1st. *Pentacrinus asteriscus*, n. sp., is so nearly like the Liassic *P. scalaris*, Goldfuss, that it is with some hesitation we have regarded it as new.

2d. *Avicula* (*Monotis*) *tenuicosta*, n. sp., is very closely related to *M. substriata*, of Munster, from the Lias.

3d. *Arca* (*Cucullœa*) *inornata*, n. sp., is very similar to *C. Munsteri* (Zeiten,) also from the Lias.

4th. *Panopœa* (*Myacites*) *subelliptica*, n. sp., is similar to the Liassic forms *M. liasensis* and *M. Alduininus*, of Quensted.

5th. *Ammonites cordiformis*, n. sp., is the same type as the Oolitic species *A. cordatus*, (Sowerby).

6th. *Belemnites densus*, n. sp., is scarcely distinguishable from the Oolitic species *B. eccentricus*, Blainville, if, indeed, it is really distinct.

We have, also, in the collection from the Black Hills, a species of Hettangia, a genus not known to occur in the old world in formations newer than the Lias, and a Trigonia more nearly resembling Jurassic types than those of any other formation.

Although it is not yet known to occupy a large geographical area in this country, we have indications that it will be found extensively developed on the eastern slope of the Rocky Mountains, from the northern part of British America to New Mexico. That it exists toward the head waters of the Yellow Stone, around Panther and Big Horn Mountains, I cannot doubt.

In the summer of 1854, while exploring the valley of the Yellowstone, as far as the mouth of the Big Horn River, I received, from intelligent traders, masses of gypsum precisely like that characterizing the Jurassic beds in the Black Hills.

VII. Cretaceous System,*—Upper, Middle and Lower (including the Wealden ?)

The beds of sandstone impure lignite, &c., which we have hitherto described as resting upon the Upper Carboniferous limestones, near Council

*In a paper recently published by Maj. F. Hawn, in the St. Louis Acad. Sci., I observe he refers the whole of formation No. 1 of the Nebraska section to the Trias; and alludes to the fact that Mr. Meek and I had referred it to the Lower Cretaceous. He also states, that he found in some of the lower beds included by us in this series in Kanzas, fossils indicating relations rather to the Permian below than the Cretaceous above.

In justice to Mr. Meek and myself, I would state, that these lower beds in Kanzas

Bluffs, and extending above the mouth of the Big Sioux River, have, until recently, been considered of doubtful geological age, on account of the paucity of their organic remains. The discovery, during the past year, at Blackbird Hills, of dicotyledonous leaves in this formation, allied to the oaks, willows, and others of our deciduous forest trees, together with their position with regard to other well-known Cretaceous formations, renders the evidence quite clear that a large portion of the strata which we have included in No. 1 of our vertical section, are of Lower Cretaceous age.* In ascending the Platte Valley, No. 1 is first observed five miles above the mouth of that river in the form of an outlier, resting upon the Carboniferous limestone and gradually increasing in thickness to the mouth of the Elkhorn; it then covers the surface of the country as far as Beaver Creek, a branch of Loup Fork. We have already mentioned its exposure by elevation in the valley of Old Woman's Creek; and it also forms a belt around the Black Hills, presenting its usually variable lithological characters, and for the most part destitute of fossils. No. 2, 3, 4 and 5 also occur in their order of sequence outward from the Black Hills, as is shown by colors on the map. We have therefore arrived at the conclusion, that No. 1, as it is revealed from Council Bluffs to the Big Sioux, is Lower Cretaceous; although two or three beds of yellow and ash-colored clays, exposed at low water, near Blackbird Hills, may be Upper Jurassic, no organic remains having been found in them to fix with certainty their age. We also consider a large portion of No. 1 ?, as seen at the mouth of the Judith, Lower Cretaceous, though some of the beds are probably Jurassic. Should the Jurassic system be found to exist in the Judith country, of which fact there is room for very little doubt, we may look for a large development of it in the Great Lignite basin, which stretches northward toward the Arctic Sea.

The discovery during the past year in the Black Hills, of beds containing fresh water fossils of the genera Unio, Planorbis, Paludina, &c., in the lower portion of Cretaceous formation No. 1, or the upper part of the Jurassic, points to the conclusion that there probably are deposits in the West equivalent to those of the Wealden of Europe. The existence of this formation in the West, was first suggested by Dr. Leidy after an examination of some Saurian remains discovered by me near the mouth of the Judith river, in the summer of 1855. At that time the evidence seemed to be conflicting in its character, the Molluscous fossils appearing more closely allied to Tertiary forms, while the Vertebrate remains were related to those of the Wealden periods.

The fact that several species of shells from the Estuary beds of the Judith

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were included in No. 1 by us, solely on the strength of information furnished by Maj. Hawn, who had informed us that he had found in these beds, or rather in still lower beds, *Ammonites*, *Baculites*, *Ancyloceros*, *Caprinella*, *Inoceramus*, *&c.*, an association of fossils never met with in older rocks than the lowest Cretaceous. The fossils, however, sent us from these lowest beds by Maj. Hawn, proved, on examination, to belong to quite distinct genera from those to which he had referred them; being all Permian and Carboniferous types. Unfortunately, they did not come to hand until after our paper was published.

That the higher beds constituting the type of our No. 1, as seen near the mouth of the Big Sioux, on the Missouri, containing numerous well-preserved leaves of unquestionable dicotyledonous trees, apparently belonging to the genera *Quercus*, *Salix*, &c., and closely resembling existing species of those genera, cannot be Triassic, or even Jurassic, will, of course, be understood by geologists. Although we have as yet no conclusive, palæontological evidence that any portion of the beds we have provisionally included in No. 1, in the region of the Judith River is Jurassic, still I am inclined to think that some of the beds of this system are there exposed by upheaval in several localities. While exploring this wild, rugged country in the summer of 1855, I often noticed a series of non-fossiliferous variegated beds of clays and grits, thrust up from beneath the fossiliferus sandstones, which we have called No. 1 ?, with the same lithological characters as the Jurassic strata, developed in the Black Hills. I have little doubt, that they are exposed around Little Rocky, Snowy and Girdle Mountains in the same manner as about the Black Hills.

*Maj. Hawn also found the same or similar leaves in this formation in Kansas.

were so closely related to forms occurring in the Great Lignite Basin, which we knew to be Tertiary beyond a doubt, that thère was a question whether they were not specifically identical; also that a species of Ostrea found in the upper Judith beds could not be distinguished from a species observed in the lowest bed of the Lignite Basin, and a species of Trionyx was considered by Dr. Leidy common to the two deposits, led both Mr. Meek and myself to express the opinion that the Judith beds were probably Tertiary, and were on a parallel with the lowest beds of the great Lignite Basin. Other facts have now been brought to light which lead us rather to suspect that the suggestion first made by Dr. Leidy, that Judith River beds, or at any rate a portion of those containing the estuary fossils, as well as those occurring in the Black Hills, may be the American representatives of the Wealden of England. On the map I have not distinguished the Wealden deposits by a separate color, but included them with Lower Cretaceous formation No. 1.

From the evidence thus far obtained in regard to the Laramie Mountains and the Black Hills, I have inferred that there have been the following oscillations of the surface of the country in this region. In the first place, after the deposition of the azoic strata, there was an upheaval of the granitic rocks, which threw into a highly inclined position these older strata. If this upheaval elevated the old azoic strata above the ocean level, there must have been a subsequent subsidence, after which the Potsdam Sandstone was deposited. Then there was a later elevation that raised the Potsdam Sandstone above the surface of the ancient sea, which was followed by a long period of repose, sufficient for the deposition of all the formations from the Potsdam to the Upper Carboniferous, when there was another subsidence followed by the deposition of the formations of the Upper Carboniferous, Permian, (possibly the Triassic,) Jurassic and Cretaceous Periods. After all these disturbances, and probably at the same time that most of our continent was raised above the ocean level, the whole of these strata were again elevated to nearly their present position previous to the dawn of the Tertiary period.

What changes may have occurred in the physical features of the country during the long period which must have elapsed between the deposition of the Lower Silurian and the Carboniferous rock, it is impossible now to determine. We know that in our present seas there is a constant deposition of sediment going on, forming sandstones, &c., or a calcareous precipitation forming limestones. In order to account for the hiatus between the Potsdam sandstone and the Carboniferous rocks in this region, we must suppose that either the surface occupied by the former was above the waters during this long interval, or that the intervening formations were deposited and subsequently removed by erosion and denudation, prior to the Carboniferous era. It seems quite improbable that so great thickness of strata could have been removed, so as to leave no trace of their former existence over so large an area. We are, therefore, inclined to the opinion that they were never deposited in this region.

VIII. Tertiary Basins of the Upper Missouri.

Our present knowledge of the geological formations of the far west, leads me to modify, to some extent, the divisions of the Tertiary Basins given in my notes explanatory of the first edition of the geological map of Nebraska, published in May, 1857. Considering the fresh water and estuary deposits at the mouth of the Judith as probably the equivalents of the Wealden of Europe, we have the following subdivisions:

1st. Great Lignite Tertiary Basin.
2nd. White River Tertiary Basin.

1*st.* *Great Lignite Tertiary Basin.*

As this formation, in its extensive development on the Upper Missouri, has been described quite fully in several preceding papers, I will here simply notice its occurrence in the only locality where it was observed during the explorations of the past year, near the source of the South Fork of the Shyenne river. It here rests conformably upon Cretaceous bed No. 5, and in no place exhibits any indications of having been disturbed by the subterranean forces which have wrought such changes in the physical features of this region. The following section will represent the descending order of the beds as seen at this locality:

e.—Yellow arenaceous bed, holding the same position, I think, as the one at Fort Clark, which contains numerous fresh water shells.
d.—Light gray grit, with numerous iron-rust concretions, same bed, seen on Cherry Creek, Fort Clark, on the Missouri above Fort Union, and on the Yellow Stone, ... 20 to 30 feet.
c.—Very impure Lignite, ... 4 to 6 feet.
b.—Dark ash colored clay passing up into the Lignite, ... 20 feet.
a.—Fine yellow sand : about 6 feet exposed.

By reference to the colored map, the boundaries of this great basin will at once be seen north and east of the Black Hills. It will also be seen that my former explorations show its full development on the Yellowstone, as high up as the mouth of the Big Horn river. It will then appear probable that its existence on the South Fork of the Shyenne indicates its extension from the Yellowstone, along the western base of the Black Hills, and that it adapts itself to the rugged features of the country, caused by the upheaval of the older formations, in the same manner as the Miocene Tertiary near Raw-Hide Peak and Laramie Peaks.

2d. *Tertiary Basin of White and Niobrara Rivers.*

In a former paper* I gave a vertical section of the different beds of this basin as far as they were known at that time. During the past year, many additional facts, and a large collection of new organic remains have been secured, which enable me to present a section more accurate and complete. It will be at once apparent from the list of localities for the different beds, how extensive a geographical area this basin occupies.

Vertical Section, showing the order of superposition of the different beds of the Tertiary Basin of White and Niobrara Rivers.

		Subdivisions.	Localities.	Estimated thickness.
POST PLIOCENE.		Yellow silicious marl, similar in its character to the loess of the Rhine, passing down into variegated indurated clays and brown and yellow fine grits; contains remains of extinct quadrupeds, mingled with those identical with recent ones; also a few Mollusca, mostly identical with recent species so far as determined.	Most fully developed along the Missouri river, from the mouth of the Niobrara to St. Joseph; also in the Platte Valley and on the Loup Fork.	300 to 500 feet.

*Notes on the Geology of the Mauvaises Terres of White River. Proceedings of the Academy of Nat. Sc. Philadelphia, June, 1857.

		Subdivisions.	Localities.	Estimated thickness.
PLIOCENE TERTIARY.	Bed F.	1st, dark gray or brown sand, loose, incoherent, with remains of Mastodon, Elephant, &c.; 2d, sand and gravel, incoherent; 3d, yellowish white grit, with many calcareous, arenaceous concretions; 4th, grey sand with a greenish tinge; contains the greater part of the organic remains; 5th, deep yellowish red arenaceous marl; 6th. yellowish gray grit, sometimes quite calcareous, with numerous layers of concretionary limestone from two to six inches in thickness, containing fresh water and land-shells, Succinea, Limnea, Paludina, Helix, &c., closely allied and perhaps identical with living species; also much wood of coniferous character.	Covers a very large area on Loup Fork, from the mouth of North Branch to source of Loup Fork; also in the Platte Valley. Most fully developed on the Niobrara river, extending from the mouth of Turtle river three hundred miles up the Niobrara. Also on Bijoux Hills and Medicine Hills. Thinly represented in the valley of White river.	300 to 400 feet.
MIOCENE.	Bed E.	Usually a coarse grained sandstone, sometimes heavy bedded and compact; sometimes loose and incoherent; varies much in different localities. Forms immense masses of conglomerate; also contains layers of tabular limestone with indistinct organic remains; very few mammalian remains detected, and those in a fragmentary condition. Passes gradually into the bed below.	Most fully developed along the upper portion of Niobrara river and in the region around Fort Laramie. Seen also on White river and on Grindstone Hills.	180 to 200 feet.
	Bed D.	A dull reddish brown indurated grit, with many layers of silico-calcareous concretions, sometimes forming a heavy bedded fine grained sandstone; contains comparatively few organic remains.	Niobrara and Platte rivers; well developed in the region of Fort Laramie; also in the valley of White river. conspicuous, and composing the main part of the dividing ridge between White and Niobrara rivers.	350 to 400 feet.
	Bed C.	Very fine yellow calcareous sand, not differing very materially from Bed D, with numerous layers of concretions and rarely organic remains, passing down into a variegated bed, consisting of alternate layers of dark brown clay and light grey calcareous grit, forming bands, of which I counted twenty-seven at one locality, varying from one inch to two feet in thickness.	White river, Bear creek, Ash Grove spring, Head of Shyenne river. Most conspicuous near White river.	50 to 80 feet.

		Subdivisions.	Localities.	Estimated thickness.
MIOCENE.	Turtle and Oreodon Bed B.	A deep flesh colored argillo-calcareous indurated grit; the outside when weathered, has the appearance of a plastic clay. Passes down into a gray clay, with layers of sandstone; underlaid by a flesh colored argillo-calcareous stratum, containing a profusion of Mammalian and Chelonian remains. Turtle and Oreodon Bed.	Old Woman's creek, a fork of Shyenne river; also on the head of the South Fork of the Shyenne; most conspicuous on Sage and Bear creeks, and at Ash Grove Spring. Well developed in numerous localities in the valley of White river.	80 to 100 feet.
	Titanotherium Bed. A.	Light gray fine sand, with more or less calcareous matter, passing down into an ash-colored plastic clay, with large quantities of quartz grains disseminated through it, sometimes forming aggregated masses like quartzose sandstone cemented with plaster; then an ash-colored clay with a greenish tinge, underlaid at base by a light gray and ferruginous silicious sand and gravel, with pinkish bands. Immense quantities of silex in the form of seams all through the beds. Titanotherium Bed.	Old Woman's creek; also in many localities along the valley of the South Fork of Shyenne. Best development on Sage and Bear creeks. Seen at several localities in the valley of White river.	80 to 100 feet.
CRETACEOUS.	Nos. 4 and 5.	Cretaceous beds 5 and 4, with their usual lithological characters and fossils.	Exposed underneath the Tertiary Beds on the South Fork of Shyenne and its Southern Branches, also in White river valley near its source.	

By reference to the map it will be seen that our route, which is indicated by a dotted line, led us up the Loup Fork of the Platte river to its source, thence a little west of North to the Niobrara river, and up the latter river to Fort Laramie. From Fort Laramie we proceeded nearly north to the Black Hills, and, on our return, crossed the Shyenne and White rivers, striking the Niobrara again above the mouth of Little Rapid river. We then passed down the Niobrara to its entrance into the Missouri river. Inasmuch as the surface deposit of the greater portion of the country thus passed over, is composed of the different beds of the Tertiary basin of which I am now treating, I think I can show more clearly the geographical area of this formation and that of its subdivisions, also the changes in the lithological characters, by giving a brief digest of my journal as we proceeded from point to point.

Ascending the Loup Fork, the first indication we observed of this formation was near the old Pawnee village, about eight miles above the mouth of Beaver creek. Here we found, near the bed of the river, large masses of pebbly conglomerate, cemented with a calcareous grit, which undoubtedly belongs to bed

E of the vertical section. The distant hills, on either side of the river, are covered with a considerable thickness of Pliocene and Post Pliocene beds.

Near the mouth of North Branch the following section of the strata, in descending order, were observed :

d.—Yellowish brown laminated argillaceous grit; effervesces briskly with muriatic acid. - - - - - - - - - - - - - -

c.—Similar to the bed above, but of a deeper color, more compact, containing a greater per cent. of clay, with numerous calcareous concretions disseminated through it, - - - - - - - 70 to 100 feet.

b.—Light brown clay, filled with fine whitish particles like magnesia. 70 feet.

a.—Gray, coarse sand, forming a heavy bedded sandstone, reaches to the waters edge, - - - - - - - - - - - 30 feet.

In the upper beds of the above local section, fragments of Mammalian and Chelonian remains were found, and all but the lower bed, which is bed *E* of the vertical section, are Pliocene. Lt. Warren explored the North Branch thirty miles above its mouth, and met with a similar series of beds, containing the same organic remains. Above the mouth of North Branch, bed *a* of the local section appears, in the form of large ledges of light gray arenaceous limestone, filled with silicified tubes like the stems of plants, and seeds resembling cherry stones In the Pliocene beds, on the distant hills, when exposed by erosion, I found numerous fragments of bones and teeth of Hipparion, Cervus, &c.

About lon. 99° we enter the desolate region of the Sand Hills. I measured the heighth of these hills at one locality and found them to be two hundred and thirty feet above the bed of Loup Fork, and composed of Pliocene beds as a base, then a thin bed of Post Pliocene marl, overlaid by a great thickness of loose incoherent sand and gravel, derived from the erosion of the different Tertiary beds. The whole country from the head of Loup Fork presents a similar character, consisting of movable sand hills, the true Tertiary beds being very seldom exposed. On the South Branch, the stream cuts though the following Pliocene strata.

c—Yellowish brown grit, containing *Mastodon micificus*, (Leidy.)

b—White chalky stratum, charged with fresh water and land shells of the genera *Helix*, *Planorbis*, *Limnea*, &c., probably identical with recent species, - - - - - - - - - - - - - 3 feet.

a—Heavy bedded gray sandstone, - - - - - - 8 t0 10 feet.

From the head of Loup Fork to the Niobrara river the whole country is covered with this superficial deposit of sand, which is blown by the wind into ridges and high conical hills, rendering travelling quite difficult. On reaching the Niobrara we find bed *E* quite well developed, also a full series of the Pliocene beds filled with Mammalian remains. Passing up the Niobrara about fifty miles, the Pliocene strata gradually disappear, and the whole country is occupied by the Upper Miocene beds *E* and *D*. A Butte near this point affords a fine detailed section of the gray sandstone bed *E*, which, measured from the base, with a pocket level, I found to be one hundred and sixty-six feet in heighth. It is composed mostly of a gray coarse grit, sometimes quite incoherent, containing many layers of concretionary sandstone. On the summit is a thin bed of shelving limestone similar to that containing organic remains at Pinau's spring, though probably not holding the same geological position. Indistinct traces of freshwater shells and numerous remains of fishes, scales, vertebræ, &c., were visible in the tabular masses. It seems to form the upper portion of bed *E*, and to vary much in its character in different localities. It presents every variety from a translucent chalcedony to a fine grained sandstone or compact limestone, and furnishes those chalcedonic masses which meet the eye of the traveller so often and have the appearance of erratic blocks. Farther from the river, and holding a higher position than the summit of the Butte, are thin beds of yellow and yellowish gray calcareous grit undoubtedly of Pliocene age, containing numerous fragments of teeth and finely preserved bones of the *Mastodon* and *Elephant*. As we pass up the river the gray sandstone bed *E* presents a great variety of lithological characters. Sometimes it forms a coarse conglomerate, then an aggregate of grains of quartz cemented by calcareous matter.

About sixty miles above the point where we struck the Niobrara, bed *D*, of the vertical section, is revealed to the water's edge. The dip of the strata towards the east gradually brings this bed to view quite conspicuously. It is composed of a flesh colored calcareous grit, and the eroded material of this bed gives to the country a dull reddish yellow tint. It also contains many layers of silico-calcareous concretions, forming large ledges which break into irregular masses on exposure. The more incoherent material has much the color and appearance of that composing the Turtle bed at Bear creek, but contains much less clay. It does not differ materially from its equivalent in the White river valley, of which Eagle Nest Butte forms a part.

Leaving the Niobrara river for Fort Laramie, we pass over a large area covered with sand hills, which have a dull ferruginous tinge, and are evidently composed of the eroded materials from bed *D*. One of these hills measured one hundred and eighty feet in heighth, with very steep sides, its present conformation being preserved by the roots of vast numbers of a species of Yucca, which cover the hill and seem to find their maximum growth in this sandy soil. Near Spoonhill creek bed *E* is composed mostly of a very coarse conglomerate, formed of angular and water-worn fragments similar to those seen in the granitic, metamorphic and carboniferous rocks, in the Black Hills, the fragments varying in size from one-eighth of an inch, to four inches in diameter and cemented with rather coarse silicious sand. It here forms huge overhanging ledges, large masses of which have fallen to the base of the hills, and are scattered over the plains below, giving to the scenery a very rugged appearance.

On Raw Hide Butte creek, bed *D* approximates more closely in its character to the turtle bed *B* of the vertical section. On an exposed area, not more than eight or ten yards square, in the valley of the creek, I observed fragments of at least eight turtles (*Testudo nebrascensis*) with a few mammalian remains similar to those found so abundantly in bed *B*, at Ash Grove Spring. The upper Miocene beds *E* and *D* occupy the country around Fort Laramie, exclusively, and extend to the base of the Laramie range of mountains. Bed *D* attains by far the greatest thickness, bed *E* having been eroded away to a great extent, and losing its conglomerate character, while bed *D* becomes one hundred and eighty to two hundred feet in thickness. The incoherent materials are here much more calcareous and of a finer grit, while the concretionary layers are formed of a sandstone coarser grained than at localities heretofore mentioned.

From Fort Laramie to Laramie Hills, August 22d.

Our course was 10° south of west from Fort Laramie ; travelled over Tertiary beds *E* and *D* for twelve miles, until we came to the head of Warm Spring, where we observed a bed of carboniferous limestone seventy-five feet in thickness. The strata seem to dip gently each way from a central axis, and are exposed at this locality over an area of only five or six hundred square yards. The upheaval is evidently a local one, the limestones being revealed by the erosion and removal of the Tertiary beds from the valley of the stream, which are every where undisturbed, resting unconformably upon the limestones on all sides. Nine miles farther on our route, another upheaval is exposed by the wearing away of the Tertiary beds in the valley of the Big Cotton Wood creek. Here we have eighty feet of carboniferous limestone, with a similar central axis of elevation from which the strata dip in all directions, while the Tertiary beds again rest unconformably upon their inclined edges. As we approach the Laramie Hills, no carboniferous rocks were seen in place, but the whole country is covered with a heavy deposit of drift, consisting of gravel and water-worn boulders from all the formations in this region.

Descending the Laramie Fork toward Fort Laramie, we again find the country covered with a thick deposit of drift, composed of a great variety of more or less water-worn materials derived from the mountains. The true Tertiary beds are revealed, by erosion, occasionally near the bed of the river, but no indications of the upheaval of the carboniferous rocks.

About twelve miles above Fort Laramie, both on the Laramie river, and the Platte a remarkable deposit is seen, composed of a coarse conglomerate, fifty to one hundred and fifty feet in thickness, of a recent character, and evidently formed since the scooping out of the present river valleys. Indeed the form of the deposit is that of a basin twelve or fifteen miles in length, and reaching its greatest thickness only in the valleys of the rivers, while the more elevated portions of the country between the Forks consist of the true Tertiary beds. It seems to vary from an aggregation of particles of quartz to an exceedingly coarse conglomerate made up of every variety of material, much of which I have not yet seen in place.

Fort Laramie to the Black Hills.

Proceeding north from Fort Laramie, we pass over Tertiary beds for the first seven miles, and then come to an extension of the Laramie range of Hills, which exhibits many peculiarities. The whole range appears to be composed of a group of conical elevations, and ridges which seem to illustrate very clearly, the irregular effect of the subterranean forces by which they were upheaved. A considerable thickness of carboniferous limestone was observed upon the sides and summits of these elevations, inclining at various angles, depending upon the power of the disturbing force from beneath, and when unchanged by heat contain numerous fossils. We can here see every variety of carboniferous limestone, from the unchanged fossiliferous rock, to that of a completely metamorphosed character, with the indications of stratification nearly or quite obliterated. Sometimes the melted material is thrust up through fissures in the unchanged rock, so that in a single hand specimen we have the changed and unchanged rock. The metamorphosed carboniferous limestones are usually of a deep red color, very compact, sometimes assuming a vitreous aspect, but never the thoroughly crystalline character of the older azoic rocks. Sometimes the limestones are elevated, so as to leave the strata horizontal, then again they are inclined at an angle of ten to thirty degrees. At the base of these ridges, the upper Miocene beds are seen insinuating themselves into ravines, or deposited high up on the sides of the elevations, thus filling up the irregularities formed by the numerous local disturbances.

In all cases the Tertiary beds are undisturbed, and not unfrequently rest directly upon the vertical edges of the azoic or granitic rocks. About eight miles west of Raw Hide Peak, the carboniferous limestones present a peculiar appearance, not unlike that of some Tertiary strata upon the Yellowstone, which have been fused or semi-fused by the burning out of the Lignite beds. The fused masses are very compact and heavy, varying in composition and color, red, yellow and mottled, oftentimes containing small fragments of partially changed rock, thus forming a sort of breccia.

After crossing the Niobrara river, the upheavals nearly cease, the blue carboniferous limestone only being exposed in a few places. The Tertiary beds occupy the larger portion of the country. Passing the dividing ridge, between the Niobrara and Shyenne rivers, into the Valley of Old Woman's creek, we find the Tertiary attaining its full development, and assuming a variety of fantastic forms from erosion, like the Bad Lands at Ash Grove Spring. The hills were covered with small pines.

On the east side of Old Woman's creek is a high ridge, trending southwest and southeast, composed of variegated sandstone, varying from a fine compact silicious rock to a coarse reddish conglomerate or sandstone, with no fossils, except indistinct traces of vegetable remains. This ridge, which belongs to Cretaceous formation No. 1, is the result of a less violent upheaval, and is exposed by the erosion of the Tertiary beds from the valley. On the distant hills, on each side of the valley, the denuded Tertiary beds are visible, while near the bottom of the stream the Titanotherium bed was observed by Lieut. Warren, presenting its usual lithological characters, and containing bones and teeth of the animal from which it derives its name. The following section of strata, in descending order, will show the details of this upheaval.

g.—Layers of whitish oolitic limestone, doubtless Tertiary.
f.—Compact ferruginous sandstone, ... 80 feet.
e.—Yellow friable sandstone, ... 2 feet.
d.—Light gray fine clay, ... 4 feet.
c.—Yellowish white sandstone, quite friable, ... 5 feet.
b.—Drab or ash colored indurated clay, passing down into red clay, 6 feet.
a.—Variable incoherent clays, red, yellowish, &c., which may be of Jurassic age, ... 50 feet.

Passing down the valley toward the Shyenne, the Tertiary beds disappear, and the Cretaceous bed No. 5 occupies the country. At one locality an upheaval was observed, exposing all the subdivisions of the Cretaceous rocks, as will appear from the following section:

No. 5. Presenting its usual lithological characters, with numerous fossils; strata but slightly disturbed, ... 100 to 150 feet.
No. 4. Presenting same characters as on the Missouri river, . 100 feet.
No. 3. . . . . 150 feet.
No. 2. . . . . 200 feet.
No. 1. . . . . 250 to 300 feet.

No. 5 is but slightly disturbed, as will be seen by examining the illustrative section. Nos. 4, 3 and 2 present only the vertical edges of this strata, across which the above measurements were taken. The strata of No. 1 seem to have been elevated so as to retain a nearly horizontal position. No. 3 at this locality contains numerous fossils, the most abundant of which are *Ostrea congesta* and *Inoceramus problematicus.* This bed does not present altogether the same lithological character as on the Missouri river, but possesses a more laminated and gritty structure, sometimes approaching to a calcareous sandstone. Crossing the Shyenne, on our way northward, we have the commencement of a series of ridges of upheaval, which surround the Black Hills.

I could not ascertain that there was any regularity in the dip and strike of the strata, each ridge or local upheaval differing from the other in that respect. As we approach the southern base of the Black Hills, the strata incline very nearly to the southeast. No. 1 does not appear, but we have a fine development of No. 2, possessing all its characteristics of plastic clay, with ash-colored grit concretions, containing an abundance of well preserved fossils; No. 3, with large quantities of *O. congesta* and *I. problematicus*, in an exceedingly comminuted condition; No. 4 also appears, and No. 5 caps the hills on all sides. Nos. 2 and 3 are exposed only by the upheaval. On a branch of Beaver creek we find No. 2. one hundred and fifty to two hundred feet in thickness, and presenting its usual characters in full.

Inasmuch as the principal facts relating to the Geology of the Black Hills have already been discussed, I will omit the details of our exploration of them, and pass on to a description of the country along our route, from Bear Peak, on the north eastern base of the Black Hills, to the entrance of the Niobrara river into the Missouri.

Near Bear Peak, No. 2 is quite largely developed, presenting its usual lithological characters, and containing great quantities of fish remains, but no other fossils were seen in it. No. 1 is composed of variegated clays, grits and sandstones, with indistinct vegetable-impressions, fossil wood, and a few uncharacteristic Saurian bones. No. 3 is also exposed by the upheaval of the beds, with its usual fossils, but possessing the character of a laminated calcareous sandstone, instead of the soft homogeneous calcareous marl of the Missouri river. From thence to the Shyenne, No. 4 forms a surface of the country, for the most part undisturbed.

I will not here dwell upon the influences which the eroding power of water must have exerted, in modifying the physical features of the country in and around the Black Hills. I am inclined to the opinion, however, that prior to the convulsion that upheaved the fossiliferous rocks, only the Cretaceous beds Nos. 4 and 5 were exposed in any portion of this region.

Along the Shyenne River, No. 4 contains most finely preserved fossils in the greatest abundance. Large Ammonites, two to three feet in diameter, still preserving their original pearly lustre, *Scaphites*, *Baculites*, *Ostrea*, &c. Ascending the valley of Sage Creek, we pass over the Cretaceous beds for the first five miles, which contain an abundance of fossils similar to those found on the Shyenne. We then meet with the lowest bed of the great Tertiary Basin of White River, resting conformably upon Cretaceous strata, which appear to be a blending of Nos. 4 and 5. We have, first, the dark clays of No. 4, then the yellowish brown, gritty shale of No. 5, with numerous ferruginous concretions; then the Titanotherium bed which sets regularly upon No. 5, and exhibits its highest development in the valleys of Sage and Bear Creeks. It is here composed, 1st, of a band of argillaceous grit weathering to a pink color, two feet in thickness, passing up into an ash colored plastic clay with a greenish tinge, full of chalcedony and calcareous concretions, altogether 50 to 80 feet in thickness; then a light gray calcareous grit upon which rests the Turtle Bed. A considerable deposit of drift consisting of water-worn bowlders, and loose sand and gravel, is distributed over the surface of the Bad Lands to a greater or less extent.

Proceeding up the valley of the Shyenne, we see only the Cretaceous beds Nos. 4 and 5, until we pass the mouth of Bear Creek, when the Tertiary makes its appearance, crossing the Shyenne and stretching off toward the base of the Black Hills in long ridges or isolated Buttes. The belt of Tertiary on the left side of the Shyenne is about thirty miles in width. A section fifteen miles above the mouth of Bear Creek, on the Shyenne, presents the following characters.

c.—Light gray indurated clay, ... 6 feet.
b.—Seam of gray sandstone, ... 18 inches.
a.—Ash-colored plastic clay with a greenish tinge, and a pinkish band of fine grit at the base, ... 30 feet.

The Titanotherium Bed varies much in its lithological characters in different localities. The layer of gray sandstone is sometimes two to four feet in thickness, composed of an aggregate of water-worn pebbles, with granular quartz, and small particles of mica, forming somewhat conspicuous ledges. On the western side of the Shyenne, the Titanotherium bed presents the following characters proceeding upward from No. 5: First, alternate seams of small pebbles and loose sand, two to six inches in thickness, passing up into a fine ferruginous grit, containing small scales of mica, weathering to a light gray color, then a band of pinkish gritty clay, six inches in thickness, passing up into ash-colored clay which has also alternate gritty layers. The pink band is quite persistent, and being exposed whenever the Titanotherium Bed is worn through, marks with a good degree of precision the base of the Tertiary. The surface in many places is covered with water-worn pebbles, varying in size from an eighth of an inch to eighteen inches in diameter, though mostly small, and representing all the varieties of metamorphosed rocks, with rounded masses of lime and flint rock, fossil wood, &c., so that No. 5, when the Titanotherium Bed is eroded away, is paved with this loose material. The Turtle Bed alone does not seem to be so marked in its character here as at Bear Creek. It weathers to a light yellow color and passes almost insensibly into the bed above. I have marked the line of separation at this locality, between the Turtle bed and the one overlying it, by a layer of very porous argillaceous sandstone of a dull brown or drab color. The Turtle bed contains much more sand than at Bear Creek, and the upper portion consists of alternate layers of calcareous concretions and indurated argillaceous grit with one band, eight feet in thickness, of ash-colored clay. Disseminated through the bed in every direction, are thin seams of chalcedony. A few mammalian remains were found, mostly of Oreodon and Rhinoceros.

On the right or east side of the Shyenne, as we pass over to White River, the Cretaceous bed No. 5 presents some peculiarities which may be worthy of notice, inasmuch as the upper portion seems to form a transition or bed of passage into the Tertiary. We have, first, No. 4, black laminated clay gradually passing up into dark brown clay, then becoming deep ferruginous; again a dull purplish hue, with seams half an inch to an inch in thickness of ferruginous matter passing up into a deep yellow arenaceous clay; lastly, a brown clay underlying the Titanotherium bed. I have been thus minute in describing these beds, from the fact that the transition from the Cretaceous to the Tertiary period seems as gradual and as natural as that of any of the subdivisions of the Cretaceous system into each other; and were it not for the organic remains which characterize each, we would scarcely be aware that we were passing from one great geological period to another.

At another locality the Titanotherium bed at the base consists of clay with a purplish tinge, filled with angular grains of quartz and water-worn pebbles, two feet; then a loose incoherent gravel, with pebbles, four inches; then six to eight feet of light gray clay, filled with pebbles and angular grains of quartz, sometimes forming a sort of quartzose sandstone, passing up into a dark ash-colored clay, with a greenish tinge.

A section of the different beds, as shown on White River, would be as follows:

Bed C.	Flesh colored marl,	10 feet.
	Bluish laminated clay with a yellowish tinge,	2 feet.
	Flesh colored indurated marl,	15 feet.
	Light gray, indurated, argillaceous grit, with nodules of clay,	4 to 6 feet.
Turtle Bed B.	Flesh colored indurated grit,	20 feet.
	Bluish argillaceous grit,	10 inches.
	Flesh colored marl,	4 feet.
	Argillaceous grit,	6 to 12 inches.
	Flesh colored marl,	30 feet.
Bed A.	A fine light gray calcareous grit, passing down into an ash-colored clay, with micaceous and silicious sandstone at base tinged with a purplish hue,	80 to 100 feet.

Cretaceous Beds Nos. 5 *and* 4.

In the valley of White River the Cretaceous beds Nos. 5 and 4 are exposed by the erosion of the overlying Tertiary beds, as may be seen by reference to the accompanying map. No. 5 reveals numerous fossils in similar tough argillaceous concretions, as those observed on the west side of the Shyenne. All the calcareous matter has been dissolved away from the shells, leaving only casts. The upper portion presents a variety of lithological characters, and is destitute of fossils.

Leaving the valley of White River, we proceeded nearly a south-east course, ascending gradually to the dividing ridge between White and Niobrara Rivers, where we find the largest development of bed *D*, which exhibits its usual lithological characters, but contains very few fossils. Passing the head of wounded-knee creek, we begin to see indications of the Pliocene formation, with a few mammalian remains, and on reaching the Niobrara, the upper Miocene beds are covered with a thick deposit of Pliocene strata. This more recent formation presents at this locality the same lithological characters as those given in the vertical section, and extends nearly to the mouth of Turtle Hill creek, where Cretaceous beds Nos. 4 and 3 gradually rise to the surface and cover the country. Outliers of Pliocene are visible, however, on both sides of the Missouri River in many localities, the principal of which are Medicine and Bijoux Hills, the latter of which has yielded several very interesting species of Mammalia

Upper Miocene bed *D* is not unfrequently revealed in the channel of the Niobrara, presenting a very irregular outline, showing most conclusively the great erosion that must have taken place prior to the deposition of the Pliocene beds. It would seem that after the deposition of the materials that entombed the Miocene fauna, this whole region was eroded so as to present the same rugged features as the Bad Lands of White River, and that the Pliocene beds were deposited upon this irregular surface entombing a second fauna, specifically distinct from, yet intermediate between that of the Miocene and our present period. I have attempted, in the illustrative section* along the Niobrara, to show the irregular outline of the bed *D*, prior to the deposition of the recent beds. The greatest thickness of Pliocene is always found in the valleys of the streams, and in consequence of its loose incoherent character is much denuded, forming the principal part of the material of the sand hills.

Catalogue of all the Fossils hitherto described, from the Tertiary Formations of White and Niobrara Rivers, wlth a table showing their stratigraphical position.

	Beds in ascending order. A	B	C	D	E	F
RUMINANTIA.						
1. OREODON GRACILIS, Leidy	...	*	*	*	...	...
2. OREODON CULBERTSONI, Leidy	...	*	*	*	...	...
3. OREODON MAJOR, Leidy	...	*	...	*	...	...
4. AGRIOCHŒRUS MAJOR, Leidy	...	*	...	*	...	...
5. AGRIOCHŒRUS ANTIQUUS, Leidy	...	*	...	*	...	...
6. POEBROTHERIUM WILSONI, Leidy	...	*	...	...	...	...
7. LEPTOMERYX EVANSI, Leidy	...	*	...	*	...	...
8. LEPTAUCHENIA DECORA, Leidy	...	...	...	*	...	...
9. LEPTAUCHENIA MAJOR, Leidy	...	...	...	*	...	...
10. PROTOMERYX HALLI, Leidy	...	...	...	*	...	...
11. MERYCODUS NECATUS, Leidy	...	...	...	...	...	*
12. MEGALOMERYX NIOBRAHENSIS, Leidy	...	...	...	...	...	*
13. MERYCHOCHŒRUS PROPRIUS, Leidy	...	...	...	*	...	...
14. PROCAMELUS OCCIDENTALIS, Leidy	...	...	...	...	...	*
15. PROCAMELUS ROBUSTUS, Leidy	...	...	...	...	...	*
16. PROCAMELUS GRACILIS, Leidy	...	...	...	...	...	*
17. MERYCHYUS ELEGANS, Leidy	...	...	...	...	...	*
18. MERYCHYUS MEDIUS, Leidy	...	...	...	...	...	*
19. MERYCHYUS MAJOR, Leidy	...	...	...	..	...	*
20. CERVUS WARRENI, Leidy	...	...	...	...	...	*
MULTUNGULA.						
21. CHŒROPOTAMUS (*Hyopotamus*) AMERICANUS, Leidy	*	...	...	...	...	...
22. ENTELODON MORTONI, Leidy	...	*	...	*	...	...
23. ENTELODON INGENS, Leidy	...	*	...	*	...	...
24. TITANOTHERIUM PROUTI, Leidy	*	...	...	...	...	...
26. PALEOCHŒRUS PROBUS, Leidy	...	*	...	*	...	...
27. LEPTOCHŒRUS SPECTABILIS, Leidy	...	*	...	*	...	...
28. RHINOCEROS OCCIDENTALIS, Leidy	...	*	*	*	*	...
29. RHINOCEROS (*Hyracodon*) NEBRASCENSIS, Leidy	...	*	*	*	*	...
30. RHINOCEROS CRASSUS, Leidy	...	...	...	...	...	*
31. MASTODON (*Tetralophodon*) MERIFICUS, Leidy	...	...	...	...	...	*
32. ELEPHAS (*Euelephas*) IMPERATOR, Leidy	...	...	...	...	...	*

*The section along the Niobrara river, as well as the more important one through the Black Hills, has been omitted in this paper, and will appear in Lt. Warren's forthcoming Report.

	Beds in ascending order. A	B	C	D	E	F
SOLIDUNGULA.						
33. Hipparion, s. Hippotherium occidentale, Leidy						*
34. Hipparion, s. Hippotherium speciosum, Leidy						*
35. Anchitherium Bairdi, Leidy		*				
36. Anchitherium (*Hypohippus*) affinis, Leidy				*		
37. Anchitherium (*Parahippus*) cognatus, Leidy				*		
38. Merychippus insignis, Leidy						*
39. Merychippus mirabilis, Leidy						*
40. Equus excelsus, Leidy						*
41. Equus (*Protohippus*) perditus, Leidy						*
RODENTIA.						
42. Steneofiber nebrascensis, Leidy			*	*		
43. Ischyromys typus, Leidy			*	*		
44. Palæolagus Haydeni, Leidy			*	*		
45. Eumys elegans, Leidy		*				
46. Hystrix (*Hystricops*) venustus, Leidy				*		*
47. Castor (*Eucastor*) tortus, Leidy						*
CARNIVORA.						
48. Hyænodon horridus, Leidy		*				
49. Hyænodon cruentus, Leidy		*				
50. Hyænodon crucians, Leidy		*				
51. Amphicyon vetus, Leidy		*				
52. Amphicyon gracilis, Leidy		*				
53. Leptarctus primus, Leidy						*
54. Deinictis felina, Leidy		*				
55. Machairodus primævus, Leidy		*				
56. Felis (*Pseudœlurus*) intrepidus, Leidy						*
57. Ælurodon ferox, Leidy						*
58. Canis sævus, Leidy						*
59. Canis temerarius, Leidy						*
60. Canis vafer, Leidy						*
61. Canis (*Epicyon*) Haydeni, Leidy						*
CHELONIA.						
62. Testudo nebrascensis, Leidy		*	*	*	*	
63. Testudo (*Stylemys*) niobraensis, Leidy						*
MOLLUSCA.						
64. Helix Leidyi, Hall and Meek		*				
65. Planorbis nebrascensis, Evans and Shumard				*		
66. Lymnea diaphana, Evans and Shumard				*		
67. Lymnea nebrascensis, Evans and Shumard				*		
68. Physa secalina, Evans and Shumard				*		
CRUSTACEA.						
69. Cypris Leidyi, Evans and Shumard				*		

Prodromus descriptionis animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit

W. STIMPSON.

PARS VI. *CRUSTACEA OXYSTOMATA.*

LEUCOSIDEA.

245. LEUCOSIA VITTATA, nov. sp. Carapax rhomboides, perconvexus, subcæruleus, rubro quinque-vittatus, superficie punctatus, apice productus. Margines crenulati; granuli marginis antero-lateralis sursum non conspicui. Margo posterior rectus, granulatus, angulis in adultis obtusus, in junioribus dentigerus. Frons tridentata, dente mediano magis prominente. Sinus thoracicus profundus, pubescens, antice productus, incisura interna profunda, rimata, externa marginem carapacis attingente. Chelipedum merus angulis et parte basali inferiore sparsim tuberculatus, basi dense tomentosus, superne tuberculis quinque, duobus magnis, tomento pœne celatis ornatus. Manus grandior. Pedum ambulatoriorum articuli sat dilatati. Abdomen ei *L. rhomboidalis* simile, gracilius, magis minuens; tuberculo segmenti penultimi minuto. Appendices abdominis maris primi paris spiraliter plicatæ, anfractibus duobus. ♂ Carapacis long. 0·97; lat. 0·85. poll. *L. craniolari* affinis sed brachio ad basim tomentoso. *L. rhomboidali* differt fronte tridentata.

Hab.—In sinibus prope portum "Hong Kong" Sinensem; in fundis limosis ad prof. quinque org. vulgaris.

246. LEUCOSIA MACULATA, nov. sp. Parva. Carapax bene rhomboides, glaber, cæruleo-fuscus, decem-maculatus, maculis parvis, rubris, in seriebus duabus longitudinalibus antrorsum divergentibus dispositis. Frontis dens medianus prominens, paullo deflexus. Sinus thoracicus profundus, pubescens, non tuberculatus, angulo antero-interno rotundato. Margo posterior convexus, leviter granulatus, utrinque obtusus. Chelipedum merus ei *L. vittatæ* similis, tuberculis marginalibus vero magis confertis. Abdominis maris segmentum antepenultimum versus extremitatem paulo contractum; tuberculum segmenti penultimi sat grande antice excavatum. Appendices abdominis maris primi paris spiraliter plicatæ, anfr. duobus. ♂ Carapacis long. 0·58; lat. 0·50 poll. *L. rhomboidali* valde affinis, differt abdominis formâ.

Hab.—Prope oras Sinenses meridianas; in fundo conchoso-limoso prof. 20 org. vulgaris.

247. LEUCOSIA PARVIMANA, nov. sp. Carapax longior quam latior, postice valde convexus, latere rotundatus, apice compressus et sursum flexus; colore luteus, utrinque albo 2–3-maculatus, postice nigro bimaculatus, maculis rotundatis. Frons ante orbitas bene producta, tridentata, dente mediano prominentiore. Margines laterales serie granulorum crenulati, retrorsum post pedes amb. primos non producta. Margo postero-lateralis inferior obscure crenulatus. Margo posterior obtusus, superne subtiliter crenulatus, subtus lævissimus. Sinus thoracicus antrorsum brevis, fissuris anterioribus rimatis; margine supra brachiorum insertionem granis tribus magnis et duobus v. tribus parvis ornato. Manus parva, extus margine acuta, intus obtusa, paulo crenulata, digitis brevibus, debilibus, hiantibus, intus inermibus. Dactyli pedum ambulatoriorum graciles, non dilatati. Sterni suturæ profunde impressæ; anguli postero-laterales prominentes, tuberculiformes. Abdomen maris sat latum, segmento antepenultimo utrinque turgidulum; segmento penultimo marginibus paulo dilatato, medio tuberculato, tuberculo acuto retrorsum tenso. Appendicium abdominis maris primi paris anfr. septem. ♂ Carapacis long.

0·84; lat. 0·73 poll. *L. pallidæ* affinis, margine minus crenulato, et sinu thoracico tuberculis tribus solum magnis ornato.
Hab.—Ad insulam "Selio" freti "Gaspar."

248. LEUCOSIA HÆMATOSTICTA, Adams et White; Voy. Samarang, Crust. p. 54, pl. xii. f. 2.—In sinu "Kagosima;" e fundo arenoso prof. 22 org. lecta.

249. MYRA FUGAX, Leach; De Haan; Fauna Jap. Crust. 134, pl. xxxiii. f. 1. —In mari Sinensi boreali; in fundis limosis et conchosis prof. 6–25 org. vulgaris.

250. MYRA AFFINIS, Bell; Lin. Trans. xxi. 296.—In sinu "Kagosima"; fundo conchoso, org. 20.

251. PHILYRA TUBERCULOSA, nov. sp. *Fœminæ* carapax orbiculato-rhomboidalis, flavo-cinereus, convexus, superficie inæqualis; regionibus branchialibus, post-gastrica, genitalique tumidis, confertim tuberculatis. Margines angulati, granulis crenulati. Margo posterior rectus. Frons concava, lævis, quam epistoma brevior. Angulus pterygostomianus prominens, marginibus granulatis. Maxillipedes ext. rugulosi, linea longitudinali barbata ornati. Chelipedes breves; mero forte granulato, prope extremitatem medio lævi; manu fere lævi, punctata, intus margine non granulata; digitis profunde sulcatis, ad basin hiantibus. Sternum confertim tuberculatum. Abdominis segmenta primum secundumque granulata; linea transversa granulorum in segmento tertio. Carapacis long. 0·49; lat. 0·47 poll.
Hab.—In sinibus prope "Hong Kong"; in arenis submersis prope litora.

252. PHILYRA PLATYCHEIRA, De Haan; loc. cit. p. 135. pl. xxxiii. f. 6.—In portu "Hong Kong"; fundo limosa, org. sex.

253. PHILYRA UNIDENTATA, nov. sp. *Fœminæ* carapax suborbicularis, antice paulo productus; superficie glaberrima, sparsim punctata; marginibus lateralibus et posteriore continuis, crenulatis, crenulis parvis, æqualibus, obtusis. Color pallide badius, partim cœruleo-albus. Frons medio unidentata. Maxillipedes ext. planati. Chelipedes carapace non duplo longiores; mero superne granulato, tertia parte antica excepta; manu sat convexa; digitis brevibus, depressiusculis, intus acutis, obsolete 1- vel 3-dentatis, tertia parte anteriore solum contiguis. Carapacis long. 0·54; lat. 0·50 poll.
Hab.—In mari Sinensi, lat. bor. 23°; e fundo arenoso prof. 30 org. lecta.

254. EBALIA MADERENSIS, nov. sp. *Fœminæ* carapax octagonus, vel rhomboides angulis truncatis. Latera antero-laterale et postero-laterale paullo concava. Margo posterior fere rectus, granulatus. Dorsum valde convexum, carina lævi mediana e fronte ad tuberculum cardiacum acute prominens producta. Regiones branchiales prominentes, summo granulati, granulis externis acutis. Frons concava, subtiliter granulata. Spina parva ad angulum pterygostomianum. Maxillipedes ext. obsolete granulati. Chelipedes granulati, granulis marginalibus subspiniformibus sparsis; mero plus duplo longiore quam latiore. Carapacis long. 0·28; lat. 0·30 poll.
Hab.—In sinu "Funchal" insulæ Maderæ; fundo subuloso, prof. 22 org.

255. PHLYXIA QUADRIDENTATA. *Ebalia quadridentata*, Gray; Zool. Misc. p 40. —In portu "Jackson" Australiensi; fundo conchoso, prof. 2 org.

256. ARCANIA GLOBATA, nov. sp. *Fœminæ* carapax (apice excepto) globosus, æqualis, confertim spinosus, spinis parvis, acutis, vix granulatis, decem in marginibus et una in regione post-cardiaca quam reliquæ majoribus. Regio frontalis pœne lævis, postice spinulosa vel granulosa. Frontis margo arcuatim concavus, angulis externis dentiformibus. Chelipedes confertim granulati, granulis plerumque subspiniformibus, in manu quam in mero multo minoribus. Digiti graciles quam palmæ non breviores. Pedes ambulatorii læves. Carapax ruber; fronte et linea mediana albidæ. Carapacis long. 0·46;

lat. 0·44 poll.; (spinis inclusis.) Ab *A. erinacea* differt pedibus ambulatoriis non spinulosis.

Hab.—In mari Sinensi, lat. bor. 23°; in fundis sabulosis vel limosis prof. 16–25 org.

257. Iphis septemspinosa, Leach. *Cancer septemspinosus*, Herbst.; Naturg. d. Krabben und Krebse, i. pl. xx. f. 112.—Prope oras Sinenses meridianas; in fundo limoso, org. 20.; vulgaris.

258. Iphiculus spongiosus, Adams et White; Voy. Samarang, Crust. p. 57. pl. xiii. f. 5. Maxillipedes eis *Iphidis* et *Oreophori* fere similes.—In portu "Hong Kong"; in fundis limoso-lapillosis, prof. 10–20 org.

259. Oreophorus rugosus, nov. sp. *Fœminæ* carapax perlatus, subpentagonus, rugosus, utrinque serie fossarum elongatarum quasi erosarum v. vermiculatarum ad margines antero-laterales parallela insculptus. Frons angustata, prominens. Regio branchialis lateraliter valde dilatata, postice tuberculis capitatis partim ornata. Chelipedes rugosi, irregulariter tuberosi vel erosi; digitis sulcatis, vix dilatatis, superne concavis, apicibus acutis curvatis; digito immobili quam dactylus latiore. Pedes ambulatorii marginibus tuberculati. Abdomen convexum, tuberculatum, tuberculis parvis, rotundatis, non confertis; lineis duabus interruptis carinam medianam minus convexam circumscribentibus. Carapacis long. 0·48; lat. 0·662 poll.

Hab.—Prope oras insulæ "Loo Choo."

260. Nursia plicata, Bell; Lin. Trans. xxi. 307, pl. xxxiv. f. 4. *Cancer plicatus*, Herbst.—In portu "Hong Kong"; fundo conchoso, prof. org. 8.

261. Nursilia dentata, Bell; Lin. Trans. xxi. 309, pl. xxxiv. f. 6.—In freto "Katona" prope insulam "Ousima"; fundo arenoso, org. 10.

Carcinaspis, nov. gen. Carapax suborbicularis, latior quam longior, depressus, postice late rotundatus non laminato-expansus. Latera dilatata, sed pedes non celantia. Frons rostrata, rostro brevi, late truncato. Oculi sub carapace celati. Orbitæ rotundatæ, profundæ, intus completæ; fissuris nullis. Fossæ antennulariæ parvæ, ovatæ, transversæ. Epistoma sat amplum, ab apice maxillipedum externorum producto bi-partitum. Area buccalis æque lata ac longa. Canaliculus pterygostomianus margine sinuatus ad angulum antero-externum. Maxillipedum externorum exognathus parvus, quam ischium multo angustior; mero ischio quarta parte breviore. Chelipedes robusti, non cristati; digitis fere longitudinalibus. Abdominis *fœminæ* segmenta tertium, quartum, quintum sextumque coalita; segmentum secundum hastiferum. Sternum latum.

262. Carcinaspis marginatus, nov. sp. Carapax ruber, pedes albidi. Carapax chelipedesque serie duplice granulorum marginati. Superficies lævis, glabra; media parte carapacis parum convexa et punctata. Rostrum sat productum, paulo resupinatum. Regiones subhepaticæ, et margines maxillipedum sternique confertim depresso-granulati. Chelipedes robusti, angulati; digitis palma dimidia brevioribus, sulcatis. Pedes ambulatorii sat dilatati; mero superne unicarinato; reliquis bicarinatis; dactylis acutis, articulis penultimis non brevioribus. *Fœminæ* carapacis long. 0·25; lat. 0·28 poll.

Hab.—Ad Promontorium Bonæ Spei; sublittoralis in rupibus, sub lapidibus.

Cryptocnemus, nov. gen. Carapax latus, pentagonus, (vel triangularis, angulis lateralibus late truncatis,) retrorsum et lateraliter valde laminato-expansus, paulo resupinatus, pedes ambulatorios (extremitatibus exceptis) celans. Frons rostrata, rostro lato, triangulato, resupinato. Orbitæ minutæ, rotundatæ, marginibus integris. Antennæ externæ fere obsoletæ. Area buccalis æque lata ac longa. Canaliculus pterygostomianus margine antico integer. Maxillipedum externorum exognathus dilatatus, quam ischium non angustior, extus regulariter arcuatus; mero ischio tertia parte breviore. Chelipedes laminato-cristati; digitis brevibus. Abdomen maris angusto-triangulatum, prope basin sub angulo recto flexum; segmentis totis, primo ultimoque exceptis, coalitis. Sternum latum. Dactyli pedum ambulatoriorum gracillimi.

263. Cryptocnemus pentagonus, nov. sp. Carapax multo latior quam longior, pentagonus, latere postero-laterali antero-laterali dimidia breviore. Dorsum lævissimum, medio convexum, antice leviter carinatum, regione cardiaca parva, leviter prominente. Rostrum sub angulo 60° resupinatum, apice acutum, lateribus convexum. Superficies inferior tota lævis, nitida. Chelipedes valde depressi, glabri, cristis horizontalibus valde expansis, marginibus profunde sinuatis vel undulatis. Digiti palmæ tertiam partem adequantes; digitus immobilis latus; dactylus sulcatus. Pedes ambulatorii laminato-cristati. ♂ Carapacis long. 0·20; long. 0·29 poll.
Hab.—In sinu "Kagosima," Japoniæ; fundo conchoso-limoso, org. 25.

Onychomorpha, nov. gen. Carapax unguiformis, laminatus, longior quam latior, antrorsum angustatus, postice valde dilatatus. Frons brevissima, truncata, non rostrata. Orbita minutissima, superne profunde fissa, intus hiatu parvo interrupta. Fossæ antennulariæ obliquæ. Epistoma mininum. Antennæ externæ obsoletæ. Area buccalis longior quam latior. Canaliculus pterygostomianus margine antico integer. Maxillipedum externorum articulus basalis parvus; endognathus angustus, apice vix exognathum superante, ischio quam merus breviore; exognathus multo endognatho latior, extus arcuatus. Chelipedes depressi, manu laminiformi, digitis brevissimis, obliquis, fere transversis. Abdomen maris subtriangulare, prope basin latum utrinque tumidum, lateribus parum concavis; segmentis multis coalitis. Sternum angustius.

264. Onychomorpha lamelligera, nov. sp. Carapax lyratus, laminiformis, utrinque super pedes ambulatorios tertios profunde sinuatus; ad extremitatum posteriorem latior. Frons truncata. Margines antero-lateralis et posterior leviter convexi. Superficies glabra, media parce convexa, prope margines leviter striata, striis radiatim dispositis. Regio pregastrica depressa. Maxillipedes læves. Chelipedes læves; mero trigono, depresso, marginibus acutis; carpo parvo, extus acuto; manu laminato-dilatata, intus subtusque pubescente; digitis sulcatis, quartam palmæ partem adæquantibus. Pedes ambulatorii graciles, non laminato-cristati; dactylis gracillimis. Abdominis maris segmentum penultimum ad extremitatem acute unidentatum. ♂ Carapacis long. 0·242; lat. ad extremitatem posteriorem, 0·22 poll.
Hab.—In portu "Hong Kong"; fundo concho-limoso, org. 10.

Calappidea.

265. Calappa cristata, Fabr.; Suppl. 346. M. Edwards; Hist. Nat. des Crust. ii. 105. *Lophos philargius*, De Haan.—In portu "Hong Kong"; fundo concho-limoso, prof. 6 org. Etiam ad insulam "Loo Choo."

266. Calappa tuberculata, Fabr.; Suppl. 345. Herbst.; loc. cit. i. 204, pl. xiii. f. 78. *C. hepatica*, De Haan, loc. cit. p. 70.—In freto "Gaspar" et ad insulam "Loo Choo."

267. Cycloes cristata. *Cryptosoma cristata*, Brullè.—In sinu "Funchal" insulæ Madeiræ; fundo arenoso, prof. org. 20.

268. Matuta lunaris, Leach; M. Edwards; Hist. Nat. des Crust. ii. 114. *Cancer lunaris*, Herbst. loc. cit. iii. 43, pl. xlviii. f. 6.—Ad insulas "Bonin."

269. Matuta victor, Fabr. Suppl. 369. M. Edw.; Hist. Nat. des Crust. ii. 115; Atlas Cuvier R. A. Crust. pl. vii. f. 1.—In mari Sinensi boreali.

DORIPPIDÆ.

270. DORIPPE QUADRIDENS, Fabr.; Suppl. 361, De Haan; Fauna Jap. Crust. 121, pl. xxxi. f. 3.—In portu "Hong Kong" in fundo limo-sabuloso prof. sex org.

271. DORIPPE FACCHINO, De Haan; Fauna Jap. Crust. 123. *Cancer facchino.* Herbst.; loc. cit. i. 190, pl. xi. f. 68. *D. sima*, M. Edwards; Hist. Nat. des Crust. ii. 157, pl. f. 11. (non Dana; Exp. Exp. Cr. i. 398.)—In mari Sinensi prope "Hong Kong"; in fundis arenosis et limosis prof. 6-30 org. vulgaris.

272. DORIPPE JAPONICA, Von Siebold; Spicilegia Faunæ Japonicæ, p. 14. De Haan; loc. cit. 122, pl. xxxi. f. 1.—In sinu "Hakodadi."

273. DORIPPE GRANULATA, De Haan; loc. cit. 122, pl. xxxi. f. 2.—In sinu "Hakodadi" Japoniæ; fundo limoso prof. sex org. Etiam prope oras orientales insulæ "Niphon," ad prof. org. 30; et in portu "Hong Kong" Sinensi.

274. DORIPPE SEXDENTATA, nov. sp. Parvula. Carapax sat elongatus, superficie inæqualis, non granulatus. Frons interocularis quadridentata, dentibus acutissimis subæqualibus. Fissuræ supra-orbitales profundissimæ, triangulato-apertæ. Dentes extra-orbitales graciles acuti, quam dentes frontales minus prominentes. Dens infra-orbitalis obsoletus. Pedes graciles, cylindrici, asperi, penultimi ultimique paris fere simplices. Abdomen maris nec tuberculosum nec nodulosum. ♂ Carapacis long. 0·275; lat. 0·242 poll.
Hab.—Iu sinu "Kagosima" Japoniæ Australis; fundo conchoso prof. org. 20.

TYMOLUS, nov. gen. Carapax oblongo-rotundatus, antice contractus, formâ fere ut in *Homola;* regione faciei angusta, prominente. Regiones hepaticæ branchialesque amplæ, tumidæ. Apertura branchialis afferens positione normalis, ad basin chelipedum. Frons quadridentata. Dens medianus marginis areæ buccalis antice inter dentes medianos frontis superne visus. Oculi parvi, longitudinaliter protractiles. Orbitæ profundæ, superne profunde interruptæ, dente in hiatu inferiore armatæ; hiatu interno magno. Antennulæ sat longæ, hiatum internum orbitarum occupantes; fossis nullis. Antennæ externæ breves, infra antennulas sitæ, articulis distinctis. Maxillipedes externi parum hiantes, valde elongati, maxillipedes internos in totum tegentes; endognathi mero quam ischium latiore, apice acuto ad vel ultra frontis marginem producto; palpo ut in *Leucosideis* celato; exognatho angusto, ischium endognathi vix longitudine superante. Pedes ambulatorii eis *Dorippes* fere similes, dactylis vix falciformibus, non sulcatis. Abdomen sex-articulatum, ei *Dorippes* simile, segmento ultimo dilatato.

275. TYMOLUS JAPONICUS, nov. sp. Carapax distincte areolatus, subtiliter granulatus, latere tridentato, dente primo majore ad angulum hepaticum. Dens validus in regione subhepatica. Dentes frontales parvi sed acuti, mediani prominentiores. Chelipedes maris asperi; carpo ad apicem unispinoso, manu brevi, alta, digitis magnis, palmâ longioribus, intus concavis. Pedes ambulatorii graciles. ♂ Carapacis long. 0·235; lat. 0·24 poll.
Hab.—In sinu "Hakodadi" insulæ "Jesso" Japoniæ; e fundo conchoso ad profunditatem octo orgyiarum lectus.

July 6th.

Vice-President BRIDGES in the Chair.

Twenty-four members present.

A paper entitled "Descriptions of twelve New Species of Uniones, and other Fresh-water Shells of the United States, by Isaac Lea," was presented for publication in the Proceedings.

Dr. Le Conte stated, in regard to the small collection of Coleopterous Insects of Japan presented this evening by Dr. A. A. Henderson, U. S. N., that several of the species exhibited a remarkable resemblance to some found in the United States. Yet this resemblance was not between species of groups peculiar to the eastern sides of both continents, if any such exist, nor between those found on either margin of the Pacific Ocean, but was found in species belonging to cosmopolitan genera, and the parallelism was between those of Japan and those of the Atlantic States. He had previously shown, in comparing the Coleoptera of Western America with those of Europe, that where parallelism existed it was also in genera of similarly wide distribution.

He also called attention to a very remarkable species of Carabus in the same collection, which imitates, by its slender form and long narrow thorax, the genus Damaster from the same region, and seems to connect the latter with the ordinary Carabus, just as Damaster connects Carabus with Cychrus. While possessing this remarkable form of body, however, the elytra are destitute of the apical prolongation seen in Damaster, and the sculpture is that of certain Carabi, consisting of approximate punctures, with three faint ranges of chain-like elevations.

On leave granted, the Committee appointed to confer with Dr. Hayes in regard to his proposed Arctic Exploration, presented a Report as follows:

That the exploration contemplated by Dr. Hayes appears to deserve the encouragement of all individuals or societies who possess an interest in the advancement of science, and especially of those who cultivate the various branches of Natural History, for the following reasons:

1st. The interesting problem of the existence of an open Polar Sea cannot as yet be considered as satisfactorily solved; as is made manifest by the doubts recently expressed by a distinguished geographer, in a memoir read before the Royal Geographical Society of London. Yet this problem is so intimately connected with theories of climate, not only in that region, but over a very large partion of the Northern Hemisphere, that its definite solution must be considered as of the utmost importance to the study of geography; and it is not impossible that its investigation may lead to valuable results of a more commercial nature. It seems probable, therefore, that this subject will attract the attention of other nations, who are engaged in an honorable rivalry with us in promoting the knowledge of the surface of the earth, and it is highly desirable that the credit of furnishing the definite solution should belong to the nation to whose energy and enterprise the interesting results already obtained are due.

2d. The natural history of this extensive region remains, as yet, almost entirely unknown; while, from the peculiarities of its climate, and its proximity to the land of the Eastern Hemisphere, it seems certain that much valuable information as to the habits of animals and plants, and the connection of our Faunas and Floras, both ancient and modern, with those of Europe and Asia, may be gained by such an exploration as is here contemplated.

3d. The excessive difficulties and hardships of such an exploration, serve to deter any but the most adventurous spirits from undertaking it; while the peculiar circumstances under which both the instruments of observation and the observers themselves are placed, render a frequent repetition of the observations necessary to produce confidence in the results. Every encouragement should therefore be extended to all who are willing to undertake the arduous task, and capable of properly meeting its unusual responsibilities.

The Committee therefore recommend to the Academy the adoption of the following resolutions:

Resolved, That the Academy of Natural Sciences of Philadelphia, having full confidence in the energy, prudence and scientific capacity of Dr. Hayes, recommends the Arctic expedition projected by him to the favorable consideration of all who are in a position to assist him in his enterprise, believing that its success will contribute largely to the advancement of science and to the honor of our country.

Resolved, That the Academy will cheerfully assist Dr. Hayes in carrying out his plans by all the means in its power.

The Report and resolutions were adopted, and the Committee continued.

July 13*th.*

Dr. THOS. McEUEN in the Chair.

Twenty-three members present.

Dr. Corse observed that in pursuance of some observations made at a former meeting, he had examined Arctomys monax, Sciurus hudsonius, and Tamias Lysteri, and found the testicles so arranged as to be readily drawn up into the belly.

July 20*th.*

Vice-President BRIDGES in the Chair.

Fifteen members present.

A paper was presented for publication in the Proceedings, entitled "Notes upon various New Genera and New Species of Fishes, in the Museum of the Smithsonian Institution, and collected in connection with the United States and Mexican Boundary Survey, Major Wm. Emory, Commissioner, by Charles Girard, M. D."

July 27*th.*

Dr. THOS. McEUEN in the Chair.

Eleven members present.

The following papers were ordered to be printed in the Proceedings:

Descriptions of Twelve New Species of UNIONES and other Fresh-water Shells of the United States.

BY ISAAC LEA.

UNIO ROSWELLENSIS. Testâ lævi, oblongâ, subcompressâ, ad latere compressâ posticè biangulatâ, valdè inæquilaterali; valvulis subcrassis; natibus subprominentibus; epidermide tenebroso-fuscâ, striatâ; dentibus cardinalibus subgrandibus, crenulatis, in utroque valvulo subduplicibus; lateralibus prælongis subrectisque; margaritâ vel purpureâ vel salmonis colore tinctâ et iridescente.

Hab.—Chatahoochee River, at Roswell, Cobb Co., Georgia. N. A. Pratt, Jr.

UNIO POSTELLII. Testâ lævi, oblongâ, compressâ, posticè subbiangulatâ, valdè inæquilaterali; valvulis subcrassis; natibus prominulis, ad apices undulatis; epidermide tenebroso-fuscâ, transversè striatâ; dentibus cardinalibus magnis, in utroque valvulo duplicibus, crenulatis; lateralibus prælongis, lamellatis subrectisque; margaritâ vel albâ vel purpureâ vel salmonis colore tinctâ et iridescente.

Hab.—Randall's Creek, near Columbus, Georgia, Bishop Elliott; and at Carter's Creek, Baldwin County, Georgia, J. Postell.

UNIO NEISLERII. Testâ regulariter plicatâ, quadratâ, inflatâ, ad latere subplanulata, valdè inæquilaterali; valvulis crassis; natibus prominentibus tumidisque; epidermide nigricante, valdè striatâ; dentibus cardinalibus magnis, crassis, crenulatis, in introque valvulo duplicibus; lateralibus crassis, sublongis curvisque; margaritâ argenteâ et valdè iridescente.

Hab.—Flint River, at Lanier, Georgia. Dr. H. M. Neisler.

UNIO PRATTII. Testâ lævi, obovatâ, subinflatâ, posticè et anticè rotundatâ, inæquilaterali; valvulis subtenuibus; natibus subprominentibus, crassè undulatâ; epidermide tenebrosâ, valdè radiatâ; dentibus cardinalibus parviusculis, crenulatis, obliquis, in utroque valvulo duplicibus; lateralibus sublongis subrectisque; margaritâ albâ et iridescente.

Hab.—Chatahoochee River, at Roswell, Cobb Co., Georgia, N. A. Pratt, Jr.; and Tobesaufke Creek, near Macon, Georgia, Bishop Elliott.

UNIO CHATTANOOGAENSIS. Testâ lævi, obliquâ, cuneatâ, scaleniâ, subinflatâ, anticè decisâ; valvulis percrassis, anticè crassioribus; natibus elevatis, incurvatis, fere terminalibus; epidermide luteo-olivâ, transversè virido-vittatâ; dentibus cardinalibus aliquantulum parvis, erectis; lateralibus, sublongis, crassis subcurvisque; margitâ argenteâ et iridescente.

Hab.—Chattanooga, Tenn., T. Stewardson, M.D. Etowah River, Rev. G. White. Coosawattee and Oostanaula Rivers, Georgia, Bishop Elliott.

UNIO DOWNIEI. Testâ lævi, ellipticâ, inflatâ, posticè subbiangulatâ, inæquilaterali; valvulis crassis; natibus prominulis; epidermide tenebroso-fuscâ, striatâ; dentibus cardinalibus subgrandibus, crenulatis, in utroque valvulo subduplicibus; lateralibus sublongis, crassis subcurvisque; margaritâ purpureâ et iridescente.

Hab.—Buck Lake, an enlargement of Satilla River, Georgia. J. C. Downie, and J. Postell.

UNIO SATILLAENSIS. Testâ lævi, ellipticâ, inflatâ, posticè subbiangulatâ, valdè inæquilaterali; valvulis subcrassis; natibus prominulis; epidermide nigricante, minutè transversè striatâ; dentibus cardinalibus magnis, subcompressis, elevatis, in utroque valvulo duplicibus crenulatisque; lateralibus longis, crassis subcurvisque; margaritâ purpureâ et salmonis colore tinctâ et iridescente.

Hab.—Satilla River, Camden Co., Georgia. T. C. Downie.

UNIO HAZLEHURSTIANUS. Testâ lævi, transversâ, subcylindraceâ, posticè biangulatâ, valdè inæquilaterali; valvulis subtenuibus; natibus prominulis; epidermide nigricante, subtilitè striatâ; dentibus cardinalibus parvis, tuberculatis; lateralibus prælongis, lamellatis subrectisque; margaritâ purpurascente et valdè iridescente.

Hab.—Satilla River, Camden Co., Georgia. T. C. Downie.

MELANIA POSTELLII. Testâ granulatâ, attenuatâ, subtenui, corneâ, infernè transversè striatâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus subplanulatis, instar octonis; aperturâ parvâ, ellipticâ, intus albida; labro acuto; columellâ tortâ.

Hab.—Altamaha River, Georgia. James Postell.

PALUDINA ELLIOTTII. Testâ subcarinatâ, pyramidatâ, subcrassâ, viridi-olivâ, arctissimè umbilicatâ, lævi; spirâ elevatâ, subacutâ, ad apicem carneâ; suturis excavatis; anfractibus septenis, rotundatâ, supernè obtusè carinatâ, ultimo parviusculo; aperturâ subrotundatâ, parvâ, intus albidâ.

Hab.—Othcalooga Creek, Georgia. Bishop Elliott.

LYMNEA HAYDENII. Testâ ovato-conicâ, lævi, tenui, pallido-corneâ, imperforatâ; spirâ breviusculâ; anfractibus quinis, convexis; suturis valdè impressis; aperturâ ovatâ; columellâ fortiter plicatâ.

Hab.—Yellowstone and Big Sioux Rivers. Dr. Hayden.

ANCYLUS NEWBERRYI. Testâ magnâ, obtusè pyramidatâ, opacâ, rufo-fuscâ, ad lateris paulisper compressis; vertice subcentrali; aperturâ ellipticâ.

Hab.—Klamath Lake, California. J. S. Newberry, M. D.

Notes upon various New Genera and New Species of FISHES, in the Museum of the Smithsonian Institution, and collected in connection with the United States and Mexican Boundary Survey: Major William Emory, Commissioner.

BY CHARLES GIRARD, M. D.

1. Amblodon neglectus.—Profile sloping evenly from the occiput to the snout. Posterior extremity of maxillar bone extending to a vertical line intersecting the middle of the pupil. Extremities of ventrals projecting somewhat beyond those of the ventrals, and reaching the vent. Second anal spine very stout. Caudal posteriorly convex.

Loc.—Common in the Province of Tamaulipas; were first collected by L. Berlandier. Specimens were also procured at the mouth of the Rio Grande del Norte (Rio Bravo), by John H. Clark, under Major Emory.

2. Umbrina phalæna.—Head somewhat less than the fourth of the total length. Preopercular spines inconspicuous. Posterior extremity of maxillary even with a line drawn across the anterior rim of the pupil. Outer row of premaxillar teeth very conspicuous. Origin of ventrals placed opposite the third dorsal spiny ray; origin of anal situated under the eighth articulated ray of the dorsal. Caudal fin slightly concave posteriorly.

Loc.—Specimens were collected at Indianola, Texas, by John H. Clark, under Col. J. D. Graham, and at Brazos Santiago, Texas, by G. Wurdemann.

I. ORTHOPRISTIS.—Mouth small; upper and lower jaws provided with small, conical teeth. Edge of preopercle nearly straight and finely serrated. Spinous portion of dorsal fin continuous with the soft, constituting one uninterrupted fin. Three small spiny rays at the anterior margin of the anal, increasing in size from the first to the third.

3. Orthopristis duplex.—Body somewhat elongated, subfusiform in its outline. Head forming the fourth of the total length; snout subconical; mouth small, and slightly protractile, with its gape somewhat oblique. Posterior extremity of maxillary bone even with a vertical line drawn immediately in advance of the anterior nasal aperture. Preopercular spines very small, short, acute. Origin of dorsal fin situated opposite the branchial apertures, hence in advance of the base of the pectorals.

Loc.—Specimens were collected at Indianola, Texas, by John H. Clark, under Col. J. D. Graham; and at Brazos Santiago, Texas, by G. Wurdemann.

II. NEOMÆNIS.—Mouth large, not very protractile; jaws equal. Velvet-like teeth along the middle and front of the vomer, along the palatines and jaws, the latter exhibiting an exterior row of large, acute and conical teeth; whilst two canine-like, still larger, exist at the extremity of the upper jaw. Tongue smooth and toothless. Edge of preopercle finely serrated. Gill apertures continuous under the throat; branchial rays seven. One continuous dorsal fin. Caudal posteriorly subtruncated or submarginated. Three spiny rays at the anterior margin of the anal.

The type of this genus is *Lobotes emarginatus*, B. & G., in Ninth Ann. Rep. Smithsonian Institution (1854), 1855, 332.

4. Polynemus octonemus.—May be distinguished from all its congeners by the presence of eight thoracic filaments, the tip of the longest of which extending beyond the origin of the anal fin.

Loc.—Adult specimens were obtained at Brazos Santiago, Texas, by G. Wurdemann; and young ones at Galveston, Texas, by Dr. C. B. Kennerly, under Lt. A. W. Whipple.

5. Mugil berlandieri.—The anterior third of the dorsal and anal fins, the base of the pectorals, and the caudal almost entirely, are protected by small scales. Forty to forty-two scales may be counted from the branchial aperture to the base of the caudal, and fourteen longitudinal series across the line of the greatest depth.

Loc.—Specimens collected at Indianola, Texas, by John H. Clark, under Col. J. D. Graham; at Brazos Santiago, Texas, by the same, under Maj. Emory; at Galveston, Texas, by Dr. Kennerly, under Lt. Whipple; and at St. Joseph's Island, by G. Wurdemann.

6. Chorinemus lanceolatus.—Body elongated, very much compressed. Head constituting the fifth of the total length. Snout elongated and subconical; gape of the mouth oblique; jaws subequal, lower one longest. Posterior extremity of the maxillar bone extending to a vertical line drawn midway between the pupil and the posterior rim of the orbit. Pectorals and ventrals of moderate development; ventrals inserted opposite the base of the pectorals.

Loc.—St. Joseph's Island, G. Wurdemann.

III. CHLOROSCOMBRUS.—Elongated and narrow patches of velvet-like teeth on the jaws, vomer and palatine bones. Tongue smooth. Mouth rather small and slightly protractile; its gape being oblique and the tip of the lower jaw projecting in front of the upper. Body rather short and deep, scaly; lateral line unarmed, that is not shielded. Pectoral fins falciform. Two small spines in advance of the anal fin; ventrals very small.. A small, horizontal spine directed forwards, in advance of the first dorsal.

To this genus belongs *Seriola cosmopolita* Cuv., Val., to which the following one is closely related.

7. Chloroscombrus caribbæus.—Body deep and rather short, very much compressed, with the ventral outline more convex than the back. Peduncle of tail exiguous; caudal fin deeply furcated. Head constituting a little more than a fifth of the length. Snout short, slightly protractile, the mouth being rather small, its gape very oblique and the lower jaw projecting somewhat beyond the upper. Posterior extremity of maxillary extending to a vertical line drawn across the anterior rim of the orbit.

Loc.—St. Joseph's Island, Texas, where specimens were collected by G. Wurdemann.

IV. DOLIODON.—Head small; snout bluntly rounded, with the mouth situated beneath it. Mouth small; velvet-like teeth upon the jaws and front of the vomer; none on the palatines and tongue. Body rather short, minutely scaly; lateral line armed. Dorsal and anal spines united together by a membrane and contiguous to the soft and articulated portion of these fins.

The type of this genus is *Lichia carolina* of Dekay; and *Zeus spinosus* of Mitchill will constitute a second species.

V. CARANGUS.—Narrow patches of velvet-like teeth on the palatines, front of vomer and upper jaw, which is moreover provided with an external row of small ones of a conical and serated form. The lower jaw having but one row of the latter kind. Profile of head more or less rounded or convex. A small horizontal spine directed forwards in advance of the first dorsal. Two spines in advance of the anal. Pectoral fins elongated and falciform. Lateral line shielded along the flanks and peduncle of the tail.

To this genus we refer, 1. *Caranx carangus*, Cuv., Val., under the name of *Carangus esculentus*, G.; 2. *Caranx chrysos*; 3. *C. fallax*; 4. *C. pisquetus*; 5. *C. bartholomæi*, of the same authors; 6. *C. defensor*, of Dekay; 7. *C. falcatus*, and 8. *C. richardi*, of Holbrook.

VI. GOBIONELLUS.—Body generally elongated, scaly. Two dorsal fins; anal fin nearly as long as the second dorsal. Caudal fin elongated and pointed.

Under this denomination will come *Gobius lanceolatus*, *G. bacalaus*, *G. smaragdus* and *G. brasiliensis*.

8. Gobionellus hastatus.—Head contained about seven times in the total length. Snout anteriorly, rounded, jaws subequal; gape of mouth oblique;

posterior extremity of maxillary extending to a vertical line drawn back of the pupil. First dorsal lower than the second. Caudal lanceolated. Anal fin as long as the second dorsal. Ventrals not reaching the vent. Pectorals extending as far back as the ventrals.

Loc.—St. Joseph's Island, Texas ; G. Wurdemann.

9. Gobius lyricus.—Head rounded anteriorly, contained five times and a half in the total length; jaws subequal; gape of mouth nearly horizontal; posterior extremity of maxillary reaching a vertical line drawn through the pupil. Dorsal fins not contiguous. Middle rays of first dorsal filiform, menbranous at their tips, higher than the second dorsal, the posterior rays of which, as also those of the anal, reach the base of the caudal. The latter is lanceolated, and the anal nearly as long as the second dorsal.

Loc.—Specimens were collected by G. Wurdemann, at Brazos Santiago, Texas.

10. Gobius wurdemanni.—General appearance like the preceding ; the head is larger, the caudal fin shorter, and the anal not quite so deep. The scales being smaller also.

Loc.—From Brazos, Santiago Texas, collected by G. Wurdemann.

11. Gobius catulus.—Head somewhat less than the fourth of the total length. Jaws even; gape of the mouth slightly oblique; posterior extremity of maxillary extending to a vertical line intersecting the pupil. Dorsal fins not contiguous; base of the second somewhat longer than that of the first. Caudal posteriorly rounded. Anal rather short, and nearly as deep as the second dorsal is high; its origin being situated opposite the third or fourth ray of the latter mentioned fin and nearly even with it behind.

Loc.—Specimens procured at St. Joseph's Island by G. Wurdemann.

12. Gobius gulosus.—Head elongated and compressed like the body, constituting about the fourth of the total length. The snout is subconical; the mouth large and very deeply cleft, with its gape oblique, and lower jaw slightly longer than the upper. The posterior extremity of the maxillary extending to a vertical line drawn altogether behind the entire orbit. The eyes are small. Dorsal fins not contiguous. Caudal posteriorly rounded. Extremities of ventrals extending to the vent. Pectorals well developed.

Loc.—Specimens collected at Indianola, Texas, by John H. Clark, under Col. J. D. Graham.

VII. GOBIOSOMA.—This genus is to include such species of the old genus *Gobius*, and which are deprived of scales: *Gobius alepidotus*, *G. viridi pallidus*, or *G. boscii*, belongs to this type.

13. Gobiosoma molestum.—Head large, depressed, constituting a little less than the fourth of the total length. Snout rounded; jaws even; posterior extremity of maxillary reaching a vertical line drawn in advance of the pupil. Dorsal fins contiguous at their base. Caudal posteriorly rounded. Anal shorter than the second dorsal. Ventrals quite small, not extending to the vent. Pectorals broad and well developed, not extending beyond the ventrals.

Loc.—From Indianola, Texas, collected by John H. Clark, under Col. J. D. Graham.

14. Blennius multifilis.—Head contained four times and a half in the total length. Posterior extremity of maxillary reaching a vertical line drawn through the pupil. Four filiform cirrhi on either side. Spinous portion of dorsal fin lower and somewhat longer than the soft portion, which is contiguous to the base of the caudal. Caudal posteriorly rounded. Origin of anal situated in advance of the anterior soft ray of the dorsal.

Loc.—Specimens collected at St. Joseph's Island, Texas, by G. Wurdemann.

15. Eleotris somnulentus.—Body subfusiform. Head contained about four

times and a half in the total length. Snout rounded; jaws equal; gape of mouth somewhat oblique; posterior extremity of maxillary extending to a vertical line intersecting the anterior rim of the orbit. Second dorsal fin higher than the first. Tips of ventrals not reaching the vent. Extremities of pectorals stretching somewhat beyond the ventrals. Caudal fin posteriorly rounded.

Loc.—Mouth of the Rio Grande del Norte (Rio Bravo), and collected by John H. Clark, under Maj. Emory.

16. Ophidion josephi.—Head contained six times in the total length. Eye moderate; its diameter contained four times in the length of the side of the head. Posterior extremity of maxillar bone extending to a vertical line drawn across the posterior rim of the orbit. Origin of dorsal fin situated at some distance behind the base of the pectorals.

Loc.—St. Joseph's Island, Texas, collected by G. Wurdemann.

17. Belone scrutator.—Lower jaw longer that the upper; head constituting about the third of the total length. Middle region of cranium depressed and scaly; gill covers, branchial apparatus, cheeks and base of lower jaw covered with scales. Eye large, subelliptical. Anal fin larger than the dorsal; caudal posteriorly subcrescentic, with its lobes subequal.

Loc.—Specimens were collected at the Brazos, Texas, by John H. Clark, under Maj. Emory; and at St. Joseph's Island, Texas, by G. Wurdemann.

18. Pimelodus vulpes.—Allied to *P. affinis*, from which it chiefly differs by a shorter and deeper anal fin, smaller spines at the anterior margin of the dorsal and pectorals, and perhaps a caudal less deeply furcated. The ventrals are rather broad and short, being also inserted further apart from the origin of the anal, since their posterior extremity extends to the anterior edge of the latter fin and no further. The posterior extremity of the adipose fin is nearly even with the termination of the anal.

Loc.—Fresh water, rivers and streams of Texas; specimens collected by John H. Clark, under Col. J. D. Graham, and by Dr. C. B. Kennerly, under Maj. Emory.

19. Pœcilia lineolata.—Head small and pointed, entering four times and a half in the total length. Dorsal fin of the female longer than high; its anterior margin being nearer the extremity of the snout than the insertion of the caudal. The caudal posteriorly rounded off, entering fours times and a half in the total length. Anal fin small, inserted opposite the posterior third of the base of the dorsal. The ventrals are small, inserted in advance of the anterior margin of the dorsal.

Loc.—Specimens were collected at Brownsville, Texas, by Capt. Vanvliet, and at Fort Brown, Texas, by John H. Clark, under Maj. Emory.

20. Limia pœciloides.—Body very much compressed, deep upon its middle. Head constituting about the fourth of the total length. External row of teeth slender and contiguous. Dorsal fin larger in the male than in the female; its anterior margin being nearer the extremity of the snout than the posterior edge of the caudal, which is convex. The anal fin, in the female, is larger than the dorsal, and inserted posteriorly to the latter; whilst in the male the same is situated opposite the middle region of the dorsal. The ventrals are small in both sexes, and inserted in advance of the anterior margin of the dorsal; the pectorals being rather short and broad.

Loc.—Indianola, Texas; specimens collected by John H. Clark, under Col. J. D. Graham.

21. Limia venusta.—Body fusiform, elongated and compressed; the head forming somewhat less than the fourth of the total length. External row of teeth slender and acute, a good deal larger than in the preceding species; the snout is also thicker and less depressed. Dorsal fin larger than the anal, and

situated more in advance than in the species just alluded to, the same sexes being compared.

Loc.—Indianola, Texas; collected by John H. Clark, under Col. J. D. Graham.

22. Anguilla tyrannus.—Head depressed; anterior third of body subcylindrical, somewhat deeper than wide, compressed upon the rest of the length. Lower jaw the longest; gape of the mouth nearly horizontal, its angle corresponding to a vertical line drawn inwardly to the posterior rim of the orbit. Eye well developed and circular. Teeth small, conical, disposed upon a longitudinal band on either jaw and along the vomer also. Origin of dorsal fin corresponding to the exterior third of the total length; the origin of the anal fin being placed somewhat anteriorly to the middle of the entire length. Scales narrow, elongated, cellular in structure, disposed in small groups, in which the longitudinal diameter of the scale assumes every possible direction.

Loc.—Mouth of the Rio Grande del Norte (Rio Bravo); a specimen collected by John H. Clark, under Major Emory.

VIII. NEOMURÆNA.—Neither pectoral nor ventral fins; dorsal and anal low, uniting posteriorly into a point; anterior maxillar teeth largest. One longitudinal series of vomerine teeth. Gill apertures lateral and subcircular.

23. Neomuræna nigromarginata.—Head subconical; body compressed, and tapering into a point. Mouth deeply cleft; jaws equal; its gape nearly horizontal, and its angles extending considerably beyond the orbit. Origin of dorsal fin situated anteriorly to the branchial apertures, which are subcircular and rather small. The vent is placed anterior to the middle of the total length, where the anal fin is reduced to a mere membranous ridge.

Loc.—Collected at St. Joseph's Island, Texas, by G. Wurdemann.

NEOCONGER.—Pectoral fins present; dorsal and anal mostly reduced to a membranous ridge, uniting with the caudal where they are better developed. Snout tapering; lower jaw shorter than the upper; maxillar teeth exiguous, disposed upon multiple series. A patch of similar teeth on the front of the vomer, and one series along its median line. Gill apertures lateral, rather large and vertical.

24. Neoconger mucronatus.—The head is small, slender, narrow and pointed; the upper jaw protruding beyond the lower. Gape of mouth horizontal; its angles extending beyond the orbits. Eyes very small, subelliptical. Vent situated somewhat nearer the extremity of the snout than the posterior edge of the caudal fin. Origin of dorsal placed a little way in advance of the vent, and like the anal, it constitutes a mere membranous ridge until about an inch and a half from the posterior extremity of the body, where it expands, fin-like, and unites with the anal.

Loc.—St. Joseph's Island, Texas. Specimens collected by G. Wurdemann.

August 24th.

Vice-President Bridges in the Chair.

Twenty-six members present.

A paper was presented for publication in the Proceedings entitled, "Mineralogical Notes, by W. J. Taylor."

Dr. Leidy made the following remarks: In the 5th volume of the Proceedings I have described a species of terrestrial planaria (*Rhynchodemus sylvaticus*,) discovered in the neighborhood of this city. This singular animal is exceedingly rare. I have sought for it in many localities without having found specimens. In the spring of 1857, I examined damp forests in the neighborhood of Wilmington, North Carolina, and Charleston, South Carolina, without detecting it. In August, of 1857, while seeking salamanders and helices, in company with Dr. Wilson and Mr. Conrad, on the summit of Broad Top Mountain, of the Alleghany range, in western Pennsylvania, I found one specimen. Last month, while on a visit to our fellow member, Mr. S. Powel, at Newport, R. I., one damp morning I observed two fine specimens of the planaria, creeping near the top of a fence 8 feet in height. On the night of the same day, at the proposal of Mr. Powel, by the light of a lantern, we sought for the animal about the fence surrounding his grounds, and in the course of an hour we found twelve fine specimens. They were obtained from all parts of the fence, some on the top, and others on the ground.

Eight of them I have preserved alive, and now have them at my residence, living in a glass box beneath some fragments of moist wood. Occasionally I feed them on a crushed house-fly, which they appear to enjoy, as they suck at it with their protruded œsophagus for an hour at a time.

They are from 5 to 7 lines long, and creep about like the slug, with their snout-like head erect. They are light-ash colored, with a blackish streak down each side of the back, and a blackish spot just back of the middle, corresponding in position below with the mouth. In form they are like an awl split in its length, the narrower end forming the head. At the base of the latter is a pair of prominent black eyes. The lateral borders of the head are often inflected, and the head itself is sometimes, in a state of rest, doubled upon the back. The intestine presents the same dendritic arrangement as in the true fluviatile planariæ.

Dr. Meigs made some remarks touching the importance of obtaining statistics regarding the actual condition of Craniological collections, with a view to establish a system of exchanges.

August 31st.

Vice-President Bridges in the Chair.

Twenty-seven members present.

The following paper was ordered to be printed in the Proceedings:

Mineralogical Notes.

BY W. J. TAYLOR.

Lecontite.

This new and interesting mineral is remarkable as being a double sulphate of ammonia and soda with potash, containing two equivalents of water, and yet homœomorphous with the group of the anhydrous sulphates, and with Mascagnine, which contains but one equivalent of water. According to Prof. Dana (System. Mineralogy, p. 379), the formula for Mascagnine is $RO, SO_3 + 2\ HO$, but this is a typographical error; the proper formula for this mineral being $RO, SO_3 + HO$, as will be seen in Sixth Supplement to Mineralogy by Prof. Dana. Lecontite and Mascagnine are consequently homœomorphous, its difference in angle being about four degrees, (Lecontite, $I : I = 103°\ 12'$, $O : 1\bar{\imath} + 117°\ 7'$; Mascagnine, $I : I = 107°\ 40'$, $O : 1\bar{\imath} + 122°\ 56'$,) and yet the one contains two equivalents of water and the other but one. Prof. Dana has very kindly made the annexed measurements of two crystals, which I sent to him soon after receiving the mineral from Dr. Le Conte, which measurements I made the substance of a verbal communication to the Academy, on the evening of the 16th of February, but owing to a mistake, it did not appear in print (though it is recorded in the minutes of that meeting) before the May number of the Academy's Proceedings. It was at this time supposed to be a new mineral, from the difference in angle found by Prof. Dana between it and other homœomorphous sulphates; and by a qualitative analysis that I made, it was considered to be a double sulphate of potash and ammonia, (the potash, I then thought, was in excess,) and anhydrous, (in this judging erroneously from the form).

The composition is now definitely determined by a thorough quantitative examination, which, by the courtesy of Dr. F. A. Genth, I have made in his laboratory, and whom I here thank, for the facilities afforded me in the investigation of this new mineral.

Lecontite occurs in crystals varying greatly in size, some being an inch in length and narrow prisms; others are short, not exceeding one-eighth of an inch in length and quite broad. The smaller crystals are more perfect in form than the larger ones, and the angles are better defined.

The following are the measurements of Prof. Dana; the crystals he mentions did not admit of measurement by a reflected image, so that it was necessary to use a candle:

Trimetric or right rhombic prism—

$$i\breve{2} : i\breve{2} = 115^\circ$$

$$i\breve{2} : I = 160^\circ \text{ by measurement,}$$
$$\tfrac{1}{4}\bar{\imath} : \tfrac{1}{4}\bar{\imath} = 127^\circ\, 30' - 128^\circ \text{ (or over } i\bar{\imath},\ 52^\circ - 52^\circ\, 30'$$

$$I : I \text{ (calculated from } i\breve{2} : i\breve{2} = \begin{cases} 76^\circ\, 48' \text{ over } i\breve{2} \\ 103^\circ\, 12' \text{ over } i\bar{\imath} \end{cases}$$

The faces I are small and indistinct except on one side.

Taking $\tfrac{1}{4}\bar{\imath} : \tfrac{1}{4}\bar{\imath} = 128^\circ$ we have $I : I = 103^\circ\, 12'$

$$O : 1\bar{\imath} = 117^\circ\ 7'$$

In hardnesss the crystals of Lecontite are from 2· to 2·5; when free from the exterior organic matter they are clear and colorless; the smaller crystals are coated with a thin crust of organic matter from the matrix.

Taste saline and rather bitter. Permanent in the air; they contain as follows:

Ammonia,	per ct.	12·94	contains oxygen		3·98	8·93.
Potash,	"	2·67	"	"	0·45	
Soda,	"	17·56	"	"	4·50	
Sulphuric acid,	"	44·97	"	"	26·94	
Water,	"	19·45	"	"	17·28	
Organic residue,	"	2·30				
Inorganic residue,	"	0·11				
Phosphoric acid,	"	a trace				

There is consequently an oxygen ratio of ammonia, soda and sulphuric acid and water, according to the numbers 8·93 : 26·94 : 17·28, which is almost exactly as 1 : 3 : 2, from which we have the general formula $RO\,SO_3 + 2HO$, and from this the specific formula (as Prof. Dana would write it) $2NH_4\,O, SO_3 + 3\,(NaO, KO)\,SO_3 + 10\,HO$; or $(\frac{2}{5}\,NH_4\,O + \frac{3}{5}\,NaO, KO)\,SO_3 + 2HO)$.

[It may be interesting to mention that there is an artificial salt, with a formula exactly corresponding to this, and of the same form, which, though rare, has been described by several chemists; it contains no potash, being solely a double sulphate of ammonia and soda, with the two equivalents of water, as mentioned above. It is described in Gmelin, Vol. III., p. 119, (Cavd. Edit.); Seguin, Ann. Chem., 91, 219; Riffault, Ann. de Chem. et Phys., 20, 432 and 435 describe the salt and its formation, and Berzelius (3, 286) mentions that the crystals are derived from right rhombic prisms. In Rammelsberg's Krystallographische Chemie, p. 234, there is a figure and measurements of a trimetric (or right rhombic) crystal of a double sulphate of ammonia and soda, with four equivalents of water,* $(NH_4\,O, SO_3 + NaO, SO_3) + 4HO$; it is from a descrip-

* The formula, as written in Rammelsberg's Krystallographische Chemie, is:—"$(Na\,\ddot{\dot{S}} + Am.\,\ddot{\dot{S}}) + 4$ aq." I am indebted to a friend for the extract from this valuable work, there not being a copy of it to be found in Philadelphia.

tion and measurements by Mitscherlich: Pogg. Ann., 58, 469, but at present not having the works to compare, I am unable to conclude whether or not it is another salt, homœomorphous with the one just described. The similarity of form between compounds, in which there is a difference in the equivalents of water, is an interesting subject for investigation, and I shall endeavor to show at a future time, that the Trimetric sulphate of ammonia, generally considered anhydrous, may contain one or two equivalents of water, and yet preserve its homœomorphism.]

Lecontite was brought to this country, in January last, by Dr. John L. Le Conte, on his return from Honduras. He discovered it in the cave near Las Piedras, in the vicinity of Comayagua. It occurs in crystals imbedded in a black matrix, resembling bitumen in appearance, which Dr. Le Conte considers to be the decomposed excrement of bats, which infest this cave in great numbers, and have, most likely, inhabited it for ages. The cave near the entrance was, at the time of his visit, being worked for nitre, which was obtained "directly by lixiviating the earth taken from near the mouth of the cave. "The material containing the crystals merely furnished a tarry, black, semifluid mass, without nitre." On some of the crystals were observed minute hairs of the bats adhering, and I observed more, when removing the crystals from their matrix. In honor of Dr. Le Conte, for this interesting species which he has been the means of adding to mineralogy, I propose to call the mineral Lecontite.

Sulphate of Ammonia and Soda.

In looking over specimens of minerals recently presented to the Academy, my attention was attracted by a substance labelled "Ammonia," from the Chincha Islands of the Pacific Ocean; from its appearance it was suspected to be a sulphate of ammonia, and a qualitative examination confirmed my suspicion. It is in compact lumps, about the size of hickory nuts; hardness from 2.5 to 3: its color is a yellowish white, with a crystalline structure, taste pungent and bitter; opaque and permanent in the air. By a qualitative analysis, I found it to contain sulphuric acid, ammonia, soda and some organic matter, and by my first trials in a matrass I could not find water; on repeating them, I have found a small quantity. Whether the water is really a part of the mineral a quantitative analysis only can determine. I made an approximative determination of the sulphuric acid from a small fragment, and found it to contain about 48 per cent. Heated on platinum foil it blackens and fuses, though not very readily, leaving a white bead, which is soluble in water, and tastes a little saline and bitter. This mineral was presented to the Academy, I believe, by Dr. Bridges.

Stercorite?

I am indebted to Dr. Bridges for a specimen of a mineral from the Chincha Guano Islands, accompanying the sulphate above described, which, from a qualitative analysis, I now suppose to be Stercorite, (microcosmic salt,) which has been discovered by T. J. Herapath, Esq., in the guano from the Island of Ichaboe, on the western coast of Africa; it never has to my knowledge been found in the Pacific guano. I hope to get sufficient material to settle definitely whether it belongs to this species. The mineral which I have is columnar in structure, and has evidently been taken from a crevice in the guano. It is opaque; yellowish white in color, very soft, taste somewhat sharp, saline and slightly ammoniacal, partially deliquescent in the air.

B. B. or gently heated on platinum foil over a spirit lamp it intumesces and blackens, giving off ammonia and water; afterwards it fuses to a clear bead, which is readily soluble in water and has a saline taste. By a qualitative examination I found ammonia, soda, and an excess of phosphoric acid.

The physical characters are quite different from those of the stercorite described by Mr. Herapath, but the chemical components and the reactions before the blow pipe are similar.

Heteromorphite.

...h has never been mentioned as occurring on this conti-
...a specimen labelled "Antimonial Silver? from Chonta,
... pyrites, and crystals of quartz colored nearly black.
Vaux, Esq., for the specimen.
...lly in the form resembling cobwebs; some cavities
...pillary crystals about one-sixteenth of an inch in

...tle irised, lustre a dull metallic, B. B. sulphur,

Vauquelinite.

...the United States is very rare, having, I be-
...d near Sing-Sing, N. Y., by Dr. Torrey. I
...from Pequa Lead Mine, Lancaster Co., Pa.,
...minations, (distinguishable with a good
...gations, forming incrustations on quartz
...considerable adamantine lustre; their
...le green; some of the detached crys-
...s probably owing to their partial

... on the first application of heat
...orus in oxydising flame a trans-
p... ...e, red bead from presence of
co...

W... ...sparent green bead when hot,
whic... ...atch glass, a drop of water
was a... ...parent.

Smal... ...galena.

It will be... ...chuylkill near Fair-
mount, of a... ...f Ilmenite. I have a
fine crystal, a... ...inch in thickness,
which was giv... ...d the locality.

Prof. Leidy gav... ...quartz, from
a coal mine in Sc... ...xamination I
now suppose to be ... ...cient of the
material for a quantit... ...waxy min-
eral, with a pearly lus... ...curs in a
thin layer, not exceedin...

B. B. acts as pyrophyl... ...e exfoli-
ation is not so great as wi... ...mineral.

Implanted in this pyroph... ...nteresting quartz
crystals; they are quite sma... ...other five-tenths of an
inch in length, while the main ... diameters of one-tenth to
one-twentieth of an inch. The ... are hexagonal prisms, which for
one-tenth of an inch are perfect... ...rent, and terminate at each end in
minute hexagonal prisms with dist... terminations; the larger crystal has over
fifty terminations at its upper, and over thirty at its lower end: the smaller
crystal has fewer terminations (not exceeding twenty), but these terminating
prisms are longer and more distinct. The terminating prisms show a marked
tendency to divergence or to radiate from the central prism.

The terminating planes of the many prisms, which I was able to distinguish
with a good lens, are R and —1; the plane (—1) is however quite minute. My
reason for particularly describing these crystals (which can be done very im-
perfectly without drawings) is, that I think there is a tendency to the form de-

scribed by Kenngott (Pogg. xcvii. 628) (3d Supplement to Dana's Mineralogy, p. 15.)

Staurotide?

A mineral resembling the so called Staurotide (?) found at the Canton Mine, Georgia, described by Prof. Shepard, (3d Supplement Dana's Mineralogy, p. 16,) I have found some time since, at a copper mine near Webster, Jackson Co., N. C. associated with automolite crystals as at the former locality. The preliminary analyses made of the mineral from the Canton Mine by Dr. Genth and myself, (the results of which agree,) renders the conclusion as to its being Staurotide very doubtful.

Cuproplumbite?

Among the ores brought home by Dr. Le Conte from his recent explorations in Honduras, was a specimen which particularly attracted my attention, from the mine of Antonio Cruz, near Comayagua; apparently it is galena, being massive and granular, with a cubical cleavage, on the faces of which there is a bronze tarnish, which gives the effect of a play of colors not unlike that on Bastite (Schiller Spar), the color being more coppery. On the edges it is decomposed, forming massive carbonate of lead, whilst the copper (in little geodes), as crystallized malachite, is disseminated through the mass.

B. B. lead, copper and a trace of antimony, streak black; sectile and brittle; fusible in an open glass tube over a spirit lamp.

Notwithstanding the similarity between its reactions and that of the cuproplumbite analysed by Platteser, this may be only a cupriferous galena as occurs in Tuscany, but the peculiar bronze hue of the cubical faces induced me to mention it among these notes. As soon as time permits I will analyse it quantitatively.

Hydrophite?

The mineral described by Dr. Genth, from Texas, Lancaster Co., Pa., (Keller and Tied. Nordamer. Monatsb. iii., 487) as Nickel-Gymnite, but which Prof. Dana (System Mineralogy, p. 285) considers a variety of Hydrophite, I have found near Webster, Jackson Co., N. C., in a band of serpentine, associated with chrome iron; (this band of serpentine is about two or three hundred yards in width, bearing N. E. and dips S.) It occurs as an amorphous reniform incrustation on a brownish green, granular serpentine, in which are crystals of chrome iron. Its hardness is about 3; lustre resinous; its color varies from an apple green to a yellowish green, streak greenish white. In a matrass, yields water. B. B. nickel and silica.

September 7th.

Vice-President BRIDGES in the Chair.

Twenty-four members present.

Dr. Hays announced the death on the 6th inst. of Dr. Edward Minturn, late a member of the Academy.

September 14th.

Vice-President LEA in the Chair.

Twenty-four members present.

Dr. Carson exhibited specimens of the fruit of Gaylussacia resinosa, from Warrior's Ridge, Huntingdon Co., Pa.; also starch from the tubers of Saggitaria saggittifolia.

On leave granted, a vote of thanks was presented to Dr. C. M. Cresson, for the donation of supposed fossil ripple-marks presented this evening.

Dr. Carson observed that the white fruited variety of Gaylussacia resinosa exhibited this evening, was very unusual, and desired that its locality, Warrior's Ridge, Huntington County, Pennsylvania, should be placed on record.

Dr. C. M. Cresson called attention to the specimens of ripple-marked sandstone presented by him this evening. They were taken from Second Mountain in the gap, through which the west branch of the Schuylkill passed, Schuylkill Co., Pa. The formation is No. 10 of Rogers' enumeration, otherwise known as the Vespertine White Sandstone. These ripple-marked plates occur in thin laminæ, and those at present exposed consist of three layers: two outer layers ripple-marked upon the surfaces next to the centre plate, and plane upon the exterior surfaces, and a centre plate ripple-marked upon each side, the markings fitting those of the enclosing laminæ. These waves are extremely regular and very nearly parallel with each other. The apices or crests of the waves are about 3″ apart, and the depression varies from $\frac{1}{2}''$ to $\frac{3}{4}''$. The thickness of the plates averages about $1\frac{1}{2}$ inches.

Sept. 21*st.*

Vice-President Lea in the Chair.

Forty members present.

The following paper was presented for publication in the Proceedings: "Description of a new Tanager from the Isthmus of Darien, and note on Selenidera spectabilis, by John Cassin," and was referred to a Committee.

Dr. Leidy exhibited a large specimen of Cryolite, obtained by Mr. Frischmuth from a locality on the river Schuylkill, near Philadelphia.

The death of Mr. John A. Vancleve, of Dayton, Ohio, late Correspondent of the Academy, was announced by Dr. Jas. C. Fisher.

Sept. 28*th.*

Vice-President Bridges in the Chair.

Thirty-three members present.

A paper read before the Biological Department, entitled "Secondary formation of Blood Crystals by W. A. Hammond, M. D.," was ordered to be printed in the Proceedings of the Department.

The following paper was ordered to be printed:

Description of a New TANAGER from the Isthmus of Darien, and note on SELENIDERA SPECTABILIS, Cassin.

BY JOHN CASSIN.

Having recently had an opportunity of examining a collection of birds made on the Isthmus of Darien, I have been much gratified as well as surprised to find both sexes of the Toucan, recently described by me, under the name of *Selenidera spectabilis*, (Proc. Acad., 1857, p. 214.) The collection alluded to was made by a party under the command of Lieut. N. Michler, U. S. Topog. Eng., that surveyed a route for a ship canal across the Isthmus, by order of the Government of the United States.

In the collection, there is also a single specimen of a Tanager of the same group as *Calliste gyrola, gyroloides* and *Desmarestii*, but distinct from either, and easily recognised by nearly the whole of the outer surface of the wing being bright chestnut like the head. It is as follows:—

1. Calliste Lavinia, Cassin.

Very similar to *C. gyrola*, *gyroloides* and *Desmarestii*, and about the same size, but having the shoulders, wing coverts, and outer edges of the secondary and shorter primary quills, bright rufous chestnut, with a golden yellow lustre on the shoulder. Head above and cheeks bright chestnut, back of the neck golden yellow, which color extends somewhat and fades gradually on the back. Throat with a longitudinal stripe of pale blue, and another of the same color on the middle of the abdomen; tibiæ rufous. All other parts fine lustrous green, inner webs of quills and tail feathers black, bill and feet light colored.

Total length about $4\frac{1}{2}$ inches, wing $2\frac{1}{2}$, tail $1\frac{3}{4}$ inches.

Hab. Isthmus of Darien, New Grenada. Discovered by Mr. W. S. Wood, Jr., naturalist, attached to U. S. Surveying party, in command of Lieut. N. Michler, U. S. Topog. Engineers.

This handsome bird is named in honor of Mrs. Lavinia Bowen, of this city, whose superior skill as an artist in natural history, and especially in ornithology, fully entitles her to such commemoration. Nearly all plates in Ornithology published in this city within the last twenty years, and many others in every department of Zoology, have been prepared under the supervision and direction of this lady.

2. Selenidera spectabilis, Cassin.

Selenidera spectabilis, Cassin. Proc. Acad. Philada., 1857, p. 214.

As stated above, both sexes of this bird are in the collection made by the surveying party, on the Isthmus of Darien, in command of Lieut. Michler, U. S. Top. Eng. The males do not vary from my description, as cited above, and both sexes have the bill parti-colored and variegated in its lighter portion as previously described.

Female. General colors very similar to those of the male, but with the head above dark chestnut, as in the females of other species of the genus *Selenidera.* Under tail coverts scarlet, mixed with dark chestnut.

According to Mr. William S. Wood, Jr., who accompanied the expedition as naturalist, this Toucan was obtained near the village of Susio, in the province of Choco, New Grenada. It was observed, generally, frequenting a tree called *Cremantina*, by the inhabitants, on the fruit of which it appeared to subsist at the period when noticed.

Dr. Fisher announced, that during the past week, the mortgage debt of the Academy had been entirely cancelled, $10,000 having been presented for that purpose by one of the members, and $1000 derived from the surplus funds of the Academy.

Oct. 5th.

Major John Le Conte in the Chair.

Twenty-nine members present.

A paper was presented for publication in the Proceedings entitled "Description of a New Species of Argynnis, by James C. Fisher, M. D." and referred to a Committee.

Oct. 12th.

Vice-President Lea in the Chair.

Thirty-four members present.

Mr. Cassin read a letter from Capt. W. F. Lynch, U. S. N., giving an account of the finding of human bones from Santos Brazil, presented this evening. The cranium was perfect when found, but by accident has been subsequently broken.

Mr. Lea exhibited two specimens of *Triquetra contorta*, Lea, (*Hyria*, Lam.) which he had received from Mr. Cuming, of London. They were from Shanghai, and make four specimens known of this curious and rare species of the family *Unionidæ.* Mr. Lea called attention to the fact, that these two specimens had both the same curve on the dorsal and basal margins, that the two previously exhibited by him and described in the Journal had, thus finally proving that the twisted form of this *Triquetra* is its normal character, like *Arca tortuosa*, Lin. in the *Arcadæ.* One of these specimens will be found in the collection of the Academy.

Oct. 19*th.*

Vice-President Bridges in the Chair.

Thirty-one members present.

A paper was presented for publication in the Journal, entitled "Catalogue of the Coleoptera of the regions adjacent to the Boundary between the U. S. and Mexico, by John L. Le Conte, M. D."

And another for publication in the Proceedings, entitled "Note on the Species of Eleodes found within the United States, by John L. LeConte, M. D.," which were referred to a Committee.

Dr. Leidy called attention to an antler of a reindeer found imbedded in the green sand marl, at Vincentown, N. J., at the depth of four feet, and presented this evening by Mr. Carlton Moore.

On leave granted, a resolution was offered and adopted, authorizing the Treasurer to send a special agent to visit the lands of the Academy in Virginia, and ascertain the best mode of disposing of the same, and the probable prices they would command.

Oct. 26*th.*

Vice-President Bridges in the Chair.

Forty-one members present.

The Report of the Biological Department was read.

The paper entitled "Catalogue of the Coleoptera of the regions adjacent to the boundary between the United States and Mexico, by John L. Le Conte, M. D." was ordered to be printed in the Journal of the Academy, and the following were ordered to be printed in the Proceedings.

Description of a New Species of ARGYNNIS.

BY JAMES C. FISHER, M.D.

Argynnis astarte.—Alis denticulatis, superioribus utrinque fulvis, nigro late marginatis et maculatis; inferioribus supra cœrulescenti-nigris macula unica albescente, subtus fuscis maculis septem margaritaceis ex axilla radiantibus. Habitat in Nova Cæsarea. Tab. II.

Upper wings with both surfaces fulvous; above with a broad, black exterior margin containing a range of seven small whitish spots parallel with the margin, four large oblong spots of black proceeding from the exterior margin, the two intermediate ones reaching beyond the middle of the wing, the others shorter, with each a small fulvous spot near the tip; and four spots of black descending from the sub-costal nervure, of which the one nearest the body is linear, the next square, the third roundish with a fulvous spot in the centre, and the fourth connate with the fourth of the before mentioned spots proceeding from the exterior margin.

The lower wings are above bluish black, changing to brownish fulvous near the base, with an indistinct whitish spot below the centre.

The under side of the upper wings has seven spots of pearly white parallel with the outer margin, of which the five exterior ones are linear, and the two others round; from these two round spots proceed two oblong black spots to the middle of the wing, and the two next have each a round black spot above them. From the sub-costal nervure proceed four black spots, of which the two nearest the body are linear, the next triangular, enclosing a fulvous spot, and the fourth is almost confounded with the black upper margin.

The under side of the lower wings is brown, with four white sublunate spots, bounded above and below by black, and parallel with the lower margin; there are likewise two long black spots outside of the outer one of these spots: the whole base of the wing is occupied by six large pearly spots radiating from the axilla, one of which occupies the pre-costal portion; between the second and third (which are very wide) is a smaller spot, and the third is crossed near its base by a short black bar. The emarginations of the wings are margined with white. Body black, thorax thickly covered with brownish fulvous hairs.

The above described Lepidopteron so nearly resembles the Argynnis Idalia, that at first sight it may easily be taken for a mere variety. The want of the double row of white spots on the upper surface of the lower wings, although a remarkable difference, would not perhaps constitute a specific mark, yet when we come to examine the under surface, instead of the twenty-four or twenty-five spots of white, which are observed over its whole surface, we find but two near the margin and six large ones occupying nearly the whole of the base, and radiating from the axilla, we cannot hesitate to pronounce it distinct and certainly new. The larva is unknown. The interesting fact of so large a species of butterfly being found at this time in New Jersey, and having heretofore escaped the researches of all entomologists, has led me to offer this short communication for publication in the Proceedings. It was found by me in July of this summer, on Succasunna Plains, near Schooley's Mountain, in Morris Co.

Note on the species of ELEODES found within the United States.

BY JOHN L. LE CONTE, M. D.

Having a number of nondescript species of Eleodes, which it becomes necessary to mention in a Catalogue of the Coleoptera of the U. S. and Mexican Boundary, now preparing for the press, I have considered it proper here to present descriptions of these species; and for the purpose of elucidating their characters in the absence of a monographic essay, the following grouping of the species in my collection belonging to this very difficult genus may be found useful. They are now very numerous, and quite heterogeneous in form, though the antennæ and oral organs do not seem to have much variation.

A. Elytra subconvex or depressed, oblong oval, margined or not, more or less sulcate (but in E. dispersa almost irregularly punctured and not striate); humeral angles distinctly margined. Prosternum never mucronate; anterior tarsi with the first joint inflated beneath and densely clothed with short bristles. Anterior femora toothed; anterior tibiæ of the females with the outer spur usually larger and broader than that of the males.

A. Humeral angles not prolonged.

I. Elytra glabrous, hardly or not at all margined. E. obscura, deleta, arata, dispersa, sulcipennis, acuta.

II. Elytra glabrous, strongly margined. E. suturalis, texana.

III. (*B.*) Humeral angles slightly prolonged under the thorax; thorax and elytra usually pubescent, the latter more or less muricate. Body broad. Pediniform.
E. pedinoides, asperata, robusta, tricostata.

B. Elytra convex or subdepressed, oval, not margined, more or less sulcate, or at least punctured in rows, with alternate rows composed of very distant punctures. Prosternum never mucronate, humeral angles distinct and margined: anterior tarsi simple; spurs of anterior tibiæ alike in both sexes.

IV. Thorax narrowed behind, anterior femora toothed. Anterior angles of thorax subacuminate.
E. sulcata, nupta, gracilis, sponsa, convexa.

V. Thorax slightly narrowed behind, anterior angles not acuminate, femora mutic.

α. Elytra caudate. E. caudifera.

β. Elytra hardly acuminate. E. obsoleta.

C. Elytra convex, not margined on the sides, more or less punctured in rows: (punctures not muricate, except in X.)

VI. Elytra without humeral angles. E. grandicolis.
Humeral angles distinct: thorax narrowed behind: anterior angles not acuminate. VII.—XIV.
Prosternum horizontally mucronate at tip. VII.—X.

VII. Humeral angles produced. E. fusiformis.

VIII. Base of elytra truncate.

α. Elytra punctured in rows. E. subnitens, seriata, debilis.

β. Elytra confusedly punctured. E. cognata, extricata.

IX. Base of elytra slightly emarginate, prosternum horizontally mucronate at tip. E. carbonaria, soror, immunis, striolata.

X. Base of elytra truncate, punctures muricate, prosternum abruptly truncate at tip. nigrina.
Prosternum obliquely mucronate at tip, base of elytra truncate. XI.—XII.

XI. Body ovate, anterior femora strongly toothed. E. ventricosa.

XII. Body elongate, femora not toothed. E. gigantea, longicollis.

XIII. Base of elytra truncate, prosternum not mucronate, femora not toothed. (Body subcylindrical in the males, ovate in the females, elytra confusedly punctured). E. quadricollis, vicina.

XIV. Humeral angles distinct, strongly margined, base of elytra truncate; thorax much rounded on the sides, elytra ovate, not convex, confusedly finely punctured, femora and prosternum mutic. (Mexican species.)

XV. Humeral angles distinct, thorax with the anterior angles more or less acuminate: prosternum horizontally mucronate.

α. Femora all acutely toothed. E. armata.

β. Femora all obtusely toothed. E. femorata.

XVI. Humeral angles distinct; thorax with the angles strongly acuminate; anterior femora strongly toothed.
E. dentipes, laticollis, acuticauda.

D. Elytra usually convex, sometimes flattened, not margined, irregularly very densely punctured, at the sides and tip muricate and setose. Femora mutic. (The anterior in XIX. very slightly toothed.)

XVII. Thorax subquadrate, prosternum mucronate; humeral angles distinct. E. granulata.

XVIII. Thorax subquadrate, prosternum not mucronate, humeri produced. E. humeralis.

XIX. Thorax rounded, remote from the elytra, the latter oval, without humeral angles. E. consobrina, marginata, Fischeri.

XX. Thorax more or less constricted at base, with distinct basal angles; elytra variable in form. E. producta, planata, reflexicollis, parvicollis, clavicornis, rotundipennis, stricta, subligata, intricata, cordata, tuberculata, viator, pimeloides.

Blaps opaca *Say*, has the first and second joints of the anterior tarsi of the male slightly dilated, and covered beneath with a dense brush of hair, and must therefore constitute a new genus. E. depressa *Lec.* has the form almost of a Akis, and having a trilobed mentum elevated at the apex, should also be separated; it seems to be allied to Embaphion, without, however, belonging to that genus.

E. dispersa, oblonga, nigra, nitida, thorace parce subtiliter punctato, latitudine paulo breviore, lateribus valde rotundatis subtiliter marginatis, ad basin subsinuatis, angulis posticis rectis: elytris elongatis thorace latioribus densius punctatis, punctis dorso subseriatis, versus latera et apicem transversim confluentibus et muricatis, haud marginatis, dorso (feminæ) planiusculis, postice valde declivibus. Long. 1·14.

Creek Boundary, Dr. Woodhouse. Of the same form as E. obscura, but with the thorax larger and less convex, the elytra a little more elongated and not at all striate; the punctures are slightly muricated, even on the middle of the back; at the sides and tip they become confluent transversely and more elevated, with a very short black bristle at the apex of each; the sides of the elytra are not at all margined. The under surface and legs as in E. obscura, except that the tooth of the anterior femora is a little less obtuse

The species of this group are related by the closest resemblances of form and sculpture, so much so that they may in some cases be considered as races, or geographical varieties. The one above described is remarkably distinct from the others, and must in all events rank as separate. Not so perhaps with a singular female specimen collected by Capt. Pope in New Mexico, which with the form of E. sulcipennis, exhibits an entire want of elytral grooves, except at the sides behind the middle, where some faint traces are seen: the punctures are submuricate, and arranged in stria distinct on the back, confused at the sides; between the rows are distant punctures as in E. obscura; the tips are abruptly declivous, and furnished with rows of tubercles, alternately large and small, the latter corresponding to the striæ of the anterior portion. The specimen is 1·20 long, and the teeth of the anterior femora are very obtuse. For convenience this may be called E. deleta.

Other specimens, both male and female, found in Arizona have also the form of E. sulcipennis, but the thorax is more convex, less flattened and less punctured at the sides, and more finely margined; the grooves of the elytra are deeper, the interstices more smooth and shining, with much fewer scattered punctures; sexual characters precisely as in E. sulcipennis. Length 1·14–1·30. This may be named E. arata.

II.

E. texana, oblonga nigro-picea, parum nitida, capite punctato, thorace subtiliter parce punctulato, transverso, capite quadruplo latiore, supra parum convexo, lateribus late depressis et paulo reflexis, subrugosis, maxime rotundatis postice subsinuatis, ad basin truncato, angulis posticis rectis, anticis acutis acuminatis; elytris thorace angustioribus parallelis marginatis, dorso planis postice declivibus (maris breviter acuminato-productis, feminæ subacutis,) sulcatis, sulcis punctatis, interstitiis punctis paucis notatis. Long. 1·25–1·5. Tab. III, fig. 1.

Ringgold Barracks, Messrs. Schott and Haldeman. Allied to E. s u t u r a l i s, but much larger and narrower, with the sides of the thorax and elytra still more strongly margined. The thorax is wider than the elytra and very much dilated and rounded on the sides. The spurs of the anterior tibiæ are equal and slender, and acute in both sexes; the anterior femora are armed with an acute tooth in the male, and an obtuse one in the female.

III.

E. p e d i n o i d e s, oblonga, nigra subnitida, capite parce subtiliter punctato, thorace parce punctulato, capite triplo latiore transverso, parum convexo, lateribus valde rotundatis, postice obliquis vix sinuatis, ad basin truncato, et extrorsum paulo impresso, angulis anticis apice rotundatis, elytris dorso deplanatis, et haud marginatis, humeris prominulis acutis, lateribus parum rotundatis, postice declivibus et subacutis, sulcato-striatis, striis punctis submuricatis, interstitiis parce punctatis, ad apicem convexioribus et asperatis. Long. ·75—1·0.

Texas: Messrs. Haldeman and Berlandière. Of nearly the same form as E. t r i c o s t a t a, but entirely glabrous above, though pubescent beneath: the elytra of the female are wider than the thorax, sometimes flattened, sometimes uniformly, though slightly convex; those of the male are narrower and flattened. The femora in both sexes are simple; the spurs of the anterior tibiæ of the female are unequal, the posterior one (the inner) is acute, the outer one is twice as long, wider and slightly obtuse. In the male the spurs are broken, but they appear to have been less unequal in size. The prosternum is not at all prominent.

E. a s p e r a t a, omnino sicut in præcedente, exceptis elytris sulcatis, in sulcis subtilius muricato-punctatis, interstitiis postice magis exasperatis et breviter flavo-setosis. Long. ·8—1·0.

Texas, Messrs. Schott, Haldeman and Weise. The differences between this and the preceding are not very obvious. This has, however, the elytra more deeply sulcate, and the interstices are more rough with acute tubercles, which terminate in short yellow bristles; near the sides of the thorax may also be seen some very fine hairs. The spurs of the anterior tibiæ are unequal but acute; in the male the anterior one is less than twice as long, but in the female more than twice as long as the posterior one. The form differs in the sexes as in the preceding.

E. r o b u s t a, oblonga latiuscula, atra opaca, supra depressa, tenuiter parce fulvo-pubescens, capite thoraceque subtilius punctatis, hoc priore triplo latiore, latitudine duplo breviore, lateribus rotundatis, postice subsinuatis, ad basin truncato utrinque late subfoveato, angulis anticis subrotundatis, elytris thorace haud latioribus, postice declivibus et subacutis, dense granulato-punctatis et subcostatis, costis alternis magis distinctis. Long. ·88.

Ringgold Barracks, Mr. Haldeman. Closely allied to E. t r i c o s t a t a, but larger, and especially much broader, the thorax of the latter being hardly more than one half wider than its length, while in the present the breadth is more than twice the length. The sexes are not very different in form, but the elytra of the male are a little narrower and less rounded on the sides. The spurs of the anterior tibiæ are unequal, the anterior being broader and twice as long; the tip is more obtuse in the female than in the male.

IV.

E. n u p t a, ovata, nigra parum nitida, capite fortius, thorace minus dense punctatis, hoc parum convexo subrotundato, latitudine breviore, lateribus valde rotundatis, postice breviter sinuatis, ad basin late rotundatis, angulis posticis obtusis, anticis acutis subacuminatis, elytris ovalibus, postice declivibus singulatim subacuminatis, thorace duplo latioribus ad basin vix emarginatis, dorso parum lateribus valde convexis, subsulcatis, in sulcis punctatis, interstitiis punctis perpaucis notatis. Long. ·75—1·05.

Laredo to Ringgold Barracks, Messrs. Schott and Weise. Closely related to E. sulcata, but differs by the more convex elytra being hardly sulcate, and by the thorax being less convex. The elytra of the male are a little narrower than those of the female, and the anterior femora are armed with a long acute tooth; in the female the tooth is short and obtuse. The prosternum is compressed and perpendicular at the posterior extremity. The abdomen is sparsely punctured and rugous.

E. gracilis, ovata, longiuscula, atra nitida, capite parce distincte punctato, thorace subtiliter parce punctulato, rotundato-quadrato, modice convexo, latitudine parum brevoire, lateribus rotundatis postice subsinuatis, ad basin late rotundato, angulis posticis obtusis, anticis acutis plus minusve acuminatis, elytris ovalibus postice declivibus acutis, thorace (maris vix sesqui, feminæ plus sesqui) latioribus, dorso parum lateribus magis convexis vix sulcatis punctato-striatis, interstitiis punctis perpaucis notatis; femoribus anticis sexus utriusque dente longo armatis. Long. ·8—·95.

Sonora, Messrs. Webb and Schott. New Mexico, Dr. Henry. More slender than the preceding, with a comparatively smaller thorax; the prosternum is not perpendicular but rounded at tip. The abdomen as in the preceding has only a few fine punctures, but they are still less distinct.

E. sponsa, subovata, nigra, thorace paulo convexo, subrotundata, latitudine parum breviore, parce punctato antice late emarginato, angulis subacuminatis, lateribus rotundatis tenuiter marginatis ad basin late subrotundato, angulis posticis subrectis, elytris thorace fere duplo latioribus ovalibus postice declivibus, et obtuse acuminatis, punctato-striatis, versus latera et apicem muricatis, interstitiis punctis sparsis uniseriatim notatis: femoribus anticis obtuse dentatis. Long. ·8—·88.

Mas elytris thorace sesqui latioribus, modice convexis.

Femina elytris thorace duplo latioribus dorso planiusculis.

New Mexico, Mr. Fendler. By the form of the thorax, and the anterior tarsi belongs to the present division, though the sculpture of the elytra recals E. deleta of division I. The tooth of the anterior femora is obtuse in one male and two females, but moderately acute in another male and female. A specimen collected in New Mexico by Dr. Henry has the elytra not at all muricate and the tooth of the anterior thighs acute.

V.

E. caudifera, ovata, nigra, thorace vix convexo, parce punctato, ad latera paulo concavo et transversim rugoso, latitudine breviore, antice late emarginato, angulis anticis haud acuminatis, lateribus valde rotundatis, postice angustato, angulis posticis obtusis: elytris thorace sesqui latioribus, ovalibus dorso planiusculis, punctis seriatis substriatis, interstitiis uniseriatim parce punctatis, ad latera et apicem muricatis, postice oblique declivibus et prolongatis, femoribus anticis muticis. Long. ·90.

Mas cauda elytrorum trientem æquante, angusta.

Femina, cauda elytrorum brevi lata, obtusa.

New Mexico, Mr. Fendler; Creek Boundary, Dr. Woodhouse.

VII.

E. fusiformis, nigra, utrinque angustata, fusiformis, thorace latitudine haud breviore, trapezoideo, antrorsum modice angustato, angulis posticis cum basi rotundatis anticis acutis, dorso parce subtiliter punctato, elytris basi emarginatis thoraci arcte applicatis, elongatis pone medium sensim angustatis ad apicem subacutis, humeris antrorsum productis, sat dense subseriatim punctatis; antennis ad apicem parum incrassatis, femoribus muticis, prosterno pone coxas anticas compresso, producto. Long. ·5; lat. ·23.

Platte River valley, near Fort Laramie, rare. This species is remarkably distinguished from all the others by the fusiform shape, by the thorax being wider at base than tip, and by the elytra being moderately deeply emarginate at base and fitting closely to the thorax, the rounded posterior angles of which are embraced by the prolonged humeri.

VIII.

E. seriata, nigra supra subopaca, capite modice thorace subtiliter punctatis, hoc quadrato, antice paulo angustato, latitudine paulo breviore, lateribus parum rotundatis, ad basin late rotundato, angulis anticis acutis, posticis obtusis et haud rotundatis, elytris convexis ovalibus (feminæ thorace duplo, maris vix sesqui latioribus), postice valde declivibus obtuse acuminatis ad basin late emarginatis, humeris acutis, plus minusve fortiter striato-punctatis, interstitiis confuse subtiliter parce punctulatis. Long. ·65–·77.

Texas and the neighboring parts of Mexico. The anterior femora of the male are emarginate so as to form a right angle near the tip, those of the female are only sinuate, so that the angle becomes obtuse.

E. debilis, nigra nitida, capite sat profunde, thorace parce et subtiliter punctato, hoc subquadrato, latitudine vix breviore, antice paulo angustato, lateribus late rotundatis, angulis anticis acutis, posticis obtusis, ad basin late rotundato, elytris ovalibus convexis (thorace maris sesqui latioribus) postice valde declivibus haud acuminatis, ad basin late emarginatis, humeris acutis, sat fortiter striato-punctatis; interstitiis uniseriatim subtiliter punctulatis. Long. ·5.

One specimen found in New Mexico by Mr. Fendler, and another in Sonora by Dr. Webb. The anterior femora are not at all armed or sinuate; the prosternum is mucronate behind as in the preceding, and the mesosternum is concave. The abdomen is shining, sparsely rugous, with a few small punctures. This species is of the size and shape of E. extricata, but the elytra in that are densely almost irregularly punctured. E. cognata *Hald.* has the elytra finely not densely, but almost irregularly punctured, and in both the prosternum is less produced, and rather carinate than mucronate.

IX.

E. soror, oblonga, nigra nitida, capite punctato, thorace subtiliter parce punctulato, quadrato latitudine haud breviore, antice posticeque parum angustato, lateribus late rotundatis, angulis anticis acutis posticis obtusis, elytris ovalibus minus convexis, thorace (maris parum, feminæ sesqui) latioribus, ad basin emarginatis, humeris acutis, postice valde declivibus obtuse acuminatis, fortius striato-punctatis, interstitiis parce punctatis. Long. ·62—·77.

Texas, at Eagle Pass and San Antonio. Related to E. seriata in form and sculpture, but the thorax is more quadrate, and not more narrowed towards the apex than towards the base; the elytra are more deeply emarginate at base, and transversely much less convex, and those of the female are much less dilated; the punctures are more regular and never have the appearance of foveæ seen in E. seriata. The anterior femora are entirely unarmed, in both sexes. The prosternum is horizontally produced into a sharp point, the abdomen is sparsely but strongly rugous and punctnred.

E. striolata, nigra nitida, capite subtiliter parce punctato, thorace vix conspicue punctulato, quadrato latitudine haud breviore, utrinque perparum angustato, lateribus modice rotundatis, angulis anticis acutis, posticis obtusis, elytris ovalibus convexis (feminæ) thorace duplo latioribus, ad basin perparum emarginatis, humeris acutis, postice valde declivibus brevissime caudatis, punctis seriatis approximatis notatis, seriebus per paria approximatis, prope apicem obliteratis, interstitiis parce subtiliter punctulatis. Long. ·75.

Laredo to Ringgold Barracks; Mr. Weise. Nearly of the same form as E, ventricosa, but much smaller and with much more numerous rows of punctures on the elytra; the sides of the elytra extend farther upon the abdomen, which is finely but more deeply rugous; the anterior femora are entirely mutic; the prosternum is horizontally produced and acute as in E. seriata.

E. immunis, oblonga, nigra nitida, capite modice, thorace subtilius et parce punctato, hoc quadrato latitudine haud breviore, antice paulo latiore, lateribus rotundatis, angulis anticis subacutis posticis obtusis, elytra ovalibus (maris parum, feminæ sesqui) thorace latioribus, modice convexis, postice obtuse subacuminatis valde declivibus, fortiter striato-punctatis, saepe fere sulcatis, interstitiis parum convexis parce punctatis. Long. ·68—·72.

Sonora, Dr. Webb, and Mr. Schott. Nearly of the same form as E. soror, but readily distinguished by the thorax being more narrowed behind, almost as in E. quadricollis; the punctures of the rows of the elytra are sometimes placed in distinct grooves, while in other specimens the surface is even. The femora of both sexes are altogether unarmed, and the prosternum is perpendicular at tip and not mucronate; the abdomen is very sparsely punctured and faintly rugous.

E. omissa, longiuscula, nigra, subnitida, thorace latitudine sub-breviore' parum convexo, lateribus late rotundatis, postice subangustato, subtiliter parce punctulato, elytris thorace parum latioribus postice declivibus et oblique angustatis, parce subtiliter fere inordinatim punctatis, prosterno apice horizontali, acuto, femoribus muticis, crassiusculis. Long. ·63.

One male, San Diego, California. Resembles very closely in form the male of E. quadricollis, but besides minor differences, it is much less punctured, the prosternum is horizontally mucronate, and the thighs are thicker.

X.

E. nigrina, elongata, nigra subopaca, thorace subquadrato, postice angustato, lateribus late rotundatis, apice fere truncato, modice convexo, subtilius sat dense punctato, elytris thorace parum latioribus, postice declivibus et oblique angustatis, inordinatim subtilius punctatis, punctis præcipue ad latera muricatis et brevissime setiferis, pedibus muricato-punctatis, femoribus anticis obtuse sinuatis, prosterno abrupte truncato. Long. ·74—·80.

Black Hills, Nebraska, Dr. Hammond; Santa Fe, New Mexico, Mr. R. C. Kern. The female is a little broader than the male, but does not differ conspicuously in form; the anterior femora are not dentate, but only slightly sinuate on their anterior margin. The punctures of the thorax are nearly equally distributed.

XI.

E. ventricosa, atra subnitida, capite parce, thorace subtiliter punctato, hoc transverso, antice modice, postice parum angustato, lateribus rotundatis, angulis anticis acutis, ad basin late rotundato, elytris ovalibus convexis, ad basin vix late emarginatis, humeris vix acutis, thorace sexus utriusque plus sesqui latioribus, postice declivibus (maris breviter caudatis, feminæ obtuse vix acuminatis) plus minusve striato-punctatis, interstitiis uniseriatim parce punctulatis. Long. ·108—·14.

Texas, near the Rio Grande. The punctures composing the striæ of the elytra vary very much in size; sometimes they are very large, while at others they are hardly different from the more distant interstitial punctures. The anterior femora of the male are armed with a long acute curved tooth, those of the female are slightly sinuate. The prosternum is compressed behind, and perpendicularly truncate, rising into a very small cusp. The abdomen is hardly rugous or punctured.

XII.

E. Haydenii, elongata nigra, nitida, thorace latitudine longiore, lateribus late rotundatis, disco modice convexo, parce subtiliter punctato, elytris confertim subtilius seriatim punctatis elongato-ovalibus, postice late attenuatis, dorso parum convexis, lateribus abrupte inflexis, prosterno mucrone acuto parvo, femoribus muticis. Long. 1·04.

One specimen from the Loup Fork of the Platte, Dr. Hayden. Related to

E. longicollis *Lec.*, but the thorax is more rounded on the sides, more distinctly punctulate, the rows of punctures of the elyta are much more evident, and the curvature from the back to the sides is abrupt, while in that species it is regular and uniform: the elytra are also more elongated near the apex, so as to produce at the inflexed margin a very slight concavity not seen in E. longicollis.

E. gigantea has the thorax more convex, more rounded on the sides, and somewhat narrowed behind, and the elytra narrower, more gradually attenuated and acute behind.

E. gentilis, elongata, nigra, subnitida, thorace latitudine haud breviore, convexo, lateribus rotundato, postice paulo angustato, subtiliter parce punctulate, elytris elongato-ovalibus postice declivibus et oblique attenuatis æqualiter transversim convexis, subtiliter parce vix seriatim punctulatis, prosterno mucrone parvo acuto, femoribus muticis. Long. ·75.

San Diego, California. Closely allied to E. gigantea, but very much smaller, with the thorax less rounded on the sides, and less narrowed at the base.

XIX.

E. scabricula, nigra, thorace opaco, transverso rotundato, dense confluenter scabro-punctato, versus latera late impresso, anguste marginato, elytris ovalibus, thorace parum latioribus, granulis reclinatis dense scabris, postice declivibus et acutis, femoribus anticis obtuse dentatis. Long. ·76.

Sacramento, California, collected by Mr. J. Wittick, and given me by Mr. Rathvon. This species is closely allied to E. marginata, but is much larger and much more roughly and densely punctured both above and beneath. The specimen is a female, and has the anterior thighs very obtusely toothed as in the male of E. marginata.

XX.

E. Veseyi, nigra, sat nitida, thorace latitudine fere sesqui breviore, paulo convexo, lateribus valde rotundatis postice breviter sinuatis, postice angustato, basi apice haud latiore, angulis posticis subrectis, dorso sat dense punctato, areolis duabus lævibus, lateribus granulato, elytris planiusculis ad basin truncatis, lateribus late rotundatis postice obtusis, dorso punctis magnis quadratis seriatis, interstitiis parce granulatis, versus latera et postice granulis reclinatis asperatis et transversim rugosis: prosterno postice truncato, femoribus anticis subsinuatis, antennis extrorsum paulo incrassatis. Long. ·70.

Fort Tejon, California: collected by Mr. John Xantus de Vésey; to whom I take great pleasure in dedicating the species, as a slight tribute of my appreciation of his enthusiastic labors, which have added much to our knowledge of the fauna of the Western Territories.

Remarkable among the species of this group by the size, and by the attempt at striæ of large punctures near the middle of the elytra. It is also distinguished by the prosternum being abruptly limited behind by a perpendicular line, while in all the others of the group the outline of the tip of the prosternum is rounded.

E. constricta, nigra, subnitida, thorace latitudine sesqui breviore, lateribus valde rotundatis, tenue marginatis, ante basin tubulatim constricto, dorso confertim versus latera rugose punctato, elytris parum convexis lateribus magis rotundatis, humeris paulo productis marginatis rotundatis, dorso crebre subseriatim punctatis, postice et ad latera granulis reclinatis scabris, antennis extrorsum parum incrassatis. Long. ·52.

Sacramento, Mr. Wittick; given me by Mr. Rathvon. Related to E. producta, but the base, though not narrower than the apex, is much more constricted than in that species, so that the sides become impressed. The elytra are broader, more rounded on the sides, the humeri are less broadly produced, and less conspicuously margined, and the sides are more rough with small reclinate tubercles. This species agrees with the description of E. parvicollis given by Mannerheim, (Bull. Mosc. 1843, 271) except that the base of the thorax is not narrower than the apex. Eschscholtz does not in his decription mention that the sides of the thorax are scabrous, but adds that the base of the thorax is nearly as wide as the widest portion of the thorax, whereby the latter appears small. A specimen from the St. Petersburg museum sent me as a type is not allied at all to this species, but rather to E. cordata.

The smaller species of Eleodes of this division are exceedingly abundant, and seem subject to some variation. It will be impossible to attain any definite results in the nomenclature of them until an authentic series of named specimens can be obtained by careful comparison with the types of Eschscholtz and Mannerheim.

E. viator, ovata, thorace latitudine sesqui breviore, lateribus valde rotundatis, postice breviter coarctato, ad basin apice haud latiore, confertim grosse punctato, elytris rotundato-ovalibus, antice truncatis, granulis nitidis inordinatis confertim positis, versus suturam punctatis, versus latera breviter hispidis, antennis extrorsum paulo incrassatis, femoribus muticis. Long. ·43—·50.

Fort Bridger, Dr. Hammond; Black Hills, Dr. F. V. Hayden. Closely allied to E. tuberculata, but with the granules of the elytra large, and extending almost to the suture, where they pass into punctures as in that species.

This is the first of the group that has occurred east of maritime California and Oregon.

The following species is unknown to me; as the work in which it is described is rarely seen, I have translated the original French description, and add it for the benefit of American naturalists.

'E. subaspera, ovalis, elongata, prothorace subquadrato, postice parum angustato, supra punctato bifoveolatoque; elytris punctatis lateribus et postice asperatis; femoribus anticis inermibus, tibiis anticis leviter incurvis. Long. ·67.'

Solier, Studi Entomologici, 246.

'This species is related to E. angusta, but is quite distinct. Head tolerably strongly punctured, especially anteriorly, where the punctures are very close. Suture of the epistoma well marked for its whole length, and forming a smooth space. Prothorax subrectangular, very slightly narrowed behind and hardly curved on the sides; punctuation of the back tolerably strong and close, but not variolate as in E. coriacea. Besides the punctures two foveæ tolerably well marked may be seen at the anterior third, about the middle of the breadth. Elytra covered with tolerably large scattered punctures, not placed in well marked striæ, somewhat rough, especially towards the sides and apex: no transverse rugæ. Abdomen finely punctured, with longitudinal rugæ, on the first three segments. Anterior tibiæ curved.

California, collection of Mr. Dupont.'

Nov. 2d.

Vice-President Lea in the Chair.

Thirty-eight members present.

Dr. Woodhouse announced the death, at Philadelphia, on the 28th ult., of Dr. Gavin Watson, late a member of the Academy.

Dr. Leidy remarked, that while spending a few weeks during the past summer, in company with Dr. Bridges, at the residence of our fellow member Mr. S. Powel, at Newport, Rhode Island, they together had examined the neighboring fresh-water streams and ponds for Polyzoa. They had the good fortune to find a species of *Cristatella;* being the first discovery of this genus in America. The locality of the polyzoon is Lily Pond, near Newport, in which it is found very abundantly, adhering to the under side of stones forming the shores of the pond.

In the month of August, the Cristatella masses were flattened, elliptical, about half an inch in length and about two lines wide, and were translucent yellowish white. About three rows of polyps encircled the masses. Each polyp supported on its horse-shoe-like arms seventy-two tentacles, conjoined at base by a delicate, festooned, areolated membrane.

Specimens of the Cristatella, placed in a dish of water, moved at the rate of an inch in about twenty-four hours.

The ova, or statoblasts, were only partially developed during my stay at Newport. The present month, Mr. Powel has sent to me fully developed specimens, accompanied with a note, in which he says, "I made an expedition to the Lily Pond, and procured great numbers of Cristatella with ova. I got upon one stone fifty-four separate masses, some of them one inch and three-quarters long and one quarter wide, of a beautiful amber color, full of ova, apparently in various stages of development."

These ova are the largest that I have seen in any genus of Polyzoa. They are double convex lenticular, and circular, with a marginal discoidal annulus, a little deeper on one side than on the other. From the inner margin of the annulus spring forth about seventy anchor-like appendages, of which fifty spring from one side, and bend in a doubly geniculate manner over the outer margin of the annulus; the remaining twenty are shorter, and diverge from the opposite side.

Breadth of statoblast, 1.152 mm., or about half a line independent of the anchors.

This American species of *Cristatella* is respectfully dedicated to the sister of Mr. Powel, with the name of Cristatella Idæ.

From the European *Cristatella mucedo*, the American species differs in habit as well as in several points of structure. Prof. Allman, in his valuable monograph on the Polyzoa, says, that "while the greater number of the fresh-water Polyzoa lurk on the under surface of stones and in dark recesses, *Cristatella* loves to expose itself to the full light and warmth of the sun."

The polyp of *C. mucedo* has about eighty tentacula; and the intestine is light bluish green. That of *C. Idæ* has about seventy-two tentacula, and the intestine is yellowish. The ova or statoblasts of *C. mucedo* are about one thirty-third of an inch broad; those of *C. Idæ* are about half a line. Prof. Allman's figure of the statoblast of the former species represents the anchors as sigmoid; those of the latter species have a double elbow.

The discovery of an American *Cristatella* has afforded me the opportunity of comparing its statoblasts with those of *Pectinatella.* The diagnosis formerly given by authors to those of *Cristatella*, equally well apply to those of *Pectinatella*, while the statoblasts of the two genera differ in a remarkable manner. This is sufficiently well indicated by comparing the following description with that above given, of the statoblasts of *Cristatella Idæ.* The statoblast of *Pectinatella magnifica* is doubly convex lenticular, quadrately circular, and slightly curved, with a marginal discoidal annulus, much deeper on one side than on the other. From the outer margin of the annulus spring forth about twelve to sixteen straightly diverging anchors. Breadth of statoblast 0.88 mm. by 0.8 mm., or about the third of a line.

Recently, Dr. Wm. Spillman, of Columbus, Mississippi, has sent to me a description, accompanied with drawings, of certain gelatinoid masses from the lakes of his vicinity, on which he desired some information. The masses, which Dr. Spillman observes hang from the immersed branches of plants and dead sticks, at the present time, (October,) "are from the size of a hen's egg to such as measure 15 inches long by 12 inches in diameter." The description, drawing of the masses, and numerous specimens of statoblasts also received, are all referable to the *Pectinatella magnifica.* I had been prepared for this announcement by repeated information of medical students from the south-western portion of our country. Some of them have stated they had seen these jelly-like masses even as large as a half-bushel measure. Mr. Stimpson, the accurate naturalist, has informed me, that as early as 1850 he had detected large brain-like masses of Polyzoa attached to stones in the Middlesex canal, near Boston. As *Pectinatella*, so far as my observations go, has always been found attached to branches of trees, perhaps from the difference of habit, the brain-like masses may prove to be distinct.

Dr. Leidy further exhibited drawings of a species of *Fredericella*, which is found in the Delaware and Schuylkill rivers, near Philadelphia, and also in Lily Pond, near Newport. He has not yet positively ascertained whether the species is different from that found in Europe. He added, that two years since he had detected a species of *Lophopus* in the Schuylkill river, but he had not yet had leisure to determine its character.

Nov. 9th.

Twenty-seven members present.

A paper was presented for publication in the Proceedings entitled: Notes on American Land Shells, No. IV, by W. G. Binney, and was referred to a Committee.

Nov. 16th.

Vice-President BRIDGES in the Chair.

Thirty five members present.

The following note, relating to the fossils presented this evening by Mr. David Christy, was read:

This fossil I have supposed to be the *Orthis bellarugosa*, CONRAD, which must have been figured from a young specimen. Hall's *O. insculpta* is an old worn specimen of it, sent by myself before we had discovered the locality for perfect specimens. It occurs at Oxford, Ohio, about 200 ft. below the Cliff Limestone, and has a vertical range of only a few feet. Its geographical range is extensive. The locality from which the best specimens come is 14 miles west of Oxford, where they occur in marlite, and the associated fossils I will give accurately hereafter.

Nov. 23d.

Vice-President BRIDGES in the Chair.

Thirty five members present.

The following papers were presented for publication in the Journal:

Description of the Embryonic forms of thirty-eight species of Unionidæ, by Isaac Lea, LL.D.

New Unionidæ of the United States, by Isaac Lea, LL.D.

And one for publication in the Proceedings, entitled:

Catalogue of Birds collected by A. A. Henderson, M. D., U. S. N., at Hakodadi, Island of Jesso, Japan, with notes, by John Cassin.

And were referred to Committees.

Mr. Cassin called attention to the specimens of Hesperiphona vespertina presented by Mr. J. D. Sergeant, which were procured in northern Illinois, and stated that since the description of the species by Mr. Wm. Cooper, it has not been collected east of the Mississippi, and is but rarely found east of the Rocky Mountains.

Nov. 30th.

Vice-President Bridges in the Chair.

Thirty-four members present.

On Report of the respective Committees the following papers were ordered to be printed in the Journal:

Description of the Embryonic forms of thirty-eight species of Unionidæ, by Isaac Lea, LL.D.

New Unionidæ of the United States, by Isaac Lea, LL.D.,

And the following in the Proceedings:

Catalogue of Birds collected by A. A. Henderson, M. D., U. S. Navy, at Hakodadi, Island of Jesso, Japan, with notes and descriptions of new species,

BY JOHN CASSIN.

During a cruise of the U. S. ship Portsmouth, Captain A. H. Foote, U. S. Navy, commanding, recently completed, a very interesting collection of birds and collections in other departments of Natural History were made by Dr. A. A. Henderson, Surgeon, U. S. Navy, and Member of this Academy. Mainly the birds were obtained at Hakodadi, in the Island of Jesso, the most northern of the Empire of Japan, and in the Island of Luzon, Philippine Islands, and the collection contains so many species, little known and otherwise of high interest, that we have deemed it proper to prepare catalogues for publication. The present paper contains birds from Hakodadi, exclusively, but we propose shortly to give a catalogue of those from the Philippines, to include also another collection recently received from the same Islands.

Though the fullest encouragement and every facility was cheerfully granted by Captain Foote, opportunities for collecting birds only presented, favorable in any considerable degree, at the two points mentioned. The U. S. ship Portsmouth, it will be remembered, was in the Chinese Seas during the recent troubles, and it was undoubtedly most fortunate for the interests of the United States that such an accomplished and efficient officer as Captain Foote was in command and so faithfully maintained and defended the dignity of his flag and the reputation of his country.

The present collection was made at Hakodadi in October, 1857.

1. Milvus melanotis, Temm. and Schleg.

Milvus melanotis, Temm. and Schleg., Faun. Jap. Aves, p. 14, (1850.)
Falco cheela, Lath. Ind. Orn. i. p. 14, (1790)?
Milvus govinda, Sykes, Proc. Zool. Soc. London, 1832, p. 81?
Temm. and Schleg., Faun. Jap. Aves, pl. 5, 6. Gould, B. of Asia, pt. 4, pl. 1?

Apparently a young male of this species, very much resembling the figures in Faun. Jap. cited above, (pl. 5,) but with the wing coverts and shorter quills tipped and edged with dull white. The entire under parts are also striped longitudinally and in the middle of the feathers with a dull yellowish white.

This bird is scarcely to be distinguished from the species usually known as *Milvus govinda*, of which a beautiful and very accurate figure is given by Mr.

Gould, as above, and which is a common species of India. The present specimen is from Hakodadi, in the Island of Jesso.

2. Emberiza fucata, Pallas.

Emberiza fucata, Pallas, Voyages, iv. p. 669, (French ed. Paris, 1793.)

Temm. and Schleg., Faun. Jap. Aves, pl. 57. Pallas, Zoog. Rosso Asiat. Aves, pl. 46.

From Hakodadi. Specimens in immature plumage.

3. Emberiza ciopsis, Bonaparte.

Emberiza ciopsis, Bonap., Consp. Av. p. 466, (1850.)

Emberiza cioides, Temm. and Schleg., Faun. Jap. p. 98, (1850, not of Brandt of previous date.)

Temm. and Schleg. Faun. Jap. Aves, pl. 59.

Hakodadi.

4. Passer montaninus, Pallas?

Passer montanina, Pall., Zoog. Rosso Asiat. ii p. 30?

Passer montanus, Temm. and Schleg., Faun. Jap. Aves, p. 89?

From Hakodadi. A single specimen in Dr. Henderson's collection is not in good plumage, but is interesting on account of its similarity in colors only to the common *Passer montanus* of Europe. It is, however, different from that species in having the bill stronger and the feet much larger, and in general appears to be a more robust bird. The toes in the present species are so much longer and thicker, that those of *P. montanus*, (from France,) appear on comparison to be quite feeble. It seems, in fact, to belong to Bonaparte's second division of the genus *Passer*, (Consp. Av. p. 508,) though with the plumage of the type of the first division, *P. montanus*.

This rather singular bird is very probably meant by Pallas in Zoog. as above cited, where he gives it as a species of eastern Siberia and probably also by Temminck and Schlegel under the name of *P. montanus*. The distinguished authors last mentioned seem, however, not to have had specimens before them The name given by Pallas very probably ought to be re-established for this species.

5. Sturnus cineraceus, Temminck.

Sturnus cineraceus, Temm. Pl. Col. ii, liv. 94, (about 1826.)

Temm. Pl. Col. 536. Temm. and Schleg., Faun. Jap. Aves, pl. 45.

Evidently a young bird of this species with nearly the entire plumage dark cinerous, lighter on the under parts, but showing the characteristic white spots on the ears, and with the throat becoming black. Under wing and tail coverts white.

"In scattered flocks at Hakodadi, very shy."—(Dr. Henderson.)

6. Alauda japonica, Temm. and Schleg.

Alauda japonica, Temm. and Schleg., Faun. Jap. Aves, p. 87, (1850.)

Temm. and Schleg. Faun. Jap. Aves, pl. 47.

The figure in Faun. Jap., cited above, seems to represent a young bird. Specimens in the present collection are more mature and have the brownish spot on the cheek very distinct. The dark markings of the upper parts are larger than in *Alauda arborea*, to which this species bears a resemblance and relationship.

The tail in the present bird is quite as long as is usual in the genus *Alauda*, and longer than in *A. arborea*. In several specimens the entire outer feather is white, in others a portion of the inner web is brown. It is quite distinct as a species. Hakodadi.

7. Parus minor, Temm. and Schleg.

Parus minor, Temm. and Schleg., Faun. Jap. Aves, p. 70.

Temm. and Schleg., Faun. Jap. Aves, pl. 33.

"Frequent everywhere in the vicinity of Hakodadi, in trees and bushes, usually several together. The voice of this species is quite similar to that of the Chickadee of the United States."—(Dr. Henderson.)

8. Parus kamtschatkensis, Bonaparte.

Parus kamtschatkensis, Bonap., Consp. Av. p. 230, (1850.)

The only specimen that we have ever seen of a species allied to *Parus palustris* of Europe, but apparently sufficiently distinct. So far as we can judge from a very short description, it is the bird meant by the Prince Bonaparte as above cited.

In this bird the upper parts of the body are pale ashy, ("*albo-canescens*," Bonap.) paler than in *Parus palustris* and the tail is longer with all the feathers uniformly ashy brown, the edges only of the outer feathers being white. Head above and neck behind black, throat black, under parts white, with a very pale and dull tinge of yellowish ashy on the abdomen and flanks. The black of the head extends on to the neck further than usual in species having this character. Bill rather stout.

This species is an addition to the Japanese fauna made by Dr. Henderson. "Common in the woods behind Hakodadi."—(Dr. Henderson.)

9. Motacilla lugens, Temm. and Schleg.

Motacilla lugens, Temminck and Schlegel, Faun. Jap. Aves, p. 60, pl. 25, (1850.)

Hakodadi.

"Along the shore and on stones where the surf was breaking. Generally several together, but sometimes solitary. Abundant."—(Dr. Henderson.)

10. Motacilla boarula, Linnæus.

Motacilla boarula, Linn., Mant. 1771, p. 527.

Motacilla Melanope, Pallas, Voy. iv. p. 667, (1793)?

Gould, B. of Eur. ii. pl. 147.

"Hakodadi, not so abundant as the preceding."—(Dr. Henderson.)

11. Anthus japonicus, Temm. and Schleg.

Anthus pratensis japonicus, Temm. and Schleg., Faun. Jap. Aves, p. 59, pl. 24.

Hakodadi.

12. Phyllopneuste coronata, (Temm. and Schleg.)

Ficedula coronata, Temm. and Schleg. Fann. Jap, p. 48, pl. 18.

Hakodadi. Allied to *Sylvia sibilatrix* of Europe.

13. Lusciniopsis japonica, nobis.

Resembling *L. Savii*, Bonap., Consp. Av. i. p. 288, Gould, B. of Eur. pl. 104, (which is *Sylvia luscinioides*, Savi,) and also *L. fluviatilis*, (Meyer) and about the same size, but with the upper parts olive green, tinged with brown, and the under parts pale yellow, spotted on the breast with greenish brown, and with the sides and abdomen pale, reddish brown. Bill rather large, upper mandible and tip of under mandible brownish black, base of under mandible pale yellow; legs and feet strong; toes long; wing short, second quill longest; tail cuneate, dark brown; outer feathers tipped with white. Upper parts dark olive green, tinged with brown, especially on the rump and upper tail coverts, obscurely spotted with brownish black on the head and back, line over the eye pale yellow. Under parts pale yellow, nearly white on the throat, with numerous greenish brown spots on the breast; sides and tibiæ dark greenish brown; abdomen and under tail coverts very pale reddish brown; under wing white. Total length about $5\frac{1}{4}$ inches, wing $2\frac{1}{2}$, tail 2 inches.

Hab.—Hakodadi, Island of Jesso, Japan. Discovered by A. A. Henderson, M. D., U. S. Navy.

This bird seems to be quite distinct from either *Sylvia lusciniodes* or *S. fluvia-*

tilis though much resembling both, and strictly of the same subgeneric group. It is shorter in the wings and has larger legs and feet than either, and differs also in color. A single specimen only is in the present collection.

No species of this group is enumerated in Temminck and Schlegel's Catalogue, nor do we find any description of an Asiatic species applicable to the present species. Its nearest relative is *S. luscinioides.* It may also be related to *Locustella rubescens.* Blyth. Jour. As. Soc. xiv. p. 582.

14. Lusciniopsis Hendersonii, nobis.

Resembling the preceding, but much smaller, and also resembling *Sylvia locustella* of Europe. Wings short, legs and feet large, toes long, tail rather wide, rounded. Upper parts dark olive green, with a tinge of brown, every feather with a central stripe of brownish black. Under parts yellowish white, breast with numerous small spots of brownish black, sides and tibiæ greenish brown, tail dark brown, abdomen, under tail coverts and under wing coverts with a tinge of very pale reddish. Bill with the upper mandible dark horn color, under mandible lighter, feet pale yellowish. Total length about 4½ inches, wing 2¼, tail 1¾ inches.

Hab.—Hakodadi, Island of Jesso, Japan. Discovered by A. A. Henderson, M. D., U. S. Navy.

This little bird appears to us to be of rather complex generic, or, perhaps, more properly, subgeneric relations, and would be quite as properly included in the genus *Locustella* as in *Lusciniopsis*, and in fact bears considerable resemblance and relationship to the European *Sylvia locustella.* It much resembles the preceding, having the same short wings, rounded tail, and very strong legs and long toes, but the bill is comparatively smaller. As will be seen by the measurements given, the present bird is much smaller than the preceding, and is smaller also than *S. locustella.*

One specimen only in the collection made by Dr. Henderson, to whom we have dedicated this curious little species, his high position as an officer of the Medical corps of the Navy of the United States, and extensive acquirements also as a naturalist, fully justifying it, but especially his untiring energy in contributing to the ornithological collection of this Academy renders the present application of his name entirely appropriate. The present bird does not much resemble any species enumerated by Temminck and Schlegel.

15. Butalis cinereo-alba, (Temm. and Schleg.)

Muscicapa cinereo-alba, Temm. and Schleg., Faun. Jap. Aves, p. 42, pl. 15.

"High up in the trees, behind Hakodadi, several together. (Dr. Henderson.)

16. Merula Naumannii, (Temminck.)

Turdus Naumannii, Temm., Man. d'Orn. i. p. 170.
Turdus eunomus, Temm., Pl. col. (liv. 87.)
Turdus dubius, Naumann.
Turdus fuscatus, Pallas?
Temm., Pl. col. 514. Naumann, B. of Germ. pl. 68. Gould, B. of Eur. ii. pl. 79.

Several specimens in excellent plumage, and undoubtedly the species figured by all the authors above cited. Resembling somewhat but quite distinct from *T. atrigularis*, Natt. Gould, B. of Eur. pl. 75, of which specimens from Siberia are in the museum of the Academy.

"Very numerous everywhere in the vicinity of Hakodadi in scattered flocks. When disturbed, uttered a note resembling that of *Merula migratoria* of the United States, which it also much resembles in general habits." (Dr. Henderson.)

17. Alcedo bengalensis, Gmelin.

Alcedo bengalensis, Gm., Syst. Nat. i. p. 450. (1788.)
Temm. and Schlg., Faun. Jap. Aves, pl. 38.

Hakodadi.

18. PICUS MAJOR, Linnæus.

Picus major, Linn., Syst. Nat. i. p. 176. (1766.)
Gould, B. of Eur. iii., pl. 229.

Very fine specimens, all of which differ from European specimens of this species in having the shorter quills fully spotted with white like the others. In other respects they are identical.

"Frequent in the woods near Hakodadi, solitary." (Dr. Henderson.)

This species was first obtained in Japan by Mr. William Heine, of the U. S. Expedition to Japan under Com. Perry.

19. SITTA SIBIRICA, Pallas.

Sitta europæa, var. sibirica, Pallas, Zoog. Ross. Asiat. i. p. 547. (1814.)
Sitta uralensis, Gloger, Handb. Vog. Eur., p. 578. (1834.)
"Sitta uralensis, Licht." Gloger ut supra.
Sitta asiatica, Temm.
"Sitta europæa, Linn. nec Auct.," Bonap. Consp. Av. p. 226.
Sitta roseilia, Bonap., Consp. Av. p. 227?
Gould, B. of Eur. iii. pl. 236.

A single specimen in the collection of Dr. Henderson appears to be the first ever obtained in Japan, and is very probably the same species inserted in their catalogue by Messrs. Temminck and Schlegel, (Faun. Jap. Aves, p. 138), on the faith of a Japanese drawing. This bird cannot be distinguished from specimens labelled "*Sitta uralensis*," in the Museum of this Academy, purporting to be from the north of Europe, and seems to be the same as represented in the figures cited above.

"On the trunks of coniferous trees forming groves behind the town of Hakodadi, having apparently the habits of the common Nuthatch of the United States, and emitting a low chirp at intervals. One pair only came under my notice." (Dr. Henderson).

20. SQUATAROLA HELVETICA, (Linnæus).

Tringa helvetica, Linn., Syst. Nat. i. p. 250, (1766).
Wilson, Am. Orn. vi. pl. 57, fig. 4.

"Abundant in the grass, a short distance from the shores of the bay at Hakodadi." (Dr. Henderson).

21. CHARADRIUS ORIENTALIS, Temm. and Schleg.

Charadrius pluvialis orientalis, Temm. and Schleg., Faun. Jap. Aves, p. 104, pl. 62.

"Along the shores of a salt-water creek at Hakodadi."

22. CHARADRIUS MORINELLUS, Linnæus.

Charadrius morinellus, Linn., Syst. Nat. i. p. 254, (1766).
Gould, B. of Eur., iv., pl. 295.

Another addition to the Japanese fauna, by Dr. Henderson, who states the locality the same as the preceding. Not to be distinguished from European specimens.

23. SCOLOPAX SOLITARIA, Hodgson.

Scolopax solitaria, Hodgson, Proc. Zool. Soc., London, 1836, p. 8.
Temm. and Schleg., Faun. Jap. Aves, pl. 68.

"In marshy grounds, near Hakodadi, solitary." (Dr. Henderson).

24. TOTANUS BREVIPES, Vieillot.

Totanus brevipes, Vieill., Nouv. Dict. vi., p. 419, (1816).
Totanus pulverulentus, Müller Verhandl., p. 153, (1844).
Totanus oceanicus, Lesson, Comp., Buff., p. 244, (1847).
Temm. and Schleg., Faun. Jap. Aves, pl. 65.

Hakodadi.

25. TOTANUS GLOTTIS, (Linnæus).
Scolopax glottis, Linn., Syst. Nat. i. p. 245, (1766).
Totanus glottoides, Gould?
Gould, B. of Eur., iv., pl. 312.

Specimens much resembling *T. glottoides*, from Australia, but probably not distinct from the European bird. The first ever obtained in Japan.

"Along the margin of a salt-water creek, near Hakodadi." (Dr. Henderson).

26. TRINGA MAGNA, (Gould).
Shœniclus magnus, Gould, Proc. Zool. Soc., London, 1848, p. 39.
Tringa crassirostris, Temm. and Scheleg., Faun. Jap. Aves, p. 107, (1850).
Gould, B. of Aust., vi., pl. 33, Temm. and Schleg. Faun. Jap. Aves, pl. 64.

"Along the shores and in grassy plains, in flocks, near Hakodadi." (Dr. Henderson).

27. TRINGA ALPINA, Linnæus.
Tringa alpina, Linn. Syst. Nat. i. p. 249, (1766).
Gould, B. of Eur., iv. pl. 329.

Identical with specimens from Europe, but smaller than the bird, regarded as the same species in the United States. The latter is our *Tringa americana*, in Pacific Railroad Report, ix., p. 719.

28. TRINGA MINUTA, Leisler.
Gould, B. of Eur. iv. pl. 332.

Obtained in Japan for the first time, by Dr. Henderson, at Hakodadi, and not to be distinguished from European specimens. "Abundant, generally several together. Between the Bay of Hakodadi and the mountains to the northward a plain rises very gradually, which is dry near the shore, but two or three hundred yards beyond, are extensive grassy marshes. From these one or two small streams run to the Bay, before discharging into which they run for a mile or two nearly parallel to the beach, and frequently not more than thirty or forty yards distant. The tide ebbs and flows in these streams, and their shores are frequented by all the wading birds preceding, except the *Scolopax*." (Dr. Henderson).

29. NUMENIUS.

A species about the size of *N. longirostris*, but with a shorter bill, to which we cannot at present apply a name, a single specimen in the collection being apparently in young plumage. It is smaller than *N. major* or *N. arquata*, and is the fourth species of *Numenius*, now known to inhabit the empire of Japan, two having been given by Temminck and Schlegel, and a third having been obtained by Mr. Heine, naturalist, attached to Perry's U. S. Expedition to Japan. Hakodadi.

30. LIMOSA LAPPONICA, (Linnæus).
Scolopax lapponica, Linn. Syst., Nat. i. p. 246, (1766).
Limosa rufa, Brisson, Orn. v., p. 281.
Limosa ferruginea, Pallas.
Gould, B. of Eur., iv. pl. 306; Naumann, B. of Germ. pl. 215.

Not to be distinguished from European specimens. Hakodadi.

31. HÆMATOPUS OSTRALEGUS, Linnæus.
Hæmatopus ostralegus, Linn., Syst. Nat. i. p. 257, (1766).
Gould, B. of Eur. iv., pl. 300; Naumann, B. of Germ., pl. 181.

For the first time this bird was obtained in Japan by Dr. Henderson. It is stated by Temminck and Schlegel to be given in their catalogue, (Faun. Jap. p. 139) on the faith of a drawing by a native artist. Hakodadi.

Notes on American Land Shells, No. 4.

BY W. G. BINNEY.

The following Catalogue of American Terrestial Mollusks, is offered in the hope of drawing attention to the subject, and by exciting criticism, to furnish the first step towards an arrangement of the confused synonomy. The list is necessarily incomplete, as but a small portion of the oldest States has been thoroughly searched, and an immense extent of territory remains quite unexplored.

The species of the Pacific coast north of Mazatlan, are catalogued separately. The Mexican species will be published in a subsequent paper.

Reference is made only to authors giving a description or figure of each species.

I.

FAMILIA LIMACEA.

ARION.

1. A. foliatus *Gld.*

LIMAX.

2. L. Columbianus *Gld.*

FAMILIA HELICEA.

SUCCINEA.

3. S. cingulata *Forbes.*
4. S. Nuttalliana *Lea, Pf., Binn.*,
5. S. Oregonensis *Lea, Pf., Binn.*,
6. S. rusticana *Gld., Pf.*

Species exclusa.

S. aperta, Lea, Ins. Sandw. nec Cal. teste Gould.

HELIX.

7. H. acutedenta *W. G. Binn.*
   ? var. β Helix Loisa, *W. G. Binn.*

   H. æruginosa Gould, =H. arrosa.

8. H. anachoreta *W. G. Binn.*

   H. arboretorum Val., =Helix Nickliniana.

9. H. areolata *Pf., Phil., Chemn., Gld., Rve.*
   var. β. *Pfeiffer.*
   var. γ. *Pfeiffer.*
   H. areolata var. Chemn.

10. H. arrosa *Gld.* in litteris.
    H. æruginosa Gld. (olim,) W. G. Binn.

11. H. aspersa *Mull.?*

    H. Baskervillei Pf. &c. =H. devia.

12. H. Californiensis *Lea, Tros. Chemn., Rve., DeK., Binn.*
    H. vincta Val., Rve., Pf., Chemn.,
    H. Californiensis Pf., Chemn., Rve., =H. Nickliniana.

13. H. Columbiana *Lea, Tros., DeK., Chemn., Pf., Rve., Binn.*
    H. labiosa Gld., Pf.

    H. damascenus Gld.=H. Pandoræ.

14. H. devia *Gld., Pf.*
    H. Baskervillei Pf., Rve.

15. H. Dupetithouarsi *Desh., Chemn., Pf., Rve., W. G. Binn., Gld.*

    (*junior*), *H. Oregonensis* Lea, Tros., DeK., Pf.

16. H. exarata *Pf.?*

17. H. fidelis *Gray, Mull., Chemn., Pf., Rve., W. G. Binn.*
    H. Nuttalliana Lea, Tros., DeK. Binn., Gld.

18. H. germana *Gld., Pf.*

19. H. infumata *Gld., W. G. Binn.*

20. H. intercisa *W. G. Binn.*
    H. Nickliniana var. Binn.

21. H. Kelletti *Forb., Chemn., Pf., Rve.*

    H. labiosa Gld., &c. =H. Columbiana.

    H. Lecontii Lea, =H. loricata *Gld.*

22. H. levis *Pf., Chemn.*

    var. β. Pfeiffer.

23. H. Loisa *W. G. Binn.*, (an H. acutedentatæ, var. ?)

24. H. loricata *Gld., Pf.*
    H. Lecontii Lea, Pf.

25. H. Mazatlanica *Pf.*

26. H. Mormonum *Pf.*

    H. nemoraviga Val., =H. Nickliniana.

27. H. Newberryana *W. G. Binn.*

28. H. Nickliniana *Lea, Tros., Binn.*, (*excl. varr.*)

H. nemoraviga Val.
H. arboretorum Val.
H. Californiensis Pf. (et. β.) Chemn. (*excl. var.* 2.) Rve.
H. Nuttalliana Lea, &c. =H. fidelis.
H. Oregonensis Lea, &c. =H. Dupetithouarsi.

29. H. Pandoræ *Forb.*, *Chemn.*, *Pf.*, *Rve.*, *Gld.*
H. damascenus Gld., olim.

30. H. ramentosa *Gld.*

31. H. redemita *W. G. Binn.*
H. Nickliniana var. Binn.

32. H. reticulata *Pf.*

33. H. sportella *Gld.*, *Pf.*
H vincta Val. &c. =H. Californiensis.

Species exclusa.

H. Sagraiana Orb., (teste Sowb., Carp.) Ins. Cuba.

BULIMUS.

34. B. Californicus *Rve.*, *Pf.*

35. B. chordatus *Pf.*
B. elatus Gld., vid. B. excelsus.

36. B. excelsus *Gld.*
B. elatus Gld., in tab.

37. B. Humboldti *Rve.*, *Pf.*
B. Mexicanus Val., nec Lam.
B. Mexicanus Pf. (*excl. B. Mexicanus* Val.)

38. B. Laurentii *Sowerby*, *&c.*, var. *β. Pfeiffer.*

39. B. Mexicanus *Lam.*, *Deless.*, *Pf.*, *Rve.*, *nec Val.*
Cochlogena vittata Fer.
B. Mexicanus Val., &c. =B. Humboldti.

40. B. vegetus *Gld.*
(*B. pallidior* Sowb,. teste Cuming.)

41. B. vesicalis *Gld.*, *nomen transmutandum.*

42. B. zebra *Muller*, *&c. vide infra.*

43. B. Ziegleri *Pf.*, *Rve.*

ACHATINA.

44. A. Californica *Pf.*, *Rve.*

Species exclusæ.

Achatina Albersi Pf. =Glandina.
Achatina turris Pf. =Glandina.

GLANDINA.

45 G. Albersi *Pf.*

46. G. turris (*Achatina*), *Pf.*, *Rve*, *Desh.*
Glandina Albersi var. *turrita* P. P. Carp.
Oleacina turris Gr. et Pf.

FAMILIA AURICULACEA.

SUB-FAMILIA MELAMPEA.

MELAMPUS.

47. M. olivaceus *Carp.*

FAMILIA ACICULACEA.

TRUNCATELLA.

48. T. Californica *Pf.*
Truncatella —? Carpenter.

II.

FAMILIA LIMACEA.

VAGINULUS.

49. V. Floridianus *Binn.*

Species exclusæ.

Vaginulus flexuolaris Grat.
" *fuscus* Grat.
" *oxyurus* Grat.
" *quadrulus* Grat.

TEBENNOPHORUS.

50. T. Carolinensis (*Limax*), *Bosc.*
Limax Carolinianus De Roissy.
" *Carolinensis* Fer., Bosc., Desh. in Lam., Mrs. Gray.
" *marmoratus* DeK., (teste Newcomb, *in litt.*) Linsley?
" *togata* Gld.
Philomycus Carolinensis Fer., Gr. et Pf.
T. Carolinensis Binn., Ad., DeK., Stimp., (abs. desc.)

51. T. dorsalis *Binn.*
Philomycus dorsalis Binn. (olim), Ad., Gr. et Pf.
Limax dorsalis DeK.

ARION.

52. A. empiricorum *Fer.*, (*teste Grat.*)

53. A. hortensis *Fer.*, *Binn.*, *DeK.*, *Gr. et Pf.*

Species exclusa.

Arion foliatus Gld., (teste Grat.,) hab. litt. occid.

LIMAX.

54. L. agrestis *Müll.*, *Ad.*, *DeK.*, *Gr. et Pf.*
L. tunicata Gld.

55. L. campestris *Binn., Ad., DeK., Gr. et Pf.*
L. flavus Binn., Gr. et Pf. =L. variegatus.
L. tunicata Gld., Gr. et Pf. =L. agrestis.

56. L. variegatus *Fer., &c, Binn.*
L. flavus Binn. olim, DeK., Gr. et Pf.

Species exclusæ.

L. Carolinianus De Roissy =Tebennophorus Carolinensis.
L. Carolinensis Fer., &c. =Tebennophorus Carolinensis.
L. Columbianus Gld., (teste Grat.)
L. dorsalis DeK. =Tebennophorus dorsalis.
L. fuliginosus Gld., (teste Grat.)
L. gracilis Raf., Gr. et. Pf.
L. marmoratus DeK., Linsley, —v. Tebennophorus Carolinensis.
L. olivaceus Gld., teste Grat.
L. togata Gld., =Tebennophorus Carolinensis.

E Limaceis exclusæ.

Eumelus Raf.
" *lividus* Raf.
" *nebulosus* Raf.
Deroceras Raf.
" *gracilis* Raf.
Philomycus Raf.
" *Carolinensis* Fer. =Tebennophorus Carolinensis.
" *dorsalis* Binn., (olim.) =Tebennophorus dorsalis.
" *flexuolaris* Raf., Gr. et Pf.
" *fuscus* Raf., Gr. et Pf.
" *lividus* Gr. et Pf.
" *nebulosus* Gr. et Pf.
Testacina Raf. teste Gr. et Pf.
Urcinella Raf., teste Gr. et Pf.
Zilotea Raf., teste Gr. et Pf.
Oxyrus Raf., Gr. et Pf.
" *quadrilus* Raf., Gr. et Pf.

FAMILIA HELICEA.

VITRINA.

57. V. angelicæ *Beck. (abs. desc.) Möll., Pf.*
Helix pellucida Fabr.
Helix domestica Ström, teste Fabr.
V. Americana Pf., &c. =V. limpida.

58. V. limpida *Gld., Pf.*
V. pellucida Say, Ad., DeK., Stimp., (abs. desc.) Binn., nec Müll.
V. Americana Pf., (olim).
V. pellucida Say, &c. =V. limpida.

SUCCINEA.

59. S. aurea *Lea, Pf., Gld.,*
S. ovalis teste Anthony, *abs. desc.*

60. S. avara *Say, Ad., Gld., (excl. S. vermeta,) Pf., DeK., Chemn., Binn. (excl. S. vermeta).*
S. Wardiana Lea, Pf.
var. major.

61. S. campestris *Say, Pf., (excl. S. campestris* Gld.,) *Chemn. (excl. do.) Desh. in Fer., Binn., nec Gld., DeK., &c. Srcipt. Am., (abs. desc.)*
S. campestris Gld., &c. =S. obliqua.

62. S. concordialis *Gld., Pf.*
S. munita Binn., vol. 1, abs. desc.

63. S. effusa *Shutt., Chemn., Pf.*

64. S. Groenlandica *Beck. (abs. desc.) Möll., Pf.*

65. S. Haydeni *W. G. Binn.*
var. minor.

66. S. inflata *Lea, Pf.*
S. campestris var. (teste Binn.)

67. S. lineata *W. G. Binn.*
S. lineata DeK., =S. obliqua.

68. S. luteola *Gld., Pf.* in litt.
S. munita Binn. =S. concordialis.

69. S. obliqua *Say, Ad., DeK., Chemn., Binn., (excl. S. Totteniana.)*
S. ovalis Say, Ad., DeK., Desh. in Lam., Enc. Mech., et in Fer., Pf., Chemn., nec Gld.
S. campestris Gld, DeK., &c. Scr. Am., (absq. desc.), nec Say.
S. lineata DeK.
Cochlohydra ovalis Fer.

70. S. ovalis *Gld., (non Say,) Binn., (excl. S. ovalis Ad., ?)*
S. ovalis Say, &c. =S. obliqua.

71. S. retusa *Lea, DeK., Pf.*
S. ovalis Binn., (excl. syn. desc. et fig.)
S. campestris Anthony (pars.) abs. desc.), nec Say.

72. S. Salleana *Pf., Chemn.*
S. Texasiana Pf. =S. luteola.

73. S. Totteniana *Lea, Pf., Gld.*
S. obliqua Binn., (pars.) nec Say.

74. S. vermeta *Say.* (=S. avara, *Say,* var. teste *Gld., Ad., Binn., Pf.*)

S. Wardiana Lea, &c. =S. avara.

Species exclusæ.

S. amphibia Dr., an in Am.?
S. putris Lin., an in Am.?

HELIX.

H. abjecta Gld., =Helix divesta.

75. H. albolabris *Say, Ad., Binn., Gld., DeK.,Desh.* in Fer., (excl. xlvi. A. f. 7 et xliii. f. 4.) *Chenu, Chemn.* (excl. varr. C and D,) *Pf.* (excl. varr. γ, δ,) *Rve., Billings, Bld.*, (excl. H. majore.)
Helicogena albolabris Fer., (excl. γ.)
Lister fig. 45, Petiver, No. 3.
junior, Helix rufa DeK.
var. =dentata.

H. albozonata Binn., =Helix griseola.
H. alliaria Forb. vid. Helix Steeustrupii.
H. annulata Case. =Helix exigua.

76. H. alternata *Say, Binn., Ad., Gld., DeK., Pf., Desh.* in *Fer., Pot. et Mich., Bill., Chemn.,Rve., Billings.*
Helicella alternata Fer.
H. scabra Lam., Chenu, Desh. in Lam., DeK.
H. radiata Gmel.
Petiver, No. 5, List., t. 90, f. 69.
H. infecta Pf.
H. strongylodes Pf.? Rve.?
Var. 1. albina.
2. Australis.
3. carinata (H. mordax Sh.?)
4. lævigatior.

H. apex Rve., =H. minuscula.
H. apicina Menke., vid. H. varians.

77. H. appressa *Say, Binn., DeK., Chemn., Pf., Desh* in *Fer., Rve.*
H. linguifera Lam., Desh. in Lam., Deless.,Chenu.,Pf., (olim. Symb. 1.)
Helicodonta linquifera Fer.
Var. a. *Say.*

78. H. arborea *Say, Binn.,Ad., Gld., DeK., Chemn., Pf.*, (excl. *H. Ottonis,*) *Rve.*
Helicella arborea Fer., (*H. nitidæ* var.)

79. H. Ariadnæ *Pf., Chemn.*
H. Couchiana Lea.

80. H. aspersa *Müll., Pf., &c., Binn.*

81. H. asteriscus *Morse.*
H. minutissima Gld., nec Lea.

82. H. auriculata (*Polygyra*) *Say.*
H. auriculata Binn., (excl. H. avara et Texasiana), Chemn., Desh. in Lam. et in Fer., Pf., Rve.
Helicodonta auriculata Fer.,
" *minor* Fer.? Conf. H. uvulifera.
H. auriculata var. avara, Binn.?

83. H. avara (*Polygyra,*) *Say.*
H. avara DeK., Chemn.? Pf., Rve.? Desh. in Fer.
H. auriculata Binn., *pars.*?
H. Sayii Wood.
Helicodonta avara Fer.

84. H. barbigera *Redf., Gld.*

H. bicostata Pf. &c., =Helix gularis.

85. H. bucculenta *Gld., Pf.*
H. thyroides var. β. Pf. ?
Helicodonta thyroides var. β, Fer?
Var. minor.

86. H. bulbina *Desh.* in *Fer.*

H capillacea Pf., =H. fuliginosa.

87. H. capsella *Gld.*
H. rotula Gld., (olim nec Lowe), Pf.
H. placentula Shutt., Pf., Gld.

H. carnicolor Pf., &c., =H. varians.
H. carolinensis Lea, &c., vid., H. palliata.

88. *H.* cellaria *Mull. Pf. &c., Binn., Gld., DeK.*
? *H. glaphyra* Say, nec Pf., Bld.
Helicella glaphyra Fer., abs. desc.

89. H. cereolus *Muhl., Chemn., Pf. Rve.*
Polygyra septemvolva Say.
H. septemvolva Binn., (pars), Wood, Sow., Pot. et Mich., Desh. in Fer.
Helicodonta septemvolva Fer.
H. planorbula Lam., Desh. in Lam., Chenu, Deless.
Var. laminifera.

90. H. chersina *Say, Binn.,* (*excl. H. egena*), *Ad., Gld. DeK.*
H. fulva, teste Chemn., Pf., Rve., Forb. & Hanl.

H. cicericula Fer. =H. griseola.

91. H. Clarkii *Lea.*

92. H. clausa *Say, Chenu., DeK? Binn. in Terr. Moll.* (*excl. synon.*) *Bld.*
H. Pennsylvanica Pf. *pars.*, Rve., Chemn. *pars.*, nec Green.
Var.
H. clausa Binn. fig. in Bost. Journ.

H. clausa Pf., Fer., &c. =H. inflecta.

93. H. concava *Say*, *Binn. in T. M.*, *Ad. DeK.*, *Binn. in B. J.* (*excl, syn et tab.*)
H. planorboides Pf., Chemn., Rve., Desh. in Fer.
Helicella planorboides Fer. abs. des.
H. convexa Chemn., Pf., &c. =*H.* monodon.
H. (*Stenostoma*) *convexa* Raf. =*H.* hirsuta.

94. H. Cooperi *W. G. Binn.*
H. costata Mull., =H. pulchella.
H. Couchiana Lea, =H. Ariadnæ.

95. H. Cumberlandiana (*Carocolla*) *Lea*, *Trosc.*
H. Cumberlandiana Binn., DeK., Rve. Pf.
H. (*Omphalina*) *cuprea* Raf., vid. *H.* fuliginosa.
H. dejecta Gld. =Helix divesta.

6. H. demissa *Binn.*, *Pf.*, *Rve.*
H. (*Helicodonta*) *denotata* Fer. &c. =Helix palliata.

97. H. dentifera *Binn.*, *Ad.*, *DeK.*, *Mrs. Gray*, *Pf.*, (*excl. syn.*) Chemn., (excl. syn. et fig.)
H. diodonta Say, &c. =Helix Sayii Binn.

98. H. divesta *Gld.*
H. abjecta Gld., (olim.,) Pf.
H. dejecta Gld., olim.

99. H. Dorfeuilliana (*Polygyra*) *Lea*, *Tros.*
H. fatigiata Binn., (pars. excl. syn. et fig.)
H. Dorfeuilliana Bld. nec. Pf., Desh. in Fer., Rve.
H. Dorfeulliana Desh. =H. Hazardi.

100. H. Edgariana (*Carocolla*) *Lea*, *Tros.*
H. Edgariana Pf., Rve., Gld.
H. spinosa var. Binn.

101. H. Edvardsi *Bld.*

102. H. egena *Say*, *DeK.*, *Chemn.*, *Pf.*, *Rve.*
non *H. egena* Gld., in Terr. Moll.
H. egena Gld. =Helix Gundlachi.

103. H. electrina *Gld.*, *Binn.*, *DeK.*, *Ad.*
H. nitidosa var. Pf., olim.
H. pura pars Chemn., Pf., Rve.

104. H. elevata *Say*, *Binn.*, *DeK.*, *Chemn.*, *Pf.*, *Mrs. Gray*, *Rve.*, *Desh. in Fer.* (*excl. H. elevata* Orb.)
Helicodonta Knoxvilliana Fer.
junior *Helix Tennesseensis* Lea, Pf.

105. H. Elliotti *Redf.*, *Gld.*

106. H. exigua *Stim.*, *Pf.*, *Gld.*
H. annulata Case, Pf., Ann. et Mag. N. H.
H. striatella junior, teste, Gld., olim (Sill. Journ.)

107. H. exoleta *Binn. DeK.*
H. albolabris & *unidenta* Pf., olim.
" var. D. Chemn.
Helicodonta albolabris var. Fer.
H. zaleta Binn. olim, Pf., Desh. in Fer., Rve., Mrs. Gray.

108. H. Fabricii (*Petasia*) *Beck.*
H. Fabricii Moll., Pf., Rve.
H. Hammonis Strom.?
H. nitida Fabr.?
H. alliaria Forb. teste Mörch.

109. H. fallax *Say*, *DeK.*, *Chemn.*, *Pf.*, *Rve.*
H. tridentata Binn., pars.

110. H. fatigiata (*Polygyra*) *Say.*
H. fatigiata Binn., (in B. J. ex parte, excl. syn. et fig.) ditto. in Terr. Moll. (ex parte, excl. syn. et t. xxxix. f. 2,) Shut., Bland.
H. Texasiana var. B. Chemn., (excl. desc. syn. et fig.) Desh. in Fer., (excl. desc. syn. et fig.)
H. Texasiana β Pf., (excl. desc. et syn.)
H. Dorfeuilliana Desh. in Fer., (excl. syn.)
Helicina fastigiata DeK.
H. fatigiata Binn., pars vid. H. Hazardi.
H. florulifera Rve. =Helix uvulifera.
H. fraterna Say, &c., vid. H. monodon.
H. fraterna Wood =Helix hirsuta.

111. H. friabilis *W. G. Binn.*
H. lucubrata Pf. in litt.

112. H. fuliginosa *Binn.*, (*in Bost. J.*, *excl. H. lucubrata et H. lævigata*) *do. in Terr. Moll.* (*excl. H. lævigata*), *Ads.*, (*excl. H. lucubrata*) *DeK.*, *Chemn. Pf.*, *Rve.?*

H. capillacea Pf., olim, nec. Fer.
Omphalina cuprea Raf.?
H. glaphyra Pf., Rve. =Helix inornata.
H. glaphyra Say, vid. Helix cellaria.

113. H. griseola *Pf., Chemn., Rve.,*
H. splendidula An. (abs. desc.) teste Pf.
H. *cicercula* Fer., MSS. teste Pf.,
Brandybœne pisum, Beck (Index) teste Pf.
H. albozonata Binn.?

114. H. gularis *Say, Binn., DeK., Chemn. (excl. var.) Mrs. Gray, Pf. (excl. var. β) Rve.*
H. bicostata Pf., (olim. nec in litteris), Chemn., Rve.
Helicodonta gularis, Fer.
Helicostyla Rafinesquea, Fer.?
var. umbilicata.

115. H. Gundlachi *Pf. Chemn.*
H. pusilla Pf., olim. nec Lowe.
H. egena Gld., nec Say.
H. Hammonis Strom. =Helix Fabricii.?

116. H. Hazardi *Bland.*
Polygyra plicata, Say.
H. fatigiata Binn. in Bost., J., (excl. syn. et t. xix. f. 3), ditto in Terr. Moll. (excl. syn. et f. 3.)
H. Texasiana Pf., (excl. desc. et fig.) Chemn., (excl. desc. syn. et fig.)
H. Dorfeuilliana Desh. in Fer., (excl. desc. syn. et fig.) nec Lea.
H. Troostiana W. G. Binn., olim. nec Lea.
Helicina plicata DeK.
H. (Carocolla) helicoides Lea =H. obstricta, Say.

117. H. Hindsi *Pf., Chemn., Rve., Gld.*

118. H. hippocrepis *Pf., Rve., Chemn.*

119. H. hirsuta *Say, Binn., (excl., H. stenotrema), DeK., Gld., Desh. in Lam. et En. M., Mrs. Gray, Chemn., (excl. var.), Pf., (excl. β), Rve., Desh. in Fer.*
H. fraterna, Wood.
H. sinuata γ Gmelin.
H. isognomostomus γ Gmelin ex parte.
Helicodonta hirsuta Fer., (excl. var. a).
Tridopsis hirsuta Woodw.
Stenostoma convexa Raf.
? junior *H. porcina* Say, DeK., Pf., Bland.

120. H. hispida *Linn.*

121. H. Hopetonensis *Shut., Rve., Chemn., Pf., Gld.*
H. tridentata Binn. (*ex parte*), Fer., (*ex parte*), nec Say.

122. H. hortensis *Mull., Binn., Gld.*
H. nemoralis Stim., (abs. des.)
H. subglobosa Binn., (olim,) DeK.

123. H. hydrophila *Ingalls* ined.
H. lucida Drap. teste Binn., Gld., et Pf., in litteris.

124. H. incrustata *Poey, Pf.*
H. saxicola Binn., Gld. in Terr. Moll., nec Pf.

125. H. indentata *Say, Binn., DeK., Gld., Ad., Chemn., Pf., Rve.*
var. umbilicata.
H. infecta Pf. =H. alternata.

126. H. inflecta *Say, Binn., DeK., Mrs. Gray.*
Xolotrema clausa Raf.
Helicodonta clausa Fer.
Helix clausa, Desh. in Lam., Chemn., Pf., Desh. in Fer., Rve., nec Say.
Lister, 93, f. 93?
junior? *H. porcina* Say, &c.

127. H. inornata *Say, Binn., Ad., DeK., Pf.* in Symb. 1, (excl H. *fuliginosa*) et Mon.
H. glaphyra Pf. Rve., nec Say.
H. inornata Rve. =H. lævigata.

128. H. interna *Say, Binn., DeK., Chemn., Pf., Rve.*
H. pomum-Adami Green.
var. albina.

129. H. intertexta *Binn., DeK., Chemn., Phil., Pf., Rve.*
var. carinata.
H. isognomostomus, Gmel. vid. H. hirsuta.

130. H. jejuna *Say, DeK., Pf., Bland.*
H. Mobiliana Lea, Pf., Binn.
" junior ? teste, Pf. in litteris.

H. (*Helicodonta*) *Knoxvilliana* Fer., =H. elevata.

131. H. kopnodes *W. G. Binn.*

132. H. labyrinthica *Say.*, *Binn.*, *Gld.*, *Ad.*, *Pf.*, *DeK.*, *Chemn.*, *Desh. in Fer.*, *Rve.*
Helicodonta labyrinthica Fer.

133. H. lævigata *Pf.*, (excl. *H. inornata*,) *Chemn.*, *Rve.*
Helicella lævigata Fer. ? absq. desc.
H. inornata Rve., (excl. syn).
H. lucubrata Binn., in Ter. Moll., (excl. syn.) nec Sav.
H. fuliginosa Binn. in B. J., pars. (excl. desc. syn. et fig.)
var. major. Pf., (an *H. lævigata*, Rve.?)

134. H. lasmodon *Phill.*, *DeK.*, *Pf.*, *Binn.*
?*H. macilenta* Shutt., Gld., Pf.
H. Lavelleana Orb. vid. H. minuscula.

135. H. leporina *Gld.*, *Rve.*, *Bld.*
H. pustula, var. β Pf.

136. H. ligera *Say.*, *Binn.*, *DeK.*, (excl. fig.) *Chemn.*, *Pf.*, *Desh. in Fer.*, *Rve.*
Helicostyla Rafinesquea Fer.?
H. Rafinesquea Pf., olim.
Lister, p. 81, f. 82.
H. Wardiana Lea, Trosc., DeK.

137. H. limatula *Ward. in Binn.*, *Pf.*

138. H. lineata *Say*, *Binn.*, *Ad.*, *Gld.*, *Pf.*, *DeK.*, *Chemn.*, *Desh. in Fer.*, *Rve.*
Helicella lineata Fer.
Planorbis parallelus Say.?
H. lucida Binn., &c., vid. H. hydrophila.
H. lucubrata Binn. =H. lævigata.
H. lucubrata Pf. in litteris =H. friabilis.
H. macilenta Shutt. =H. lasmodon.

139. H. major *Binn.*, *DeK.*, *Mrs. Gray.*
H. albolabris Pf., (γ *maxima*), Chemn. (C), Desh. in Fer., (*pars* t. 43, f. 4, et 46 A., f. 7,) Rve. 656?, Bld., nec Say.
Helicogena albolabris γ Fer.
H. Mauriniana Orb. vid. H. minuscula.

140. H. microdonta *Desh. in Fer.*, *Chemn.*, *Pf.*, *Rve.*
H. plana Dunker.

141. H. minuscula *Binn.*, (excl. syn.), *Pf.*, (excl. *minutissima?*) *Ad.*, *Chemn.*, *Rve.*, *Shutt.*
H. minutalis More., nec Fer.
H. apex Rve.
H. Lavelleana Orb. in textu.
H. Mauriniana Orb. in tab.
H. minuta Say =H. pulchella.
H. minutalis Mor. =H. minuscula.

142. H. minutissima *Lea.*, *Tros.*, *Pf.*
H. Mitchella Kirt. =H. Mitchelliana?

143. H. Mitchelliana *Lea*, *Tros.*, *DeK.*, *Chemn.?* *Pf.*, *Bld.*, *nec Desh. in Fer.*
H. clausa Binn., pars nec Say.
H. Mitchella Kirt.? absq. desc.
H. Mitchelliana Desh. =H. Pennsylvanica.
H. Mobiliana Lea =H. jejuna.

144. H. monodon *Rack.*, *Binn. in Bost. J.*, *Gld.*, *DeK.*, *Mrs. Gray*, *Bill.*, *Binn. in Terr. Moll.*, (excl. *H. fraterna*).
H. convexa Chemn., (excl. syn. et t. 66, f. 24–27), Pf., (excl. β et γ), Desh. in Lam. et in Fer., Rve.
Helicodonta hirsuta, a, Fer., (excl. syn).
var. 1. H. fraterna *Say.*, *Binn. in B. J.*, *Mrs. Gray.*
H. monodon, ex parte DeK., Binn. in Terr. Moll.
H. monodon Wood.
H. convexa Chemn. pars.
" var. Rve.
" var. β Pf.
var. 2. H. Leaii *Ward*, ined.
H. monodon, var. γ Pf.
" ex parte Binn.

145. H. Mooreana *W. G. Binn.*

146. H. mordax *Shutt.*, *Pf.*, *Gld.*, *conf. H. alternata var. carinata.*

147. H. multidentata *Binn.*, *Ad.*, *Chemn.*, *Pf.*, *Rve.*

148. H. multilineata *Say.*, *Binn.*, *DeK.*, *Pf.*, *Chemn.*, *Desh. in Fer.*, *Rve.*
Helicogena multilineata, Fer.
var. albina.
var. rufa, unicolor.

H. nemoralis St. =H. hortensis.
H. nitida Fabr. vid. H. Steenstrupii.
H. nitidosa var. Pf. =H. electrina.
H. notata Desh. =H. palliata.

149. H. obstricta *Say, Pf., Rve.*
H. palliata var. a. Say.
" var. a. b. DeK.
H. palliata var. Binn.
H. appressa var. Desh. in Fer., (in tab. non in tex).
Helicodonta denotata var. Fer.
Carocolla helicoides Lea.

150. H. Ottonis *Pf., olim, Binn.*
H. arborea Pf. (Mon., pars), Rve., (pars,) nec Say.

151. H. palliata *Say, Binn.*, (excl. *H obstricta, et Car. helicoides*) *Ad., DeK.*, (excl. var. *a. b.*) *Chemn., Pf., Mrs. Gray, Desh. in Fer., Rve.*
Helicodonta denotata Fer., (excl. var).
H. denotata Desh. in Lam.
H. notata Desh. (olim).
var. Carolinensis.
H. Carolinensis Lea.
H. palliata var. c., DeK.
" pars. Fer., Binn., Chemn., Pf., Desh. in Fer., Rve.

H. patula Desh. =H. perspectiva.
H. patula ? Pf. =H. striatella.

152. H. Pennsylvanica *Green, Binn., DeK., Pf.*, (excl. *H. clausa*,) *Chemn.*, (excl. *H. clausa*,) *Mrs. Gray, Rve.* (676, excl. syn.) *Bld.*
H. Mitchelliana Desh. in Fer., nec Lea.

H. *Pennsylvanica* Pf., &c., nec Green =H. clausa.

153. H. perspectiva *Say, Binn., DeK., Pot. et Mich., Desh. in Lam. et in Fer., Chemn., Pf.*, (excl. *H. filiola* olim) *Rve.*
Helicella perspectiva Fer.
H. patula Desh., olim.

H. pisana Mart. & Chem. =H. varians.
H. placentula Shutt. =H. capsella.
H. plana Dunk. =H. microdonta.
H. planorboides Pf., &c. =H. concava.
H. planorbula Lam. =H. cereolus.
H. plicata Shutt. =H. Trostiana.
H. (*Polygyra*) *plicata* Say =H. Hazardi.
H. polychroa Binn. =H. varians.
H. pomum-Adami Green =H. interna.
H. porcina Say, vid. H. hirsuta et H. inflecta.

154. H. profunda *Say, Binn., DeK., Chemn., Pf., Chenu, Desh. in Fer., Rve., Mrs. Gray.*
Helicella Richardi Fer.
H. Richardi Lam., Desh. in Lam. et En. Meth., Deless., Chenu.
Polygyra profundum Ad. Gen., abs. desc ?
var. unicolor.
var. albina.

155. H. pulchella *Mull., Binn., Ad., Gld, Say in* MSS.
H. minuta Say, DeK., Stimp.
var. costata, *H. costata*, Mull.

H. pura vid. H. electrina.
H. pusilla Pf. =H. Gundlachi.

156. H. pustula (*Helicodonta*) *Fer.*
H. pustula Pf., (excl., var. β) Chemn., Desh. in Fer., Rve., Bld., non Binn.
H. fatigiata Binn., olim (ex parte excl. desc. syn, et fig.)
H. leporina W. G. Binn., olim ex parte.

H. pustula Binn. =H. pustuloides.

157. H. pustuloides *Bld.*
H. pustula Binn., non Fer.

H. (*Helicostyla*) *Rafinesquea* Fer., vid. H. ligera et H. gularis.
H. radiata Gmel. =H. alternata.
H. rhodocheila Binn. =H. varians.
H. Richardi Fer. &c. =H. profunda.

158. H. Roëmeri *Pf. olim, Rve.*
H. dentifera Pf. pars, Chemn. pars. nec Binn.

H. rotula Gld. =H. capsella.
H. ruderata Ad. =H. striatella.
H. rufa DeK. =H. albolabris *junior.*

159. H. Rugeli *Shutt., Pf., Gld.*

160. H. Sayii *Binn., Ad., Chemn., Mrs. Gray, Pf., Desh. in Fer., Rve.*
H. diodonta Say, DeK.
H. Sayii Wood. =H. avara.
H. saxicola Binn., Gld. =H. incrustata.
H. scabra Lam. &c. =H. alternata.

161. H. sculptilis *Bld.*
H. selenina Gld. =H. vortex.
H. sinuata γ Gmel. =H. hirsuta.

162. H. solitaria *Say, Binn., DeK., Pf., Chemn., Rve.*
var. minor.

163. H. spinosa (*Carocolla*,) *Lea.*
H. spinosa Binn., (excl. H. Edgariana) DeK., Chemn., Pf., Rve.
H. splendidula Anton =H. griseola.

164. H. Steenstrupii (*Helicella*) *Mörch.*
Helicella n. s. Steens., teste Mörch.
H. alliaria Forbes Br. Ass., teste Mörch.
H. nitida Fab., teste Mörch conf. H. Fabricii.

165. H. stenotrema *Fer.*, (ined.,) in *Pf. Sym.*, (excl. *H. pustula?*) *Rve.*
H. hirsuta var. β., Pf. Mon.
H. hirsuta var. stenotrema, Chemn.
H. hirsuta var. β., Pf.

166. H. striatella *Anth., Binn., Gld., Ad.* olim, *DeK.*, (excl. *syn.*) *Chemn., Pf.*, (excl. *H. perspectiva*, olim) *Rve.*
H. patula junior? Pf. olim.
H. ruderata Ad., nec Studer.
H. strongylodes Pf. =H. alternata.
H. subglobosa Binn., &c. =H. hortensis.
H. submeris Mighels =H. varians.

167. H. subplana *Binn., Pf.*

168. H. suppressa *Say, Binn., DeK., Rve.*
H. gularis var. β Pf.,
" var. Chemn.
H. Tamaulipasensis Lea, =H. Texasiana.
H. Tennesseensis Lea, =H. elevata.

169. H. tenuistriata *Binn., Pf.*
H. vortex Gld., (excl. desc. syn. et. fig.) nec Pf.

170. H. Texasiana *Mor., Pf.*, (*excl. syn. et var.* β), *Chemn.*, (*excl. var. et fig.*) *Desh. in Lam.* 3*d ed., Shutt., Rve., Desh. in Fer.? Binn.*
H. auriculata Binn., olim, ex parte, nec. Say.
H. fatigiata Fer., Bull. Zool., nec Say.
var. β Pf.
var. (an sp. dist.?) H. triodonta, Iahn.? (H. Texasiana Fer., 69 D. f. 2, teste Pf.)

171. H. tholus *W. G. Binn.*

172. H. thyroides *Say.*
H. thyroidus Say, Binn., Ad., Gld., DeK., Mrs. Gray, Desh. in Lam. 3d ed.
Helicodonta thyroidus Fer., (excl. var. β).
H. thyroides Chemn., Pf., Rve.
Anchiostoma thyroides Ad. Gen.
Lister, f. 91, Petiver No. 4.

173. H. tridentata *Say, Binn.*, (*excl. syn.*) *Ad., Gld., DeK., Pot. et Mich., Wood, Chemn., Pf., Desh. in Lam. et in Fer., Mrs. Gray, Rve.*
Helicodonta tridentata Fer.
Triodopsis lunula Raf.
Lister, fig. 92.
Petiver No. 6.

174. H. Troostiana (*Polygyra*) *Lea, Tros.*
H. Troostiana Pf., Desh. in Fer.? Chemn., Rve., Bland.
H. fatigiata Binn., (in tab. Bost. J. in textu ex parte excl. syn.) in Terr., Moll., (exparte excl. syn. et fig.) nec Say.
H. fatigiata var. plicata, Binn., in tab. Terr. Moll.
H. plicata Shutt., nec. Say.

175. H. uvulifera *Shutt., Chemn., Pf., Gld.*
H. florulifera Rve.
H. auriculata minor Fer.?

176. H. varians *Menke, Chemn., Pf., Rve.*
H. carnicolor Pf. olim, Desh. in Fer., Rve.
H. pisana Mart. et Chemn., Fer.? nec Mull.
H. submeris Migh., Pf.
H. rhodocheila Binn., olim.
H. polychroa Binn.
Helicella carnicolor Fer.
Hemitrochus hæmastomus Sowb.

var. β H. apicina *Menke*, (*Chemn.*)
177. H. ventrosula *Pf.*, *Chemn.*, *Rve.*
var. depressa.
178. H. volvoxis *Pf.*, *Chemn.*, *Rve.*
Polygyra septemvolva Beck? (Pf.)
179. H. vortex *Pf.*, *Chemn.*, *Rve.*, *Gld.*
H. selenina Gld. olim, Rve.
180. H. vultuosa *Gld.*, *Reeve*, *Chemn.*, *Pf.*

H. Wardiana Lea =H. ligera.
H. zaleta Binn., &c. =H. exoleta.

Species exclusæ.

H. arbustorum Linn.
H. Bonplandi Lam., Florida ?
H. harpa Say =Bulimus.
H. dealbata Say, DeK. =Bul. dealbatus.
H. depicta Grat.
H. domestica Ström. =Vitrina angelicæ.
H. hieroglyphica (Euryomphala,) Beck ?
H. irrorata Say =H. lactea.
H. lactea Muller, Say.
Helix irrorata Say olim, DeK., Pf. olim.
H. nemoralis Lin. ? (teste Gray.)
H. pellucida Fabr. =Vitrina angelicæ.
H. Pisana Mull. ? teste Gray.
H. subcylindrica Pult., Mont. = Truncatella.
H. Trumbulli Lins. =Skenia serploides, Mont., teste Gld.
H. virgata Mont. ? (teste Gray.)

Bulimus.

181. B. acicula (*Buccinum*,) *Müller*, *&c.*
182. B. alternatus *Say.*, *Pf.*
B. lactarius Pf. Rve., Gld., W-G. Binn.
B. dealbatus Binn. pars. nec Say.
183. B. Binneyanus *Pf. in litt.*
B. dealbatus Binn. pars, nec Say.
B. Schiedeanus Gld., W. G. Binn., nec Pf.

B. confinis Rve., &c. =B. dealbatus.

184. B. dealbatus (*Helix*) *Say. DeK.*
B. dealbatus Pot. et Mich., Phil., Rve., Pf., Chemn., Binn., (excl. varr.)
B. confinis Rve., Pf.
B. liquabilis Rve.
185. B. decollatus (*Helix*) Linn., *Binn.*, *&c.*
B. mutilatus Say, DeK., Pf., Rve.
186. B. Dormani *W. G. Binn.*
187. B. Floridianus *Pf.*
188. B. gracillimus *Pf.*, *Rve.*
Achatina gracillima Pf. olim, Binn.
B. striaticostatus Orb.
189. B. harpa (*Helix*) *Say.*
B. harpa Pf., Chemn., Rve. Binn.
Pupa costulata Migh.

B. hortensis Ad. =B. subula ?
B. lactarius Pf. &c. =B. alternatus.
B. liquabis Rve. =B. dealbatus.

190. B. marginatus (*Cyclostoma*) *Say.*
B. marginatus Pf.
B. fallax Gld. in Binn., Stimp. ab. desc.
Pupa fallax Say, Gld., DeK., Chemn., Pf., (olim).
Pupa albilabris Ad.
" *Parraiana* Orb.
191. B. multilineatus *Say*, *DeK.*, Pf.
B. virgulatus Binn. (*excl. syn.*) nec Fer.
B. Menkei Gruner, Pf ?
B. venosus Rve. ?

B. mutilatus Say =B. decollatus.

192. B. octona *Ch.* (*in hortis.*)

B. octonoides Orb. =B. subula.
B. princeps Brod. &c., =B. zebra,
B. procerus Ad. =B. subula.

193. B. Schiedeanus *Pf.*, *Phil.*, *Chemn.*
var. β fauce nigra.
var. γ apice nigra.
194. B. serperastrus *Say*, *Rve.*, *Phil.*, *Chemn.*, *Pf.*, *Binn.*
var. β ? vid. Cat. Mex.
var. γ ? vid. Cat. Mex.

B. straticostatus Orb. =B. gracillimus.

195. B. subula *Pf.*, *Rve.*, *Binn.*
B. procerus Ad., teste Pf.
B. octonoides Orb.
B. hortensis Ad. ?
Achatina subula Pf., olim.

B. undatus Brug. &c. =B. zebra.

196. B. zebra (*Buccinum*) *Müll.*

Zebra Mülleri Mart. et Chemn.
Bulla zebra Gmelin, Dill.
Bulimus undatus Brug., Lam., Chemn., Val.
Cochlostyla undata Fer.
B. zebra Ant., Orb., Pf., Rve., Desh., Chemn., Binn.
Achatina flammigera Say, nec Fer.
" *zebra* Pf., (*olim.*)
Agatina fuscata Raf.
Orthaliscus undatus Shutt.
var. γ. *Bulimus princeps* Brod., Sowb.
Cochlostyla princeps Orb.
Orthaliscus princeps Shutt.

Species exclusæ.

B. exiguus Binn. =Carychium.
B. fasciatus Binn. =Achatina.
B. Gossei Pf., vid. Macroceramus pontificus.
B. Kieneri Pf., vid. Macroceramus pontificus.
Bulimus lubricus Ad., &c., =Achatlna.
B. obscurus Dr. vid. Pupa placida Say.
B. striatus Brug. =Glandina truncata.
B. vexillum Brug. =Achatina fasciata.
B. zebra Orb. =Achatina fasciata.

MACROCERAMUS.

197. M. pontificus (*Cylindrella*) *Gld.*
Cylindrella pontifica Gld. in Binn.
=Bulimus Kieneri Pf., (teste Pf.)
=Bulimus Gossei Pf. (teste Poey.)
Pupa unicarinata Binn.

ACHATINA.

Achatina Anais Less. =Ach. fasciata.

198. A. fasciata (Buccinum) Müll.
Bulla fasciata Mart. et Chemn., Gmel., Dill.
Bulimus vexillum Brug., nec DeK.
Cochlitoma vexillum Fer.
Achatina vexillum Lam., Chemn.
Achatina fasciata Swain., Reeve, Orb., Pf., Desh. in Fer.
Achatina lineata Valen.
Lister t. 12, f. 7. Knorr. t. 25, f. 4.
Bulimus fasciatus Binn.
Agatina variegata Raf.
junior Achatina murrhea Rve.
Var. β. *Achatina pallida* Swain.
Cochlitoma vexillum var. Fer.
var. γ. *Achatina crenata* Swain.
" *anais* Less., Wiegm. Ach.
" *fasciata* var. Rve.
Cochlitoma vexillum var. Fer.
Bulimus zebra Orb.
var. ζ. *Achatina solida* Say, DeK., Pf., olim.
Achatina lineata Val. =Ach. fasciata.

199. A lubrica (*Helix*) *Müll.*
Achatina lubrica Pf.
Bulimus lubricus Ad., Gld., DeK., Binn.
Bulimus lubricoides Stimps. abs des.
A. murrhea Reeve =Ach. fasciata.
A. pallida Sw. =Ach. fasciata.

200. A. picta Rve., Trosch. Pf.
Bulimus fasciatus var. Binn.
A. solida Say =Ach. fasciata.
A. vexillum Lam. =Ach. fasciata.

Exclusæ.

A. bullata Pf. =Glandina.
A. flammigera Say =Bulimus zebra.
A. gracillima Pf. =Bulimus gracillmus.
A. pellucida Pf. *olim*, Binn. =Blauneria.
A. rosea Desh. =Glandina truncata.
A. striata DeK., &c. =Gl. truncata?
A. subula Pf. =Bulimus.
A. Texasiana Pf. =Glandina.
A. truncata Pf., &c. =Glandina.
A. vexillum DeK., v. A. virginea.
A. Vanuxemensis Pf., &c. =Glandina.
A. virginea Linn. (*A. vexillum* DeK., nec Brug.) an in Florida?

GLANDINA.

201. G. bullata *Gld.*
Achatina bullata Pf.
Oleacina bullata Gr. et Pf.

202. G. corneola *W. G. Binn.*
Glandina truncata var? Binn.

203. G. parallela *W. G. Binn.*
Glandina truncata var. Binn.

204. G. Texasiana (*Achatina*) Pf., W. G. Binn.

205. G. truncata (*Bulla*) Gml. Dill.
Buccinum striatum Mart. et Chemn.
Bulimus striatus Brug.
Cochlicopa rosea Fer.

Achatina rosea Desh. in En. Meth.
" *striata* Desh. in Lam., Ch.
" *trucunta* Orb., Chemn., Pf., Reeve.
Glandina truncata Say, DeK., Chem. Mrs. Gray, Binn. (excl. var.)
Oleacina truncata Gr. et Pf.
Polyphemus glans Say, olim.
Planorbis glans DeK.

206. G. Vanuxemensis *Lea, Binn., Pf. olim.*
Achatina Vanuxemensis Pf. Reeve.
Oleacina Vanuxemensis Gr. et Pf.

PUPA.

Pupa armigera Pot. et Mich. =P. armifera.

207. P. armifera (*Carychium?*) Say.
Pupa armifera Gld., Ad., Pf., DeK., Chemn., Binn.
" *armigera* Pot. et Mich.
" *rupicola* Pf. (Symb.)

208. P. badia *Ad. Gld., DeK. Chemn., Binn.*
Pupa muscorum Linn. (teste Forb. et Hanl.)
" muscorum, β. Pf.
Pupa carinata Gld. =P. rupicola.

209. P. contracta (*Carychium*) *Say.*
Pupa contracta Gld., Pf., DeK., Chemn., Binn.
Pupa deltostoma Charp. in Chemn.
" *corticaria* Pf., (Symb.)
Vertigo contracta Ad. Gen. abs. desc.

210. P. corticaria *Say, Gld., DeK., Chemn., Binn.,* (*Vertigo?*)
Odostomia corticaria Say, olim.
Carychium corticaria Fer. (abs. desc.
Pupa corticaria Pf. (Symb.) =P. contracta.
Pupa curvidens Gld. =P. pentodon.

211. P. decora Gld., Pf.
Vertigo decora Ad. Gen. abs. desc.)
Pupa deltostoma Charp. =P. contracta.
Pupa detrita Shull., &c. =P. incana.
Pupa gibbosa Chemn. =P. rupicola.

212. P. Hoppii *Möll., Tros., Chemn., Pf.*
Pupa Steenbuchii Beck, teste Mörch.

213. P. incana *Binn., Pf.*
Pupa detrita Shutt., Pf., (olim.)
" *maritima* γ Pf. (olim.)
" *maritima* γ Gld. in Terr. Möll. var. fasciata.
Pupa maritima Gld. =P. incana.
P. maritima γ., Pf. = P. incana.
P. minuta Pf. = P. rupicola.

214. P. modica *Gld., Pf.*
P. muscorum β. Pf. =P. badia.

215. P. pentodon (*Vertigo*) *Say.*
Pupa pentodon Gld., DeK., Chemn., Pf., Binn.
Pupa Tappaniana Ad., Pf., (olim.)
P. curvidens Gld., (olim.)

216. P. placida *Say.*
=*Bulimus marginatus* Say, teste DeK., Gld., (*olim.*)
=*Bulimus obscurus* Müll., teste Gld. DeK., Pf.
Pupa procera Gld., &c. =P. rupicola.

217. P. rupicola (*Carychium*) *Say.*
Pupa rupicola Gld., DeK., Pf., Binn. nec Pf. Symb.
Pupa procera Gld., Chemn., Pf., (*olim.*)
Pupa carinata Gld., (*olim.*) Pf.
Vertigo rupicola Binn.
" *minuta* Ad., Gen ?
Pupa gibbosa Chemn. ?
" *minuta* Pf.
P. rupicola Pf., (Symb.) =P. armifera.
P. Steenbuchii Beck., v. P. Hoppii.
P. Tappaniana Ad., &c., = P. pentodon.

218. P. variolosa *Gld., Pf.*

Species exclusæ.

P. albilabris Ad. =Bul. marginatus.
P. costulata Mighels =Bul. harpa.
P. exigua Say, &c. =Carychium.
P. fallax Say, &c. =Bul. marginatus.
P. Gouldii Binn., &c. =Vertigo.
P. milium Gld., &c. =Vertigo.
P. modesta Say, &c. =Vertigo ovata.
P. ovata Gld., &c. =Vertigo.
P. ovulum Pf. =Vertigo ovata.
P. Parraiana Orb. =Bul. marginatus.
P. simplex Gld., &c. =Vertigo.
P. unicarinata Binn. =Macroceramus pontificus.

VERTIGO.

219. V. Gouldii *Binn., Stimp.* (abs. desc.)

Pupa Gouldii Binn., (olim), Gld., Chemn., Pf.

220. V. milium *Gld.*, *Stimp.* (abs. desc.), *Binn.*
Pupa milium Gld., (olim), Ad., DeK., Chemn., Pf.

221. V. ovata *Say*, *Stimp.* (*abs. desc.*) *Binn.*
Pupa ovata Gld., Ad., DeK., Pf., Chemn.
Pupa modesta Say, Gld.
" *ovulum* Pf., (olim).

222. V. simplex *Gld.*, *Stimp.* (*abs. desc.*) *Binn.*
P. simplex Gld., (*olim*), DeK., Pf.

Species exclusæ.

V. contracta Ad. Gen. =Pupa.
V. decora Ad. Gen. =Pupa.
V. minuta Ad. Gen., v. Pupa rupicola.
V. pentodon Say =Pupa.
V. rupicola Binn. =Pupa.

E Heliceis exclusæ.

Aplodon *Raf.*
Aplodon nodosum *Raf.*
Chimotrema *Raf.*
Chimotrema planiuscula *Raf.*
Hemiloma *Raf.*
Hemiloma avara *Raf.*
Mesodon *Raf.*
Mesodon maculatum *Raf.*
Mesomphix *Raf.*
Odomphium *Raf.*
Odostomia Say =Pupa.
" *corticaria* Say =Pupa.
Odotropis *Raf.*
Omphalina *Raf.*
" cuprea *Raf.* v. Helix fulignosa.
Partula Otaheitana *Fer.*
Stenostoma *Raf.*
Stenotrema Raf.
" *convexa* Raf.
Toxostoma *Raf.*
Toxostoma globularis *Raf.*
Toxotrema *Raf.*
Toxotrema globularis *Raf.*
Toxotrema complanata *Raf.*
Triodopsis *Raf.*
Trophodon *Raf.*
Xolotrema *Raf.*
" lunula *Raf.*
" triodopsis *Raf.*

CYLINDRELLA.

223. C. Goldfussi *Menke*, *Phil.*, *Pf.*

224. C. jejuna *Gld.*, *Pf.*
C. lactaria Binney =C. Poeyana Orb.

225. C. Poeyana *Orb.*, *Pf.*
C. lactaria Binn., (excl. desc. et syn.) nec Gld.

226. C. Rœmeri *Pf.*, *Rœmer.*
Var. *β.*

Species exclusa.

C. pontifica Gld. =Macroceramus.

FAMILIA AURICULACEA.

Sub-familia MELAMPEA.

MELAMPUS.

227. M. bidentatus *Say*, *Rus.*,*Pf.*, (*excl. M. borealis*).
M. biplicatus Pf.
M. corneus Stimp., (*abs. desc.*)
M. Jaumei Pf.
Auricula biplicata Desh.
" *cornea* Desh.
" *bidentata* Gld., DeK., Chemn.
non *Auricula bidens* (Say), Pot. et Mich.
Auricula Jaumei Mittre.
Var. lineatus *Say.*
Melampus bidentatus *β. Pf.*
Auricula bidentata var. a. DeK.

M. biplicatus Pf. =M. bidentatus.

228. M. cingulatus *Pf.*, *Shutt.*
Auricula cingulata Pf. (*olim*), Chemn.
" *oliva* Orb.
" *stenostoma* Küst. teste Pf.

229. M. coffea (*Voluta*) *Linn.*, *Schrö. Gmel.*, *Dill.*
Bulla coffea Linn.
Voluta minuta Gmel., Dill.
Auricula midæ parva &c., Martini?
Ellobium Barbadense Boelten ?
Bulimus coniformis Brug.
Melampus coniformis Montf., Lowe, C. B. Ad., Shutt.
" *fusca* Mörch. (teste Pf.)
" *coffea* Mörch. (teste Pf.)
Melampa minuta Pf., Schw.
Tornatelle coniforme Blain.
Auricula coniformis Fer., Lam., Pot. et Mich., Rve., Sowb. Chemn.
Auricula ovula Orb.
Conovulus coniformis Lam.,Anton., Woodw.
M. coffeus Beck., abs. desc.

M. coffee Gray.
M. obliquus Say ?
Var. β ?
Melampus coniformis Mont., &c. =M. coffea.
M. corneus Stimp. =M. bidentatus.

230. M. Floridianus (*Auricula*) *Shutt.*
M. Floridianus Pf.
M. fusca Mörch. =M. coffea.
M. Jaumei Pf. =M. bidentatus.
M. nitens Shutt. =M. pusillus.

231. M. obliquus Say, Pf.
Auricula obliqua DeK., Conf. M. coffea.
Melampus ovulum Lowe =Melampus pusillus.

232. M. pusillus (*Voluta*) Gmel., Dill., Wood.
Voluta n. 108, Sch.
Favanne t. 68, f. H. 4.
Auricula midæ parva &c., Mart. et Chemn.
Voluta triplicata Don., Mont., Dill., Wood.
Bulimus ovulus Brug.
Melampa ovulum Schw.
Conovula ovula Fer., Pot. et Mich.
Auricula nitens Lam., Chemn.
" *pusilla* Desh., Petit.
" *leucodonta* Nuttall., MSS. teste H. and A. Ad.
Conovulus nitens Voigt.
" *pusillus* Anton.
Melampus ovulum Lowe.
" *nitens* Shutt.
Pythia ovulum Beck, (*abs. desc.*) teste Pf.
P. triplicata Beck, (*abs. desc.*) teste Pf.
Tralia pusilla Ad. Gen.
" *ovulum* Mörch. (abs. desc.) test Pf.

Species exclusæ.

Melampus borealis Conrad =Alexia myosotis.
Melampus denticulatus Stimp. =Alexia myosotis.

Sub-familia AURICULEA.

AURICULA.

Species exclusæ.

Auricula bidentata Gld., &c. =Melampus.
A. biplicata Desh. =Melampus bidentatus.
A. cingulata Pf., &c. =Melampus.
A. coniformis Fer. =Melampus coffea.
A. cornea Desh. =Melampus bidentatus.
A. denticulata Gld., DeK. =Alexia myosotis.
A. Floridianus Shutt. =Melampus.
A. Joumei Mittre. =Melampus bidentatus.
A. nitens Lam. =Melampus pusillus.
A. obliqua DeK. =Melampus.
A. oliva Orb. =Melampus cingulatus.
A. pusilla Desh. =Melampus.
A. Sayii Kuster. =Leuconia.
A. stenostoma Kuster. =Melampus cingulatus.

ALEXIA.

233. A. myosotis (*Auricula*) Drap. &c.
Alexia myosotis Pf.
Auricula denticulata Gld., DeK., nec Mont.
Melampus denticulatus Stimp., (abs. desc.)
M. borealis Con.

BLAUNERIA.

234. B. pellucida Pf.
Achatina ? pellucida Pf., olim.
Achatina " Gld.
Tornatellina Cubensis Pf. olim., Chemn.
Odostomia ? Cubensis Poey.

LEUCONIA.

235. L ? Sayii (*Auricula.*) *Küst.*
Leuconia ? Sayii Pf.
An Alexia myosotis ?

CARYCHIUM.

236. C. exiguum (*Pupa ?*) *Say.*
Carychium exiguum Pf., Chemn., Stimp., Gld. Frau., Bourg.
C. exile H. C. Lea, Tros.
C. existelium Bourg ?
C. euphæum Bourg ?
Bulimus exiguus Binn.
Pupa exigua Gld., Ad., DeK.
Pupa exigua (abs. desc.) Kirt., &c. Script. Am.
Carychium exile H. C. Lea =Car. exiguum ?
C. existelium Bourg. =Car. exiguum ?
C. cuphæum Bourg. =Car. exiguum ?

Species exclusæ.

Carichium? armigera Say =Pupa.
" *corticaria* Fer. =Pupa.
" *contracta* Say =Pupa.
" *rupicola* Say =Pupa.

FAMILIA ACICULACEA.

TRUNCATELLA.

237. T. bilabiata *Pf. Küst.*

238. T. Caribæensis *Sowb.* mss., *Rve.*, *Pf.*, *Küst.*
T. variabilis Pf., olim, abs. desc.
T. Gouldii C. B. Ads. abs. desc., Bronn.
T. Geurinii Parr. abs. desc., nec Villa.
T. succinea C. B. Ads.

T. Caribæensis v. T. subcylindrica.
T. Gouldii Ads. =T. Caribæensis.
T. Guerinii Parr. =T. Caribæensis.

239. T. pulchella *Pf.*, *Shutt.*, *Küst.*, *Ads. Gen.*

240. T. subcylindrica *Gray*, *Shutt.*, *Pf.*, *Orb.*, (exc. pars syn.)
Helix subcylindrica Pult., Mont.
T. truncatula Lowe ?
T. Caribæensis Pf., olim, ex parte, Küst. ex parte.
T. succinea Ads. =T. Caribæensis.
T. truncatula Lowe ? v. T. subcylindrica.
T. variabilis Pf. =T. Caribæensis.

FAMILIA CYCLOSTOMACEA.

Sub-familia CISTULEA.

CHONDROPOMA.

C. crenulatum Pf. =C. dentatum.

241. C. dentatum (*Cyclostoma*) *Say.*
Cyclostoma dentatum DeK., Binn.
" *lineolatum* Anton. teste Pf.
" *Auberianum* Orb.?
" *lunulatum* Mörch. teste Pf.
" *crenulatum* Pf., (olim), Chemn. nec Fer.
Chondropoma crenulatum Pf., (*olim*).
" *dentatum* Pf., Gr. et Pf.

Cyclostomacea exclusa.

Cyclostoma Auberianum Orb. v. Chondropoma dentatum.
C. Cincinnatensis Lea=Amnicola.
C. crenulatum Pf., Ch. =Chondropoma dentatum.
C. dentatum Say, &c. =Chondropoma.
C. lapidaria Say =Amnicola.
C. lineolatum Anton. =Chondropoma dentatum.
C. lunulatum Morch. =Chondropoma dentatum.
C. marginalis Kirt. =Bul. marginatus.
C. marginata Say, &c. =Bulimus.
C. tricarinata Say =Valvata.

FAMILIA HELICINACEA.

HELICINA.

H. ambeliana Sowb. =H. tropica.
H. castanea Gld. =H. orbiculata.

242. H. chrysocheila *Binn.*, *Pf.*

243. H. Hanleyana *Pf.*, *Ch.*, *Gr. et Pf.*

244. H. occulta *Say*, *DeK.*, *Ch.*, *Chenu.*, *Binn.*, *Pf.*, *Gr. et Pf.*

245. H. orbiculata *Say*, *DeK.*, *Chenu.*, *Ch.*, *Blnv.*, *Binn.*, (*pars*) *Gld.*, (*excl. H. rubella*), *Pf.*, (*excl. H. rubella* Green), *Gr. et Pf.*, *non Sowb.*
Oligyra orbiculata Say, olim.
junior *Helicina vestita* Guild.,Sowb., Gr. et Pf.
junior *Helicina castanea* Guild., Sowb.?

246. H. subglobulosa *Poey*, *Pf.*

247. H. tropica *Pf.*, *Ch.*, *Tros.*, (*teste Pf.*), *Gr. et Pf.*
H. ambeliana Sowb., nec DeB.
H. orbiculata Binn., *pars* nec Say.
H. vestita Guild. =H. orbiculata.

Species exclusæ.

H. fastigiata DeK. =Helix fatigiata Say.
H. plicata DeK. =Helix Hazardi Bland.
Oligyra Say =Helicina.
O. orbiculata Say =Helicina.

Mr. Samuel Ashmead, a Curator of the Academy, having tendered his resignation of the office, in consequence of removal from the city, the following preamble and resolutions were offered by Mr. Cassin and adopted:

Whereas, Mr. Samuel Ashmead, an efficient and faithful officer of this Academy, has recently removed his residence from the city of Philadelphia, and on that account has resigned his Curatorship,

Resolved, That this Academy has accepted with sentiments of deep regret the resignation of Mr. Ashmead, one of the Curators of the Society without intermission since 1841, a term of office rarely paralleled, and that it does hereby declare its high sense of his very valuable as well as long continued services.

Resolved, That the thanks of this Academy be cordially tendered to Mr. Ashmead, and that the Corresponding Secretary be hereby instructed to furnish him with copies of these Resolutions.

The following was adopted:

Resolved, The the Committee on Proceedings be hereby authorized to furnish to Mrs. Lucy W. Say, widow of the late Mr. Thomas Say, and herself a member of this Society, the Proceedings of this Academy gratuitously after January 1st, 1859.

A resolution was also adopted giving to Mrs. Christiana Watson, widow of the late Gavin Watson, M.D., authority to issue orders and endorse tickets of admission to the Academy.

Dec. 7th.

Vice President Lea in the Chair.

Thirty-one members present.

The following extract from a letter of Mr. C. O. Sanford, dated Petersburg, Va., Oct. 20th, 1858, was read.

I was much interested in the slab of sandstone (mentioned on page 177,) showing the ripple marks on its opposite sides, at right angles, or nearly so, and although I thought I could account for it, I was not willing to venture an opinion until I could have access to my books.

I send an extract from Calver, on the improvement of tidal rivers, which satisfies me that the marks were not made by currents, but by waves caused by winds.

1st. A wind produced the ridges upon the soft bed of sand.

2d. That a deposit of sand was made upon these ridges, which in like manner was ridged by a wind blowing at a different angle from the first. One side of the slab is probably the impression of the ridges first made.

Extract from a letter written by an officer in the British Navy.

"In 1838, while lying in one of H. M. ships, in the port of Santander, on the north coast of Spain, we observed, upon looking over the side at high water, and when the water was unusually clear, that the bottom, composed of sand, was covered by ridges running paratlel to the waves that had been on the surface during a strong breeze of two or three days' duration, but which had bean succeeded by a calm. Our anchorage was within the harbor, and the wind off shore. The impression it made on my mind at the time was, that as the ridges lay at right angles to the direction in which the wind had been blowing, they were occasioned by a motion given to the water at that depth by the waves at the surface.

Our anchorage at high water (the time alluded to,) was forty feet.

I do not think that the waves, from the crest to the lowest part of the hollow could have been more than five feet, as the wind was an off shore one upon that coast.

The ridges were small, apparently not more than a foot in width, and so, not corresponding in magnitude with the waves on the surface, but only with their direction."

On leave granted, the Report of the Biological Department for November was presented and ordered to be printed, with the Proceedings of last meeting.

Dec. 14*th.*

Vice-President BRIDGES in the Chair.

Sixty-seven members present.

The following papers were presented for publication in the Proceedings:

Ichthyological Notices, by Charles Girard, M. D.

Prodromus Descriptionis Animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum septentrionalem, a Republica federata missa, Cadwaladaro Ringgold et Johanne Rodgers ducibus observavit et descripsit W. Stimpson; pars septima, Crustacea Anomoura.

And were referred to Committees.

Mr. Wm. Parker Foulke made a statement respecting the fossil bones, shells and wood presented by him to the Academy this evening.

Passing the summer and autumn at Haddonfield, Camden County, New Jersey, Mr. Foulke learned that one of his neighbors, Mr. John E. Hopkins, while digging marl upon his farm, about twenty years ago, had found some bones. These were described as vertebræ, and as being of large size, and very numerous. Mr. Hopkins being young at the time of the discovery, and not specially interested in such subjects, had permitted visitors to carry away the fossils; so that none remained in his own possession, nor could he remember the names of any of the persons by whom the vertebræ had been taken. According to his recollection, no head had been found, nor any other bones than those of the spine, except one, which was said by him to have resembled, in general respects, a "shoulder blade." It appeared, then, not improbable that upon digging around the old pit, (which was sixteen feet long and eight feet wide,) a head, or at least a portion of one containing teeth, might be obtained. Considering the geological age of the formation upon which Haddonfield stands, and that specimens of Mosasaurus have been discovered in places not very remote from the village, there appeared sufficient motive for exploration. Mr. Hopkins, with an intelligent appreciation of the object proposed, gave to Mr. Foulke, with prompt liberality, permission to dig in any part of the farm, and to take away whatever fossils might be thus procured. There was some difficulty in ascertaining the place of the old excavation. It had been made in the bed of a narrow ravine, in which a brook flows eastwardly into the south branch of Cooper's Creek; but the pit had long since been filled to the common level of the bed, and it was in like manner overgrown with grass, shrubs, and young trees, so as to be undistinguishable by the eye. After conference with one of the diggers who had been employed at the time of the discovery, (whose indication proved to be inaccurate,) and after a careful survey of the vicinage by Mr. Hopkins, a party of experienced marl diggers were set at work; and after one day's preliminary trial, the eastern side of the old pit was detected. In conformity with Mr. Hopkins' recollection of the manner in which the vertebræ lay, the party of diggers was shifted to the western side of the old pit. The superficial deposit overlying the marl here, was only about four feet thick; the ravine being between twenty and thirty feet deep. At nearly four feet further depth, a thin stratum of decomposed shells was passed; and at about two feet below this, overlying and intermixed with another stratum of shells, the workmen came upon a pile of bones—the same now before the Academy. The total depth from the surface was between nine and ten feet.

The marl being tenacious, great care was requisite to extricate the fossils. With a small trowel and a knife, the bones were carefully dissected from their bed, and from one another. A sketch was made of their position, and some measurements were taken of them, in anticipation of the contingency of their fracture in the attempt to remove them. Several lines of transverse fracture were observable before their position was changed. Each bone was separately transferred to a board, and thus carried from the pit, and then wrapped in a piece of coarse cloth. Thus enveloped it was laid upon a thick bed of straw in the bottom of a cart; and the whole were safely transported in this way, about three quarters of a mile, to Mr. Foulke's residence. A small tooth and some fragments of a jaw were found with the other specimens.

Mr. Isaac Lea and Dr. Leidy were informed of the discovery, and they promptly visited the excavation. Their opinion of the scientific value of the fossils justified further exploration; and the diggers were kept at work, from time to time as the weather permitted, during the month of October.

Another tooth having been accidentally turned up by Mr. Foulke near the surface of the marl which had been thrown out, the entire mass was broken up and carefully raked over; and by this process, in two or three days, the number of teeth increased to nine, and some useful fragments of jaw were also added to the collection.

Various specimens of shells were obtained; but their extreme friability rendered their preservation difficult. Several pieces of wood were found. The excavation was carried quite around the old pit, and extended so as to form a considerable area for search; but nothing further appeared, except a few vertebræ, and small fragments of other bones, and of wood, near the margin of the old pit. It seemed then useless to proceed, and the diggers were dismissed.

One of the workmen, having become interested in the search, kept his attention upon the subject; and about a week afterward found, in the green marl near the White Horse tavern (about six miles southward from Haddonfield), some vertebræ, parts of long bones, and several teeth of a crocodile, believed to be of a species not heretofore found in New Jersey; which are now in Dr. Leidy's hands for final examination. The workman stated that, at the bottom of all the diggings, casts of *cucullea* are found in great quantity. They are known at the pits by the name of "squirrel heads," from a fancied resemblance. Two specimens accompany the crocodile bones just mentioned.

Subsequently, Drs. Leidy and LeConte and Mr. Foulke made a short tour among green marl pits, worked for sale of marl, southward of Haddonfield. On the road to the White Horse, they visited the large opening of Mr. Alexander Cooper, who stated that he knew of no bones being found there—certainly none during thirty years. Near the White Horse, it was said that bones had been thrown from all the diggings. At the extensive pit of Mr. Randall Morgan, on a south branch of Timber Creek, a short distance southward from Blackwoodtown, a curious specimen of conglomerate of terebratulæ and other shells was obtained. Bones had been recently found; but they had been thrown away, and were lost. From Mr. Charles Stevenson, in the same neighborhood, it was learned that in his pit, and that of Mr. Marshall, below Mr. Morgan's, bones had been repeatedly found, but no care was taken of them. In fact, within the last year Mr. Stevenson had thrown some portions into the yard between his house and barn. After a little raking, a few crocodile bones were discovered amongst leaves and dirt. Mr. King, a blacksmith at Blackwoodtown, was said to have collected a few bones as curiosities. Upon application being made to him, he stated that he had given, or loaned, or lost, nearly all of his stock; but he produced from the corner of his workshop, three specimens which Dr. Leidy immediately recognised as fragments of jaw of Mosasaurus, each containing a large portion of a tooth; the three exhibiting very clearly the mode of dentition of the animal.

These details were presented to the notice of the members, because they suggested the probability that valuable illustrations of palæontology and geology are annually lost through the ignorance of marl diggers or the inattention of owners of pits. In view of the great promise of a region so near to Philadelphia, it is important that measures shall be taken to awaken in the minds of proprietors and workmen an interest in the preservation of specimens for the cabinet of the Academy.

It may be observed, upon inspection of the geological map of New Jersey, that a line drawn from the recent opening on Mr. Hopkins' farm, southwesterly in the direction of the exposure of the green sand formation, passes several miles westward of the *green* marl pits which were visited as just narrated. The marl at Mr. Hopkins' is, when in the pit, dark blue approaching black, micaceous, stiff, and tenacious. Upon free exposure to the air, it becomes, after a week or two, light bluish gray in color, and then it crumbles easily. From its not being considered as good a fertilizer as the green marl, it has been rarely dug, of late, in that part of the country; and hence there is not an opportunity for collecting fossils, such as is furnished by the pits in the green marl. The latter deposit is more seaward; and hence a diminished probability of finding in it the remains of animals which lived upon land, or in the freshwater tributaries of the old ocean.

Of the two exogyra presented on behalf of Mr. Robert Hare Powel, the smaller was dug, a number of years since, from Mr. Hopkins' farm. The larger, showing a curious peculiarity of growth, was taken more recently from a small excavation in Mr. Powel's ground, between Mr. Hopkins' and the main street. The diagram upon the table would make clear to the members the principal localities which had been mentioned.

The hard stone containing casts of shells, apparently belonging to the tertiary period, was found at about five miles south-eastward of Allowaystown; and was presented in behalf of Mr. Isaac H. Wood, of Haddonfield.

The sandstones on the table were not new nor rare; but they afford very good examples of the mode in which sand and gravel are converted into hard stone by a ferruginous cement. The specimens show interesting gradations of fineness, compactness and hardness. They came from the superficial deposit near Mr. A. Cooper's marl pit, where they lay loosely embedded. Similar stones are used in the neighborhood for coarse building purposes.

The bones found by Mr. Foulke, had been submitted by him to Dr. Leidy, for description; the shells, to Mr. Lea; and the wood to Dr. Hammond. As these gentlemen were prepared to report the results of their inspection, Mr. Foulke restricted himself to the simple introductory narrative of facts just given; reserving to a future occasion some observations which had occurred to him respecting the succession of cretaceous deposits in New Jersey, and the relations of and and sea during the cretaceous period.

Dr. Leidy stated that the bones, mentioned in the remarks of Mr. Foulke, obtained from the marl of Mr. Hopkins' farm, near Haddonfield, New Jersey, and now exposed to the view of the Society, were those of a huge herbivorous saurian. The animal was closely allied to the great extinct *Iguanodon* of the Wealden and Lower Greensand deposits of Europe; the genus is, however, different, and for it the name of HADROSAURUS is proposed.

Besides a number of small fragments, the bones consist of twenty-eight vertebræ, mostly with their processes broken away; a humerus, a radius and an ulna, complete; an ilium and a pubic bone, imperfect; a femur, a tibia and a fibula; two metatarsal bones and a first phalanx, complete. There are also in the collection nine teeth and a small fragment of the lower jaw.

The bones are ebony black, from the infiltration of iron, and are exceedingly heavy. Their texture is firm and well preserved; and they are neither crushed nor water rolled. In association with them, besides the shells and wood, were found several teeth of *Odontaspis* and *Enchodus*.

Most of the specimens of teeth of the *Hadrosaurus* appear to have belonged to the lower jaw. These, when unworn and perfect, are about two inches long, and of all known teeth most resemble those of the *Iguanodon*. They have a demi-conoidal crown, with a lozenge-shaped enamel surface directed inwardly, and divided by a prominent median carina. The upper borders of this surface are provided with short, transverse, tuberculated ridges. The body of the crown outwardly is paraboloid in transverse section, and is prolonged into a laterally compressed conoidal fang. As the teeth were worn away from the summit, their gradually expanding triturating surface sloped downward and outward. This surface is shield-like in outline, is bordered by enamel internally, and crossed by a slightly elevated crucial ridge with diverging branchlets. The ridge, resulting from the later ossification of the dental pulp, is harder than the surrounding dentine, and is adapted to retain a rough triturating surface. The sides and bottoms of the teeth exhibit the impressions of lateral and inferior successors, and appear to indicate that the teeth in use, together with those more or less developed within the jaw, had a quincuncial arrangement.

Two of the specimens of teeth perhaps belong to the upper jaw. They differ from the others in the extraordinary degree of development of the median carina of the crown. The enamelled surface was perhaps directed in a reverse manner to that of the lower teeth; that is to say, outwardly. It is likewise lozenge-like in outline, and tuberculated at the lower borders. The body of the crown inwardly is half oval in section. The fang for more than half its width is prolonged from the carina of the crown. These teeth also exhibit the impress of successors holding the same relative position with one another as in the lower teeth.

The fragment of the lower jaw is a portion of the left dentary bone, and is three inches in depth. It has an outer parapet wall about two inches high, with deep vertical grooves for the support of the teeth. No corresponding wall appears to have existed on the inner side of the latter.

The cervical vertebræ have their bodies prominently convex in front and deeply concave behind, and would appear to indicate that Mantell was correct in assigning similar vertebræ, found in the Wealden deposits of England, to the *Iguanodon*. Three cervical vertebræ, suspected to be the third, fourth, and fifth, are two and a half inches long at the sides.

Five succeeding vertebræ, not immediately conjoining the ones just mentioned, and supposed to be anterior dorsals, likewise have convexo-concave bodies. At the sides of the latter they are from 3 to 3½ inches long, and posteriorly are 3½ inches wide. The sides of their arch present a deep pit for the articulation of a rib; but no articular mark is perceptible at the sides of the bodies. Two other vertebræ, perhaps posterior dorsals, have the bodies slightly prominent in front and slightly concave behind; and they are 3½ inches long at the sides, and 4¾ inches wide posteriorly.

The caudal vertebræ possess articular surfaces for chevron bones; and the specimens we possess, from different parts of the tail, give the following succession of measurements of their bodies: length 2½ inches, breadth 5 inches; length 3 inches, breadth 4½ inches; length 3 inches, breadth 3½ inches; length 2¾ inches, breadth 2¼ inches; length 2½ inches, breadth 1¾ inches. From the gradation of size of seventeen specimens in the collection, it may be estimated that there were originally about fifty vertebræ to the tail. This number may be too great by about ten, but certainly not more.

A caudal vertebra from near the middle of the tail has its arch and spinous process complete. The two latter together measure 11 inches long from the body, which is 4½ inches deep. The addition of a chevron bone would indicate the tail of the animal, at its middle, to have been between one and a half and two feet in depth.

The *humerus* is perfect, and is 23 inches long. Its breadth at the tuberosities, between which the head projects midway, is 7 inches. The shaft above is compressed from without inwardly; its lower part is cylindroid, and near the middle of the bone measures 9¾ inches in circumference. At the condyles the transverse diameter is 5¼ inches. Only a very short and narrow medullary cavity occupies the centre of the shaft.

Both bones of the forearm are solid. The *ulna* is 23 inches long, and 7 inches in circumference at the middle. The *radius* is 20 inches long, and 6 inches in circumference at the middle.

A very great disproportion exists between the bones of the fore and hinder extremities. So much is this the case, that I was at first inclined to believe they belonged to different animals. The disproportion is even greater than in the *Iguanodon*, as indicated by comparison with the remains of an individual of the latter, in the British Museum, known as the Maidstone specimen.

The *ilium* has its two extremities broken away, and in its present condition is 27 inches long. Its sacral articular surface is 12 inches long by 3 inches thick. The breadth of the bone, opposite the latter surface, is from 7 to 9 inches. A bone, which I suspect to be the *pubic*, but which appears to correspond with that, of the Maidstone *Iguanodon*, described as the clavicle, is 26 inches long in its present state ; one end being broken away. The remaining pubic extremity is 10½ inches wide.

The *thigh bone* is 40 inches long; its breadth at the head and adjoining trochanter is 9 inches ; its breadth at the condyles is 8 inches ; and the antero-posterior diameter of the internal condyle is 10 inches. The shaft is quadrate, and provided at its middle portion internally with a large trochanter. The circumference of the shaft just above the latter is 17 inches ; just below it, 15 inches. The condyles in front enclose a large foramen terminating a groove descending from the shaft. Posteriorly, at the bottom of the intervening notch, they enclose a smaller foramen. The medullary cavity is of large size, and extends about half the length of the shaft through its middle portion.

The *tibia* is 36½ inches long ; its breadth at the upper part is 11 inches ; and its breadth below is 10 inches. Its shaft is narrow and cylindroid at the middle, where it measures 11¾ inches in circumference. From this position it rapidly expands towards the two extremities of the bone. The medullary cavity is very short and narrow.

The two *metatarsal bones* are of robust proportions and are each about 11 inches long. The *proximal phalanx* of a toe is 6 inches long, and 5¼ inches broad at base.

If we estimate the number of vertebræ of the trunk of *Hadrosaurus* to have been the same as in the recent Crocodile and Iguana ; the number of sacral vertebræ to have been the same as in the *Iguanodon ;* and the number of caudal vertebræ to have been fifty ; the whole number of vertebræ would have been eighty. A calculation of the length of the specimens of vertebræ in our possession, with a proper allowance of separation by intervertebral fibro-cartilages, and an addition of two and a half feet as an estimate of the length of the head, would give, as the total length of the animal, about twenty-five feet.

The great disproportion of size between the fore and back parts of the skeleton of *Hadrosaurus*, leads me to suspect that this great extinct herbivorous lizard may have been in the habit of browsing, sustaining itself, kangaroo-like, in an erect position on its back extremities and tail. As we, however, frequently observe a great disproportion between the corresponding parts of the body of recent and well known extinct saurians, without any tendency to assume such a position as that mentioned, it is not improbable that *Hadrosaurus* retained the ordinary prostrate condition, progressing in the manner which has been suspected to have been the case in the extinct batrachian of an earlier period, the *Labyrinthodon.*

Hadrosaurus was most probably amphibious ; and though its remains were obtained from a marine deposit, the rarity of them in the latter leads us to suppose that those in our possession had been carried down the current of a river, upon whose banks the animal lived.

Occasionally uncharacteristic fragments of huge bones have been found in the green sand of New Jersey, (of which we have several in the collection of the Academy,) which I suspect to belong to *Hadrosaurus.* One of these specimens, exposed to the view of the members, indicates a much larger individual than the one whose remains have been presented this evening.

The species I would respectfully propose to dedicate to our fellow member W. Parker Foulke, than whom none of our number is more zealous in the advancement of the great objects of this Academy. The name of the great extinct saurian will then appear as HADROSAURUS FOULKII.

Mr. LEA remarked that the members must all feel under great obligations to their fellow member, W. Parker Foulke, Esq., for the conception, the industry and perseverance which he has brought to the exhumation of these various reliques of a former state of existence of organisms, totally different from any which now live on the surface of the earth; for there no longer now remains a single creation which had life during the whole of the Cretaceous period. With the true spirit of scientific investigation he has enabled geologists to examine these important remains of a former world, and with equal liberality he has placed the whole in the possession of the Academy. It was with very great pleasure that Mr. Lea assisted, with Dr. Leidy for a few days, by the invitation of their friend, during the progress of his successful labors.

The result has been that one of the most interesting fossil animals on record has been added to the fauna of this period, the bones of which have just been so happily illustrated by Dr. Leidy. There were also numerous genera and species of *Mollusca*, as well as coniferous plants added to our palæontology and fossil botany.

Geological science is indebted to our late fellow member, Prof. Vanuxem, for the identification of the marl beds of New Jersey and Delaware with the Cretaceous group of Europe, but it was not then known in either country that there were so many subdivisions of the group, and the exact parallelism of the green sand was not attempted to be traced. While studying in Paris, under the instruction of Brogniart, he was led to the conclusion, from his previous examination of many of these "marl pits," with Mr. Lea, that the *mollusca* were the same which belonged to the upper beds of Brogniart's "Pelagiques." At that early period of our geological history, when he was examining the Paris basin, he was convinced, in 1818, that the alluvial of Maclure consisted of "secondary, tertiary, and alluvial masses." Subsequently, in January, 1828, his notes were published in the Journal of this Academy,* and he gave a tabular view of the "relative geological position" of the secondary, tertiary, and alluvial formations of the United States. He also defined their "geographical position," and stated that "this bed, (green sand), was argillaceous, and contained greenish particles analogous to those which are found in the green sand, or chalk, of Europe," and that it was "characterised by six genera, viz., *Terebratula*, *Gryphæa*, *Exogyra*, *Ammonites*, *Baculites* and *Belemnites*." These views of Professor Vanuxem were subsequently confirmed in various papers, also published in the Academy's Journal, by Dr. Morton, who, in his "Synopsis of Organic Remains," published in 1834, page 7, says that "Mr. Vanuxem was the first to detect the analogy between this deposit (Ferruginous sand,) and the chalk formation of Europe." Other geologists in various papers and state reports have, by their developments, confirmed the opinions of Prof. Vanuxem, and from year to year new explorations have tended to demonstrate the vast extent of the Cretaceous Formation in the United States east of the Rocky Mountains.

The Cretaceous Formation commences at Martha's Vineyard, in Massachusetts, is largely developed in New Jersey, and is found in Delaware, Maryland, Virginia and the Carolinas. In Georgia, it is more largely developed. Here, sweeping round the inferior strata, the Primary, Silurian, and Carboniferous masses, it continues in a very enlarged band in a northerly direction, through Alabama, Mississippi and Tennessee, to near the mouth of the Ohio River. Crossing the Mississippi River, it descends to the south-west, through Arkansas, where on the upper waters of the Red River it expands to the north, through Nebraska Territory, far into the British Possessions east of the Rocky Moun-

* Vol. 6, page 57.

tains, embracing the head waters of the River Saskatchewan.* To the west, from Red River, it extends to and beyond Santa Fe, embracing the head waters of the Colorado, and stretching north-west, reaches the head waters of the Columbia, as well as those of the Missouri River. Following a south-western direction from Red River through Texas, it crosses the Rio Grande into New Leon, and thence south through St. Luis Potosi, it passes indefinitely into Mexico.

In all the great extent of this formation, there is evidence of the *cretaceous period*, while most of the species differ from our eastern fauna, as the lithological characters do in the rocks and sediments.

In New Jersey, the green sand beds are but slightly calcareous, the limestone lying above having about 80 per cent. of lime. In North and South Carolina, it is, according to Pro. Tuomey, " 25 to 30 per cent. of the mass," but in Alabama it is " highly calcareous."

This vast extent of a simultaneous deposit of this kind, is calculated to excite the greatest interest, when we consider how much it affects our agricultural prosperity; and in a geological point of view, it has received the attention of many of our ablest investigators.

Prof. Vanuxem, in the first place, had in view, the division of McClure's " alluvial," and in his paper he gives a table, dividing it into secondary, tertiary, and alluvial. To these he gave seven subdivisions—two only to the secondary, No. 1, being "Marl of New Jersey and Delaware," which he refers to the" green sand, or chalk of Europe."

Dr. Morton, in his " Synopsis of Organic Remains," (page 13,) in 1834, six years subsequently, gives in a table the same three grand divisions, with a difference in the subdivisions, assigning the name of " Ferruginous sand" to the lower division in which Prof. Vanuxem had continued the name of " Marl of New Jersey," the equivalent of " green sand, or chalk of Europe." Subsequently, in June, 1835, in an appendix, page 89, he separates the " Cretaceous deposits of America" into three divisions, the " Upper, Medial, and Lower."

In 1840, Prof. H. D. Rogers published his Report on the Geology of New Jersey, in which he separated the cretaceous group into five divisions, under the name of " the upper secondary series, embracing the green sand formation."

1. A group of sands and clays, extremely white and pure.
2. A mixed group, consisting of *green sand*, alternating with and occasionally replaced by layers of a blue, sandy, micaceous clay, the so-called "green sand formation."
3. A yellowish, granular limestone, having a profusion of organic remains.
4. A yellow, very ferruginous coarse sand, with some fossil shells of the green sand formation.
5. A coarse, brown, ferruginous sandstone, sometimes passing into a conglomerate.

Subsequently, in Johnston's Physical Atlas, 1855, under the name of "Newer Mesozoic," he continues these divisions, the whole thickness of which he presumes to be a thousand feet.

Prof. Tuomey, in the tables of his geological survey of South Carolina, in 1848, calls the New Jersey deposits " upper green sand;" those of South Carolina, " the gault;" those of Alabama, the lower green sand, equivalent to the Néocomien of the French geologists.

In 1854, Messrs. Hall and Meek made a communication to the American Academy of Arts and Sciences, on some fossils from the Cretaceous Formation of Nebraska. This they divide into five sections.

5. Arenaceous clay passing into argillo-calcareous sandstone.
4. Plastic clay, the principal fossiliferous bed of the upper Missouri.
3. Calcareous marl, containing *Ostrea congesta*, &c.
2. Clay containing few fossils.
1. Sandstone and clay.

* See the map of Nebraska, by Lieut. Warren and Dr. Hayden, with explanations by the latter who has done so much for the geology of the Western Territories; also the excellent map of Hall & Lesley, in Major Emory's Report on the Mexican Boundary Survey, and Prof. Hall's Report of the Geology of the Boundary in the same volume. Also, the various papers of Meek & Hayden.

In 1855, Mr. Marcou published, in the Bulletin of the Geological Society of France, an account of the Geology of the United States, in the cretaceous division of which, (page 70,) after giving to Prof. Vanuxem the credit of being the first to detect this group in the United States, he says that it may be divided provisionally into "three great groups," which have been named in Europe, 1st, le Néocomien; 2d. le grès vert supérieur et la craie marneuse; 3d, la craie blanche.

In March, 1856, Mr. Meek and Dr. Hayden, published their section of the Cretaceous formation of Nebraska, in the Proceedings of the Academy of Natural Sciences, which they republished more fully in the following November, also in the Academy's Proceedings.

5. Gray and yellowish arenaceous clays, with great numbers of marine mollusca, few land plants and bones of Mosasaurus.

4. Bluish and dark plastic clay, containing numerous marine Mollusca.

3. Lead gray calcareous marl, with scales of fishes. *Ostrea congesta*, *Inoceramus*, &c.

2. Dark gray laminated clay, with scales of fishes, small ammonites, &c.

1. Heavy bedded yellowish sandstone, with water-worn lignite. This formation they say may not belong to the cretaceous system.

Prof. Hall in his Geological Report, August, 1856, connected with Major Emory's Mexican Boundary Survey, gives an excellent table prepared by Prof. G. H. Cooke, of the New Jersey Survey, which divides the whole of this system in New Jersey into eight members, which may be thus suscinctly given:—

8. Green Sand, 3d or upper bed.
7. Quartzose Sand.

Nos. 4 and 5 Nebraska section.
6. Green Sand, 2d bed—(a) *Eschara*, &c.
(b) *Gryphæa*, &c.
(c) *Cucullea*, &c.
5. Quartzose sand, highly ferruginous—*Exogyra*, &c.
4. Green Sand, 1st or lower bed—*Exogyra*, *Ostrea*, &c.
3. Dark colored clay, containing green sand—*Ammonites Delawarensis*, &c.

2. Dark colored clay—Fossil wood, no animal remains.
1. Fire Clay and Potter's Clay—Fossil wood and leaves, no animal remains.

In May 1857, Mr. Meek and Dr. Hayden, in the Proceedings of the Academy, continued their valuable papers on the Tertiary and Cretaceous formation of Nebraska, and gave a table of equivalents with the New Jersey deposits, and Dr. Hayden in June of the same year made a communication entitled "Explanations of a second edition of a geological map of Nebraska and Kansas," in which the whole series of formations is reviewed, including the cretaceous system.

It is a very important matter in discussing these organic remains to ascertain, as nearly as possible, the horizon on which this particular formation would stand in regard to its parallelism with those of Europe, where so much has been written on the subject of the various members of the Cretaceous group.

Sir Charles Lyell says, that the New Jersey "strata consist chiefly of green sand and green marl, with an overlying coraline limestone of a pale yellow color, and the fossils, on the whole, agree most nearly with those of the upper European series from the Maestricht beds to the gault inclusive." *

Professor Rogers in his New Jersey Report, does not seem to agree with this idea; he "does not regard these strata as the equivalents in the strict sense of the word, of the green sand formation, so called, of Europe" (page 178). "Nor are we able," he says, "positively to decide, merely by the relationship of the genera, whether the cretaceous period embraces both the commencement and termination of the American green sand series" (page 179).

M. D'Orbigny † considers the chalk formation of North America to belong to

* Manual, third edition, page 224.

† Cours Elémentaire, page 671.

his "étage sénonien" (the upper chalk of Morris) and not to the "grès verts," as supposed by Dr. Morton and others.

Dr. Mantell considered that the teeth of the *Mosasaurus*, found in the green sand formation of New Jersey, described by Dr. Harlan, were in every respect analogous to those of the Maestricht reptile, and that the deposit was equivalent to the Maestricht bed.

The Blackdown green sand of Dr. Fitton‡ has in its fossil *mollusca* a very strong resemblance to our green sand fossils, and as D'Orbigny makes this formation an equivalent to his Cénomanien, there is some evidence that the New Jersey green sand may be on the same horrizon; for according to D'Orbigny's tables the genus *Belemnites* ceases with the Cénomanien, and we have abundance of that genus in our green sand formation. If he be correct as to the decadence of the Cephalopoda, then we could not place this formation higher up in the series than his Cénomanien, which is the "Glauconie crayeuse" of Brogniart, found at Cap le Hève in France, the Blackdown green sand of Fitton and the Upper green sand of Mantell in the south of England.

Under all the information, we have, however, from the various investigations made by so many distinguished geologists, I think the evidence is in favor of D'Orbigny's opinion, that the green sand formation, from which these fossil remains were exhumed, belong to his Sénonien, but it may prove upon further examination to be a little lower in the Cretaceous series.

That portion of the grey micaceous clay at Haddonfield, in which the *Mollusca*, all marine, were generally found, was some ten feet from the surface of the soil. The declination of the layer is very gentle and towards the south east. The bones and coniferous wood were so near or interspersed with the shells as to tend to prove that they must have lived in the vicinity of the shores which the *Mollusca* inhabited, for these show that they were deposited in a sediment totally and completely at rest. The most tender and delicate forms remain without abrasion, and usually, in the case of the bivalves, the two valves are attached. The great tenacity, however, of the clay, and the extreme tenderness of the shells, render it almost impossible to get out perfect specimens, and when they come under the action of the atmosphere, and become desiccated, the calcareous matter crumbles to pieces, the base membrane composing the animal portion of the shell having been previously entirely absorbed.

I propose here to give a hasty list of the genera which were collected, reserving for a future time, when more at leisure, the specific differences of those which are new. It will be observed that the *Lamellibranchia* greatly prevail over the *Gasteropoda*.

List of Genera:—Pinna, 1 species; Inoceramus, 2 do.; Ostrea, 3 do.; Anomia, 1 do.; Corbula, 2 do.; Arca, 1 do.; Cardita, 1 do.; Exogyra, 1 do.; Siliquaria, 2 do.; Nucula, 3 do.; Trigonia, 1 do.; Tellina, 2 do.; Pecten, 2 do.; Turritella, 1 do.; Dentalium, 1 do.; Natica, 1 do.; Buccinum, 1 do., Pterocera, (?) 1 do.; Ammonites, 2 do.; Scaphites, (?) 1 do.; Echinus, 1 do., (spines of); Eschara, 1 do.; 1 Coprolite; 2 small vertebræ of fishes.

Dr. Hammond observed in relation to the fragments of fossil wood found in the same locality as the bones and shells described this evening by Dr. Leidy and Mr. Lea, that he had submitted them to a careful examination, the details of which might prove of interest to the Academy.

Upon inspecting the pieces of this wood placed upon the table, it will be perceived that they are all of an intensely black color, but differ greatly in degree of hardness. One specimen is so soft as to crumble readily on the slightest handling; whilst another is dense and hard, and capable of receiving a high polish. Several of the fragments exhibit teredo perforations, a circumstance of considerable interest. These perforations are so completely filled with sulphuret of iron that casts of them are readily obtained. All the fragments are more or less im-

‡ Strata below the Chalk.

pregnated with this mineral. In some parts the organic tissue has been entirely removed, and nodules of the sulphuret have taken its place; in others the mineral has entered the cells and tubes of the wood, leaving these of their natural forms. Occasionally perfect casts of the cells are found detached from the tissue when the specimen is mounted in Canada balsam.

It was of course highly desirable that these woods should be submitted to microscopical examination. He found, however, upon trial that it was impossible to cut satisfactory sections without removing the sulphuret of iron. This was done by macerating pieces of the wood in dilute chlorhydric acid. After this process they were readily cut into sections with a suitable knife, or ground down till the requisite degree of tenuity was obtained.

Sections thus obtained when placed under the microscope showed conclusively that the wood was of the coniferous family of plants. For some time Dr. H. was under the impression that one fragment belonged to an entirely different class. This idea arose from the fact that from an examination of eight or ten vertical sections none of the characteristic pits or cells could be perceived, nor any indication of the existence of medullary rays. Finally, however, he obtained a section which exhibited both very clearly, and a transverse section which previously he was unable to cut, positively determined it to be of the same character as the other pieces.

Some cause or other, probably the carbonizing process, had entirely destroyed the pits which had existed; a fact of some importance in investigations of this nature. All the fragments appear to belong to the same species of conifer, and as far as Dr. H. could judge do not differ essentially in microscopic characters from the pines which now grow on the locality.

Mr. T. Edwards Clark had kindly given him some specimens of a fossil wood described by Unger, which in many respects resembles that referred to, the pits being absent from a large portion of the tissue.

On leave granted, the thanks of the Academy were tendered to his Excellency, Wm. F. Packer, Governor of the State, for the donation of a White Deer, presented this evening.

Dec. 21st.

Vice-President Bridges in the Chair.

Forty-one members present.

Papers were presented for publication in the Proceedings, entitled:

Description of new genera and species of N. American Lizards, in the Museum of the Smithsonian Institution, by Spencer F. Baird.

Remarks on the lower Cretaceous beds of Kansas and Nebraska, with descriptions of some new species of Carboniferous fossils from the valley of the Kansas River, by F. B. Meek and F. V. Hayden.

And were referred to Committees.

Dec. 28th.

Vice-President Bridges in the Chair.

Sixty-five members present.

The Report of the Biological Department for December was presented.

On report of the respective Committees, the following papers were ordered to be printed in the Proceedings:

Ichthyological Notices.

BY CHARLES GIRARD, M. D.

I.

Those interested in the study of American animals, and of fishes in particular, will hear with interest, of the discovery recently made, of a representative of the Myxinoid family on the north-eastern coast of this continent. It belongs to the genus *Myxine*, so carefully and skilfully investigated by Joh. Müller. It is the more interesting to comparative anatomists, as it typifies the lowest grade of the vertebrated plan of structure. The species which we allude to closely resembles the European one, *M. glutinosa;* like it, it is an inhabitant of a rather high latitude, and its habits or mode of living are quite as little understood. The only specimens that were ever found were collected by my friend, W. Stimpson, who gave most of his specimens to Prof. Agassiz, reserving but one, which he deposited in the Museum of the Smithsonian Institution.

The latter specimen is eleven inches and a half long: the thoracic region alone is subcylindrical; the abdominal and caudal regions being quite compressed and somewhat tapering. The dorsal fin begins somewhat posteriorly to the branchial apertures as a mere fold of the skin, increasing very slightly in elevation towards the spear-shaped tail, being highest posterior to the vent. The latter, in the form of an elongated split, is situated nearly an inch and a half from the tip of the tail where the anal fin meets with the dorsal, of which it has both the aspect and development. A membranous fold or abdominal fin, a good deal more developed than the dorsal one just alluded to, may be observed all along the abdominal region, from the vent to the branchial apertures, being continuous with the anal fin, properly so called, the vent itself not affecting materially its continuity, since it is partly situated between a double fold at the origin of the anal fin. As regards the branchial apertures themselves, the left one is larger than the right, which is placed somewhat in advance and sideways of the left; they are situated about three inches from the apex of the snout. The double series of abdominal mucous pores (one on either side), are conspicuous upon the removal of the slimy investment; the pores being about an eighth of an inch apart. The head is small, continuous with the body; its anterior aspect is shelving inwardly downwards, the snout being subconical, at the apex of which may be observed four subequal tentacles closely grouped together, directed upwards and inserted, two on either side, upon the very edge of the spiracle which they seem to protect, together with a small flap at its posterior margin. The buccal aperture is anterior, below the declivity of the snout; it is divided into two parts by a lateral convoluted lip, the upper part being subtriangular or subcordiform, the lower part transverse and elongated; its lower periphery is rumpled. The third pair of tentacles is the largest of all, and inserted, one on either side, near the upper and outer edge of the convoluted lateral lip just alluded to. It hangs downwards like the fourth pair, which is the smallest and rather inconspicuous, inserted near the inner and lower edge of the same convoluted lip, over the lower part of the buccal aperture. Thus the eight tentacles constitute four pairs: two rostral pairs presiding over the spiracle; and two buccal pairs presiding over the mouth, one at the upper part, the other at the lower. The palatine tooth is slender and elongated. The four rows of lingual teeth are composed each of seven sublanceolated and acute teeth, much larger in the interior than in the posterior rows. They are very crowded and inclined backwards or rather inwards; the anterior row overlapping the base of the posterior one.

The color is of a uniform reddish brown or chestnut tint, somewhat lighter beneath than above. The membranous fold along the abdomen being whitish. The head and anterior aspect of the snout, tentacles and mouth, are whitish also.

From the foregoing remarks it is easy to perceive that we have on the American coast a distinct speeies of the genus *Myxine,* chiefly to be distinguished from its European analogue, by the external aspect of the snout, and buccal aperture, the insertion and proportional development of the tentacles, the form of the body, and by the presence of a membraneous fin-like expansion along the abdomen. To distinguish it henceforwards we propose calling it *M. limosa.* It was collected in great abundance on muddy bottoms, off the island of Grand Manan, Bay of Fundy, by fifty fathoms of depth.

II.

Sometime during the month of September last, a "giant herring," as it was called by fishermen, was caught off Long Island; its total length being five feet, and its weight forty-seven pounds. The trophy was brought to New Haven, where, after a preliminary survey, the prize was cut into pieces, and sold for the table. My friend Wm. H. Dougal, of Georgetown, D. C., well known as an artist of the first order, happening to be at New Haven at the time, and struck at the beauty of a fish, which he had never seen before, drew up an accurate outline of its body and fins, counted the rays of the fins, and the scales of the lateral line, preserving at the same time a few scales taken upon various regions of the body. With these materials on hand, and which we owe to his friendship, we have been enabled to refer this fish, not only to its family and proper genus, but its specific characters to a certain extent could likewise be analysed.

In 1846, Valenciennes withdrew the genera *Elops* and *Megalops* from the herring family (*Clupeidæ*), in which they were formerly included, and proposed to erect for them the family of *Elopidæ.* The genus *Megalops* was framed by Commerson upon a species of the Indian Ocean, the history of which got interwoven with one from the West Indies, until Valenciennes established their specific difference, calling the former *M. indicus*, and the latter *M. atlanticus.* It is to be regretted that the West Indian fish is not more fully described; Valenciennes description being brief and comparative with that of the East Indian species. It is nevertheless sufficient to establish the fact that the "giant herring" brought to New Haven, has a more elongated and subfusiform body, a more elongated head, an eye so much smaller that it never could have suggested the generic name of Big-Eye (*Megalops*). The ventral fins are also inserted more in advance of the anterior margin of the dorsal fin. The latter is subtriangular and rather small, its posterior elongated ray not extending as far as the base of the caudal; whilst the anal is long and very low, deeply emarginated upon its lower edge, which has the shape of an open crescent, the posterior ray being elongated and extends as far as the rudimentary rays at the lower lobe of the caudal. The formula of the rays is: D 13; A 24; C 20; V 9; P 14. The rudimentary rays of the caudal not being taken into account, the number given to that fin appears a good deal smaller than in the other species of the genus, when in reality it is identical. The scales are deeper than long, rounded off, scalloped upon their anterior margin, and undulated upon the upper, posterior and lower margins. Fifty of them were counted in the lateral line. Three or four radiating furrows may be observed upon their anterior section only. A silvery tint prevails all over the body and head; the dorsal region, however, assuming a much darker hue than the middle of the flanks and the belly. The coloration is nearly alike in all the species of this genus. From the characters alluded to, we infer the existence of a species hitherto undescribed, allied to *M. atlanticus*, and for which we propose the name of *M. elongatus.* It is probable that its habitat is the gulf of Mexico, and that the specimen caught off Long Island is a strayed individual that has followed the gulf stream on a northwards journey.

III.

Since my report upon the Fishes of the U. S. P. R. R. Explorations and Surveys has passed through the press, new facts relating to the history of the salmons of the Columbia River have come to our knowledge, calling for various rectifications of synonymy. The species which is figured and described under the name of *Fario gairdneri* is not the *Salmo gairdneri* of Sir John Richardson. Nor does it appear to be any of the other species recorded in the "Fauna Boreali Americana." To distinguish it henceforwards from its congeners we will call it *Fario newberrii*, or else *Salmo newberrii*, just as it may suit systematic writers. It is sufficient for the present to refer to the description alluded to above.

My friend Dr. Geo. Suckley, who has devoted much time in studying the manners and habits of the Salmonidæ of Oregon and Washington Territories, being now engaged on a work upon that family, I leave the rest of the subject with him, without further comment upon the specimens which he has himself collected.

IV.

In that same Report upon the Fishes of the U. S. P. R. R. Explorations and Surveys we have instituted the genus *Thaleichthys* upon a species of Salmonid which we had at first glance referred to the genus *Osmerus*. In treating of its characters, comparatively with both *Osmerus* and *Argentina*, to which genera it is closely allied, we omitted accidentally to compare it with the genus *Mallotus*, to which it bears some affinities, but from which it however differs by a more anterior position of the dorsal and ventral fins, by its small and lanceolated pectorals, and by the absence of maxillar teeth. As to the species referred to under the name of *Thaleichthys stevensi*, a further examination having shown its identity with *Salmo (Mallotus?) pacificus* of the "Fauna Boreali Americana," it is henceforwards to be designated under the name of *Thaleichthys pacificus*.

Prodromus descriptionis animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum Septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit

W. STIMPSON.

PARS VII. *CRUSTACEA ANOMOURA.*

I. *TELEOSOMI.*

Segmentum ultimum thoracicum non liberum.

SYNOPSIS DROMIDEORUM.

A. Pedes 4ti 5tique paris subprehensiles.

DROMIDIA, nov. gen. Carapax convexus, pilosus. Palatum utrinque colliculo instructum. Fœminæ sterni sulci ad segmentum chelipedum producti et in tuberculum approximati; appendices abdominis articuli penultimi minutæ, celatæ. Pedes iis *Dromiæ* similes.

Typus, D. hirsutissima. *Dromia hursutissima*, Lam'k; An. s. vert. v. 264. Desm.; Consid. sur les Crust. p. 137, pl. xviii. f. 1.—Africa Australi.

D. Antillensis, Stimpson.—Ins. Antillarum.

D. spongiosa et excavata, infra.

? *Dromia globosa*, Lam'k; l. c. v. 264.

? *Dromia gibbosa*, M. Edw.; Hist. Nat. des Crust. ii. 175.

? *Dromia unidentata*, Ruppel; Beschr. und Abbild. Kurzschw. Krabben, 16, pl. iv. f. 2.—Sinu Arabico.

? *Dromia rotunda*, McLeay; in Smith's Hist. S. Afr. Zool., p. 71. Africa Australi.

CRYPTODROMIA, nov. gen. Carapax convexus, pubescens, vix pilosus. Palatum utrinque colliculo instructum. Fœminæ sterni sulci remoti, ad segmentum pedum secundi paris tantum producti, terminis in tuberculis. Pedes iis *Dromiæ* similes, sed nodosi. Species parvæ.

Typus, C. coronata, infra.

C. nodipes. *Dromia nodipes*, Lam'k.; Guerin; Icon. pl. xiv. f. 1.

C. lateralis. *Dromia lateralis*, Gray; Zool. Misc. 40.—Australia.

C. tuberculata, tumida, et canaliculata, infra.

? *Dromia fallax*, Lam'k.; M. Edw.; Hist. Nat. des Crust. ii. 179.—Ins. Mauritii.

? *Dromia caput-mortuum*, M. Edw.; Hist. Nat. des Crust. ii. 173.—Mari Orientali.

Dromia, Fabr. Carapax transversus, convexus, pilosus. Palatum læve. Fœminæ sterni sulci ad segmentum pedum secundi paris tantum producti, non approximati. Pedes mediocres, mero non dilatato; digitis primi paris apicibus calcareis; pedes 4 postici reliquis minores, breviores, extremitatibus subcheliformes, processu spiniformi art. penultimi terminali.

Typus, D. vulgaris, M. Edw.; Cuv. Reg. Anim. Crust. pl. xl. f. 1.—Europa.

D. Rumphii, Fabr.; De Haan; Fauna Japonica, Crust. pl. xxxii.; M.-Edw.; Hist. Nat. des Crust. ii. 174.—Mari Sinensi.

D. lator, M. Edw.; Hist. Nat. des Crust. ii. 174.—Insulis Antillarum.

? *D. indica* Gray; Zool. Misc. 40. Griff. Cuv. Cr. pl. xxiv.—Mari Orientali.

Pseudodromia, nov. gen. Carapax elongatus, convexus, pubescens; postice parum induratus. Regio faciei dimidia carapacis latitudinis multo latior. Epistoma, (v. triangulum interanten nularium,) fronti non junctum. Palatum utrinque colliculo instructum. Fœminæ sulci sterni ——? Abdominis maris art. penultimi appendices minutæ, celatæ. Pedes iis *Dromiæ* fere similes, sed 5ti paris longissimi, eis 2di paris multo longiores.

Typus, P. latens, infra.

Petalomera, nov. gen. Carapax oblongus, convexus, epimeris post suturam membranaceis. Palatum utrinque colliculo instructum. Fœminæ sterni sulci ——? Meri pedum sex anticorum laminato-dilatati. Chelipedum digiti apicibus cornei, cochleariformes. Pedes 4 postici iis *Dromiæ* similes.

Typus, P. granulata, infra.

Conchœcetes, nov. gen. Carapax depressus, oblongo-subpentagonus. Pedes 4ti paris quam 3tii paris robustiores, subcheliformes, dactylo valido, hamato; processu art. penultimi obtuso, basali. Pedes 5ti paris gracillimi, non subcheliformes, dactylo minuto, contorto. Testas bivalvarum ferentes.

Typus, C. artificiosus. *Cancer artificiosa*, Herbst; Naturg. d. Krabben u. Krebse, iii. 54, pl. lviii. f. 5.—Mari Sinensi.

Hypoconcha, Guerin; (Rev. et Mag. Zool. ser. 2d. vi. 333.) Carapax deplanatus, superne membranaceus. Fœminæ sterni sulci ut in *Dromiâ*. Pedes 4 postici non subcheliformes, dactylo lunato, pedunculato. Testas bivalvarum ferentes.

Typus, H. sabulosa, Guerin; loc. cit. pl. v.—Ins. Antillarum.

H. arcuata, Stm.—Ins. Antillarum.

B. Pedes 5ti paris solum subprehensiles.

Dynomene, Latreille; M.-Edw. (Hist. Nat. des Crust. ii. 179.) Frons lata. Fœminæ sterni sulci remoti. Appendices abdominis art. penultimi majores. Pedes 5ti paris gracillimi.

Typus, D. hispida, Latr., M.-Edw.; Reg. Anim. Crust. pl. xl. f. 2.—Ins. Mauritii.

D. Latreillii, Eyd. et Soul.; Voy. Bonite, Crust. pl. iii. f. 3–5.

LATREILLIDEA;—genus unicum Latreillia, Roux. :—Conf. De Haan; Fauna Japonica, Crust. 105.

HOMOLIDEA;—genus unicum Homola, Leach;—Conf. M. Edw.; Hist. Nat. des Crust. ii. 181.

RANINIDEA;—Conf. Dana U. S. Expl. Exp. Crust. i. 403.

II. *SCHIZOSOMI.*

Segmentum ultimum thoracicum liberum.

SYNOPSIS PORCELLANIDEORUM.

A. Antenarum externarum articulus primus brevis, marginem carapacis superiorem non attingens.

PETROLISTHES, nov. gen. Carapax depressus, subovatus, non latior quam longior; fronte triangulari, margine plus minusve undulata, dentata vel integra. Oculi sat grandes. Antennarum pedunculus plus minusve cristatus. Chelipedes lati, depressi. Pedum ambulatoriorum dactyli normales, i. e. breves, sat robusti, unguiculo unico.

Typus, P. violaceus. *Porcellana violacea*, Guerin; Mag. de Zool., 1838, p. 5, pl. xxv. f. 2. *P. macrocheles*, Pœppig.—Chili.

P. validus. *Porcellana valida*, Dana; U. S. Expl. Exp. Crust. i. 415. pl. xxvi. f. 5.—Chili.

P. rupicolus. *Porcellana rupicola*, Stm.; Crust. et Echin. Pacif. Coast of N. America, p. 40. Bost. Jour. Nat. Hist. vi. pl. xx. f. 2.—California.

P. tridentatus, Stm.—Ins. Antillarum.

P. elongatus. *Porcellana elongata*, M.-Edw.; Hist. Nat. des Crust. ii. 251.—Nova Zelandia.

P. gracilis, Stm.—Sinu Californico.

P. Japonicus. *Porcellana Japonica*, De Haan; Fauna Jap. Crust. 199. pl. l. f. 5.—Mari Japonico.

P. asiaticus. *Porcellana asiatica*, Gray, Zool Misc. 15.—Asia.

P. politus. *Porcellana polita*, Gray; Zool. Misc. 15; Griff. Cuv. xiii. 312, pl. xxv. f. 2. *P. magnifica*, Gibbes; l. c. 191.—Ins. Antillarum.

P. armatus. *Porcellana armata*, Gibbes; Proc. Am. Assoc. 1850, p. 190. —Florida.

P. marginatus, Stm.—Ins. Antillarum.

P. maculatus. *Porcellana maculata*, M.-Edw.; Hist. Nat. des Crust. ii. 253.—Nova Hibernia.

P. Lamarckii. *Pisidia Lamarkii*, Leach. *Porcellana Lamarckii*, M.-Edw.; Hist. Nat. des Crust., ii. 551.—Nova Hibernia.

P. speciosus. *Porcellana speciosa*, Dana; loc. cit. i. 417. pl. xxvi. f. 8.—Mari Pacifico.

P. scabriculus. *Porcellana scabricula*, Dana; loc. cit. i. 424. pl. xxvi. f. 13.—Mari Orientali.

P. dentatus. *Porcellana dentata*, M.-Edw.; Hist. Nat. des Crust. ii. 251.—Java.

P. tomentosus. *Porcellana tomentosa*, Dana; loc. cit. i. 420. pl. xxvi. f. 10.—Mari Pacifico.

P. Boscii. *Porcellana Boscii*, Savigny; Egypt, Crust. pl. vii. f. 2.—Egypt.

P. rugosus. *Porcellana rugosa*, M.-Edw.; Hist. Nat. des Crust. ii. 252.

P. hirsutus. *Porcellana hirsuta*, Gray; Griffiths' Cuvier, xiii. 312. pl. xviii.

P. Edwardsii. *Porcellana Edwardsii*, De Saussure; Rev. et Mag. Zool., 1853, v. 366. pl. xi. f. 3.—Mazatlan.

P. sexspinosus. *Porcellana sexspinosa*, Gibbes; loc. cit. 190. *P. galathina*, Gray, Say.—Florida.

P. occidentalis, Stm.—Panama.

P. tuberculatus. *Porcellana tuberculata*, Guerin; Mag. de Zool., 1838, p. 6. pl. xxvi. f. 2. *P. lobifrons*, M.-Edw.—Chili.

P. tuberculifrons. *Porcellana tuberculifrons*, M.-Edwards et Lucas; in D'Orb. Voy. en l'Am. Merid., Crust. p. 33. *P. affinis*, Guerin.—Chili.

P. tuberculosus. *Porcellana tuberculosa,* M.-Edw.; Hist. Nat. des Crust. ii. 256.—Chili.

P. acanthophorus. *Porcellana acanthophora,* M.-Edw. et Lucas; in D'Orb. Voy. en l'Am. Merid., p. 33. pl. xvi. f. 2.—Chili.

P. coccineus. *Porcellana coccinea,* Owen; Beechy's Voy. Zool., 87. pl. xxvi.—Ins. Hawaiensium.

P. pubescens et hastatus, infra.

? *Porcellana Desmarestii,* Eyd. et Gerv.; Voy. de la Favorite, v. pl. iii. f. 1.—Chili.

? *Porcellana lævigata,* Guerin; Mag. de Zool., 1838, p. 5, No. 2.—Chili.

? *Porcellana affinis,* Gray; Zool. Misc. p. 15.

? *Porcellana cinctipes,* Randall; Jour. Acad. Nat. Sci. Philad. viii. 136.—Ins.Hawaiensium.

? *Porcellana granulosa,* Guerin; Mag. de Zool. 1858, p. 6, pl. xxv. f. 1.—Chili.

Pisosoma, nov. gen. Carapax rotundatus, sat convexus, non longior quam latior. Frons superne visa recta, integra. Chelipedes crassi. Dactyli pedum ambulatoriorum normales.

Typus, P. pisum. *Porcellana pisum,* M. Edw.; Hist. Nat. des Crust. ii. 254.—Mari Orientali.

P. sculptum. *Porcellana sculpta,* M. Edw.; Hist. Nat. des Crust. ii. 253. —Mari Orientali.

P. Riisei, Stm.—Ins. Antillarum.

? *Porcellana viridis,* Gray; Zool. Misc. p. 15. *Pisidia viridis,* Leach.

B. Antennarum externarum articulus primus plus minusve productus et margini carapacis junctus; articulus secundus orbitâ remotus.

Raphidopus, nov. gen. Carapax rotundatus, latior quam longior. Frons non prominens, fere recta, tridentata. Oculi minuti. Pedum ambulatoriorum dactyli longi, recti, gracillimi compressi et acutissimi.

Typus, R. ciliatus, infra.

Pachycheles, nov. gen. Carapax rotundato-ovatus, non longior quam latior; epimeris postice solutis, parte posteriore quadrata, interstitio cutaneo disjuncta. Frons medio parum prominens, subacuta. Antennarum articulus primus minus productus. Chelipedes crassissimi, rugosi; carpo brevi. Pedum ambulatoriorum dactyli normales.

Typus, P. grossimanus. *Porcellana grossimana,* Guerin; Mag. de Zool. 1838, pl. 26, f. 3.—Chili.

P. rudis, Stm.—California.

P. natalensis. *Porcellana natalensis,* Krauss; Sudafr. Crust., 58, pl. iv. f. 1.—Africa Australi.

P. moniliferus. *Porcellana monilifera,* Dana; loc. cit. i. 413, pl. xxvi. f. 3.—Brazilia.

P. pectinicarpus et Stevensii, infra.

Megalobrachium, nov. gen. Carapax rotundatus, non longior quam latior. Frons angusta, laminata, parum prominens, fere recta. Oculi minuti. Chelipedes crassi, mero magno, manu brevi. Pedum amb. dactyli normales.

Typus, M. granuliferum, Stm.—Ins. Antillarum.

Porcellana, Lam'k, restrictum. Carapax plerumque longior quam latior, lateribus carinatus; epimeris integris. Frons sat lata, prominens, plus minusve dentata. Orbitæ profundæ. Antennarum articulus primus valde productus, intus acutus. Chelipedes sat depressi; carpo brevi, margine anteriore sæpius unilobato; digitis sæpius contortis. Pedum amb. dactyli normales, sat longi.

Typus, P. platycheles, Lam'k; An. s. vert., v. 230.—Europa.

P. Sayii, Gray; Zool. Misc. 15.

P. pilosa, M. Edw.; Hist. Nat. des Crust.; ii. 255.—Carolina.

P. ocellata, Gibbes; loc. cit. 190.—Florida.

P. longicornis, M.-Edw.; Hist. Nat. des Crust., ii. 257. *Pisidia longicornis*, Leach. *Porcellana Leachii*, Gray.—Europa.

P. Dehaani, Krauss; Sudafr. Crust., 59, pl. iv. f. 2.—Africa Aust.

P. armata, Dana; l. c. i. 426, pl. xxvi. f. 14, (non Gibbes.)—Mari Orientali.

P. suluensis, Dana; l. c. i. 414, pl. xxvi. f. 4.—Mari. Orientali.

P. serratifrons, dispar, latifrons, streptocheles, pulchra, et ornata, infra.

? *P. punctata*, Guerin; Icon. Cr., pl. xviii. f. 1. *P. cristata*, Edw.—Peru.

? *P. angulosa*, Guerin; Voy. Favorite, v. 175. pl. ii, f. 3.—Chili.

? *P. sociata*, Say; Journ. Acad. Nat. Sci. Philada., i, 457.—Carolina.

? *P. minuta*, Westwood and Hailestone; in Loudon's Mag. Nat. Hist., viii. 265; f. 265–270, 1835.—Anglia.

? *P. mitra*, Dana; loc. cit. i. 419, pl. xxvi., f. 9.—Peru.

Minyocerus, nov. gen. Carapax angustus. Frons tridentata. Antennulæ longiores, articulo primo magno, depresso, dentato. Antennarum articulus primus ei *Porcellanæ* similis; pars mobilis minuta, quadriarticulata, quam art. primus non longior. Chelipedes debiles. Pedum amb. dactyli normales.

Typus, M. angustus. *Porcellana angusta*, Dana; loc. cit. i. 423, pl. xxvi. f. 12.—Brasilia.

Porcellanella, White. (Voy. Rattlesnake, ii. 394.) Carapax oblongus, multo longior quam latior, lateribus fere parallelis; lobulis gastricis obsoletis. Frons horizontalis, laminiformis, valde prominens, tridentata. Antennæ ei *Porcellanæ* similes. Chelipedes læves, carpo brevi, manu elongata. Pedes ambulatorii parvi, mero crasso, dactylis brevibus, uncinatis, compressis, multi-unguiculatis.

Typus, P. triloba, White; l. c., ii. 394, pl. v. f. 2.

P. picta, infra.

Polyonyx, nov. gen. Carapax rotundato-ovalis, latior quam longior, convexus, lævis. Frons sat angusta, recta. Antennularum articulus primus non dentigerus. Antennarum articulus primus prælongus. Oculi minuti. Chelipedes læves; mero magno. Pedum amb. dactyli brevissimi, lati, intus bi- vel multi-unguiculati. *Megalobrachio* affinis, dactylis exceptis.

Typus, P. macrocheles. *Porcellana macrocheles*, Gibbes; Proc. Am. Assoc. 1850, p. 191.—Carolina.

P. biunguiculatus. *Porcellana biunguiculata*, Dana; loc. cit. i. 411, pl. xxvi. f. 1.—Mari Orientali.

P. sinensis, infra.

Synopsis HIPPIDEORUM.

Hippidæ.

Pedes antici non subcheliformes. Antennæ externæ aciculo carentes. Maxillipedes externi operculiformes, exognatho nullo.

Remipes, Latreille, M.-Edw. (Hist. Nat. des Crust., ii. 204). Antennæ externæ breves. Maxillipedum externorum palpus paullo unguiformis. Pedes antici longi, dactylo mediocri, robusto, subcylindrico.

Typus, R. testudinarius, Latr., M.-Edw.; Hist. Nat. des Crust., ii. 206.—Mari Orientali.

R. marmoratus, Humbr. et Jacq.; Voy. au Pole Sud, Atlas, Inv. pl. viii. f. 22.

R. pacificus, Dana; loc. cit. i. 407., pl. xxv. f. 7.—Mari Pacifico.

R. hirtipes, Dana; loc. cit. i, 408, pl. xxv. f. 8.—Mari Orientali.

R. barbadensis, Stm. *Squilla barbadensis ovalis*, Pétiver; Pætrigr. Americana, pl. ii. f. 9.—Ins. Antillarum.

R. scutellatus, Leach, White; Brit. Mus. Cat., 1847, p. 57. *Hippa scutellata,* Fab.; Ent. Syst. ii. 474.—Mari Australi.

MASTIGOPUS, nov. gen. Antennæ breves. Maxillipedes externi oblongi; meri apice truncato. Pedes antici prælongi, dactylo flagelliformi, multiarticulato.

Typus, M. gracilis, infra.

HIPPA, Fabr., M. Edw. (Hist. Nat. des Crust. ii. 207.) Antennæ longæ. Maxillipedes externi grandes, palpo tenui. Pedes antici breves, dactylo ovato, laminato.

Typus, H. emerita, Fabr., M.-Edw.; Hist. Nat. des Crust. ii. 209. *Cancer emeritus,* Lin.—Brasilia.

H. talpoida, Say; Jour. Acad. Nat. Sci. Philada. i. 160.—Virginia.

H. analoga, Stm. Crust. et Echin. Pacific Coast of N. Am. p. 46.—California.

H. asiatica, M. Edw.; Hist. Nat. des Crust. ii. 209.—Mari Orientali.

ALBUNIDÆ.

Pedes antici subcheliformes. Maxillipedes externi subpediformes, exognatho instructi.

BLEPHAROPODA, Randall. (Journ. Acad. Nat. Sci. Philada., 1839, viii. 131.) =*Albunhippa,* M.-Edw., 1841. =*Abrote,* Philippi, 1857. Antennæ sat longæ, aciculo nullo. Oculi cylindrici graciles.

Typus, B. occidentalis, Randall; loc. cit. viii. p. 131, pl. vi.—California.

B. spinosa. *Albunhippa spinosa,* M.-Edw. et Lucas; Arch. du Mus. d'Hist. Nat. ii. 477, pl. xxviii. f. 1-13.—Peru.

B. spinimana. *Abrote spinimana,* Philippi; Arch. f. Naturg. xxiii. i. 124, pl. viii.—Chili.

ALBUNÆA, Fabr., M.-Edw. (Hist. Nat. des Crust. ii. 202). Antennæ aciculo instructæ prælongo. Oculi laminati, angusto-triangulares. Maxillipedum externorum carpi angulus superior parum productus.

Typus, A. symnista, Fabr.; M.-Edw.; Hist. Nat. des Crust., ii. 203.—Mari Orientali.

A. Lucasii, De Saussure; Rev. et Mag. Zool. ser. 2dæ, v. 367, pl. xii. f. 4.—California.

A. oxyophthalma; Leach, White; Brit. Mus. Cat., 1847, p. 57.—Ins. Antillarum.

A. speciosa, Dana; loc. cit. i. 405, pl. xxv. f. 6.—Ins. Hawaii.

A. Guerini, Lucas; Rev. et Mag. Zool., ser. 2dæ, v. 45.—Algeria.

A. Paretii, Guerin; Rev. et Mag. Zool., ser. 2dæ, v. 47.—Ins. Antillarum?

A. Gibbesi, Stm.—Florida.

LEPIDOPA, nov. gen. Antennæ aciculo instructæ brevissimo. Oculi squamiformes, vix longiores quam latiores. Maxillipedum ext. carpi angulus superior longe productus.

Typus, L. scutellata. *Albunæa scutellata,* Fabr., M.-Edw.; Hist. des Crust. ii. 204.—Ins. Antillarum.

L. venusta, Stm.—Ins. Antillarum.

SYNOPSIS LITHODIDEORUM.

A. Corpus convexum, habitu Maioideorum.

LITHODES, Latr., M.-Edw. (Hist. Nat. des Crust., ii. 184). Abdominis extremitates et partes laterales scutellis approximatis induratæ; pars media mollis, verrucis disjunctis armata. Pedes sepius longi.

Typus, L. maia, Leach. *Cancer maia,* Lin. *L. arctica,* M. Edw.; Hist. Nat. des Crust., ii. 186.—Mari Atlantico Boreali.

L. antarcticus, Humbr. et Jacq.; Voy. au Pole Sud, Inv. pl. vii.—Fuegia.

L. camtschaticus, Tiles., De Haan; Fauna Japonica, Crust. 217, pl. xlvii.—Mari Ochotzskiensi.

L. spinosissimus, Brandt; Bulletin phys.-mathém. de l'Acad. de St. Petersbourg, vii. 172.—Mari Pacifico Boreali.

L. brevipes, M.-Edw. et Lucas; Arch. du Mus. d'Hist. Nat. ii. 463, pl. xxiv–xxvii. *Paralithodes brevipes*, Brandt.—Kamtschatka.

Echidnocerus, White. Proc. Zool. Soc. London, 1848, p. 47). *Lopholithodes*, Brandt. *Ctenorhinus*, Gibbons. Abdomen scutis quinque-seriatis approximatis induratum. Antennarum aciculum triangulatum, superficie margineque spinosum. Pedes brevissimi.

Typus, E. cibarius, White; P. Z. S. 1848, p. 47; Annulosa, pl. ii. iii. *Lopholithodes Mandtii*, Brandt; Bulletin phys.-math. de l'Acad. de St. Petersbourg, vii. 174.—Sitka.

E. setimanus, Stm.; Crust. et Echin. Pac. Coast of N. Am., p. 37. *Ctenorhinus setimanus*, Gibbons; Proc. Cal. Acad. Nat. Sci., i. 48. California.

E. foraminatus, Stm.—California.

Paralomis, White. (Proc. Zool. Soc. London, xxiv. 134). Abdomen scutis quinque-seriatis approximatis induratum. Antennarum aciculum margine spinosum. Pedes mediocres.

Typus, P. granulosus, White; l. c. *Lithodes granulosus*, Humbr. et Jacq.; Voy. au Pole Sud. Inv., pl. viii. f. 15. Mari Antarctico.

P. verrrucosus. *Lithodes verrucosus*, Dana; loc. cit. 128, pl. xxvi. f. 16.—Fuegia.

Rhinolithodes, Brandt. (Bulletin de l'Acad. vii. 174.) Abdomen scutis triseriatis obessum. Antennarum aciculum margine spinosum. Pedes mediocres.

Typus, R. Wosnessenskii, Brandt; l. c.—Sitka.

Acantholithus, nov. gen. Abdomen scutis multiseriatis obsessum. Antennarum aciculum truncatum, 3-4-spinigerum. Pedes mediocres.

Typus, A. hystrix. *Lithodes hystrix*, De Haan; Fauna Japonica, Crust. 218, pl. xlviii.—Japonia.

Phyllolithodes, Brandt. (Bulletin phys.-mathem. de l'Acad. de St. Pétersb. vii. 174.) *Petalocerus*, White. Carapax puteis profundis excavatus. Abdomen flexile, scutis quinque-seriatis induratum; scutis paullo imbricatis, sed bene disjunctis, interstitiis cutaneis. Antennarum aciculum flabelliforme, in laminis tres divisum. Pedes sat breves.

Typus, P. papillosus, Brandt; Bulletin, vii. 174. *Petalocerus Bellianus*, White; Proc. Zool. Soc. Lond. 1856, xxiv. 134, pl. xlii. California.

Cryptolithodes, Brandt. (Bulletin phys.-math. de l'Acad. de St. Pétersb. vii. 175.) Carapax marginibus dilatatus, pedes totos celans. Rostrum laminatum deflexum. Antennarum aciculum laminiforme simplici. Abdomen induratum, scutellis triseriatis approximatis.

Typus, C. typicus, Brandt; Bulletin, vii. 175. Stimpson; Crust. et Echin. Pacific Coast of N. America, p. 32. Bost. Jour. Nat. Hist. vi. pl. xx. —California.

C. sitchensis, Brandt; Malanges Biologiques tirés du Bulletin phys.-mathem. de l'Acad. Imp. des Sciences de St. Pétersb., i. 654.—Sitka.

B. Corpus depressum, habitu Porcellanideorum.

Lomis, M. Edwards, (Hist. Nat. des Crust. ii. 187.) Carapax rotundatus, rostro rudimentari. Abdomen sat induratum lamellatum.

Typus, L. hirta, M. Edw.; Hist. Nat. des Crust. ii. 188. *Porcellana hirta* Lam'k.—Australia.

Dermaturus, Brandt. (Melanges Biologiques, i. 57.) Abdomen molle, crassum, segmentis primo, ultimo penultimoque scutellis protectis. Maxillipedum externorum articuli ultimus penultimusque non dilatati.

Typus, D. Mandtii, Brandt; Mel. Biolo. i. 57.—Ins. St. Pauli.

Hapalogaster, Brandt. (Melanges Biologiques, i. 58.) Abdomen ei *Dermaturi* simile. Antennarum aciculum laminatum, sublanceolatum. Maxillipedum ext. articuli ultimus penultimusque intus dilatati.

Typus, H. Mertensi, Brandt; Mel. Biol. i. 58.—Sitka.

H. dentatus. *Lomis dentata*, De Haan; loc. cit. 219. pl. xlviii. f. 3. —Japonia.

H. cavicauda, Stm. California.

Synopsis PAGURIDEORUM.

Cenobitidæ.

Birgus, Leach, M. Edw.; Hist. Nat. des Crust. ii. 244.) Abdomen rectum, laminis calcareis induratum.

Typus, B. latro, Leach, M. Edw.; Hist. Nat. des Crust. ii. 246; Reg. Anim. Crust., pl. xliii. f. 1. *Cancer latro*, Herbst.—Mari Orientali.

Cenobita, Latreille, M. Edw. (Hist. Nat. des Crust. ii. 238.) Abdomen molle, in cochleam retortum.

Typus, C. clypeata, Latreille, Encyc., pl. ccci. f. 1. M. Edw.; Hist. Nat. des Crust., ii. 239.—Mari Orientali.

C. diogenes, Latr., M. Edw.; Hist. Nat. des Crust. ii. 240, pl. xxii. f. 11-13.—Ins. Antillarum.

C. carnescens, Dana; loc. cit. i. 472, pl. xxx. f. 3.—Mari Pacifico.

C. rugosa, M. Edw.; Hist. Nat. des Crust. ii. 241. De Haan; l. c., p. 212. Dana; loc. cit. i. 471, pl. xxx. f. 1. *C. clypeata*, Owen; in Beechey's Voy. Zool.—Mari Pacifico.

C. brunnea, Dana; loc. cit. i. 470, pl. xxix. f. 10.—Mari Pacifico.

C. Olivieri, Owen; Beechey's Voy. Zool. p. 84.—Mari Pacifico.

C. compressa, M. Edw.; Hist. Nat. des Crust. ii. 241. De Haan; l. c. p. 241.—Mari Orientali.

C. spinosa, M. Edw.; Hist Nat. des Crust. ii. 242.—Mari Orientali.

C. perlata, M. Edw.; Hist. Nat. des Crust. ii. 242. Reg. Anim. Crust., pl. xliv. f. 1. De Haan: l. c. p. 213.—Mari Pacifico.

C. purpurea et cavipes, infra.

Paguridæ.

A. Maxillipedes externi basi approximati, coxis valde dilatatis, contiguis.

a. Abdomen symmetricum.

Cancellus, M. Edw. (Hist. Nat des Crust. ii. 243.)

Typus, C. typus, M. Edw.; Ann. des Sc. Nat. ser. 2da Zool. vi. pl. xiv. f. 3.

b. Abdomen asymmetricum.

1. Abdomen maris appendicibus genitalibus carens. Pedes 4ti paris cheliformes.

Diogenes, Dana, (U. S. Expl. Exp., Crust. i. 438.) Annulum ophthalmicum apertum, rostriferum. Antennarum aciculum basi latum, interdum bifidum; flagellum ciliatum. Chelipedes inæquales, (sinister major,) manûs commisura marginali; digitis obliquis, apicibus calcareis acuminatis. Pedum 2di 3tiique paris dactyli longi.

Typus, D. miles, Dana; loc. cit. i. 439, pl. xxvii. f. 9. *Pagurus miles*, Fabr., M. Edw.; Hist. Nat. des Crust. ii. 235.—Mari Orientali.

D. custos, Dana; loc. cit. i. 439, pl. xxvii. f. 10. *Pagurus custos*, Fabr., M. Edw.; Hist. Nat. des Crust. ii. 236.—Mari Orientali.

D. diaphanus. *Pagurus diaphanus*, Fabr., M. Edw.; Hist. Nat. des Crust. ii. 236.—Mari Atlantico.

D. spinifrons. *Pagurus spinifrons*, De Haan; Fauna Jap. Crust. 212, pl. xlix. f. 6.—Japonia Australi.

D. Edwardsi. *Pagurus Edwardsii*, De Haan; l. c., p. 211, pl. i. f. 1.—Japonia Australi.

D. arenarius. *Pagurus arenarius*, Lucas; Expl. Alger. Cr. pl. iii. f. 7.—Algeria.

D. brevirostris et penicillatus, infra.

?*Pagurus pugilator*, Roux; Crust. de la Medit. pl. xiv. f. 3. Mari Medit.

Petrochirus, nov. gen. *Paguro affinis*. Frons medio obtusa. Annulum ophthalmicum apertum, bracteoliferum. Oculi crassi, squamularum basalium apicibus gracilibus. Chelipedes subæquales, (dexter major,) dissimiles; manûs commisuris marginalibus; digitis verticalibus; manûs dextræ marginibus obtusis, apicibus digitorum calcareis; manûs sinistræ marginibus acutis, apicibus corneis. Pedum 2di. 3tiique paris dactyli contorti.

Typus, P. granulatus. *Pagurus granulatus*, Oliv., M. Edw.; Hist. Nat. des Crust. ii. 225.—Mari Atlantico Occidentali.

Pagurus, Fabr., Dana. (U. S. Expl. Exped., Crust. i. 449.) Frons medio recta. Annulum ophthalmicum apertum, bracteoliferum. Oculi plus minusve crassi, squamularum basalium apicibus latis. Antennarum aciculum breve sat robustum, flagellum longum, nudum. Chelipedes inæquales, (sinister major,) manûs commisuris marginalibus; digitis verticalibus, apicibus corneis, subexcavatis.

Typus, P. punctulatus, Oliv., M. Edw.; Hist. Nat. des Crust. ii. 222. Dana; loc. cit. i. 451, pl. xxviii. f. 4.—Mari Orientali.

P. spinimanus, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ v. 61.—Mari Pacifico.

P. affinis, M. Edw.; Hist. Nat. des Crust. ii. 224.—Ceylania.

P. guttatus, Oliv., M. Edw.; Hist. Nat. des Crust. ii. 223. Quoy et Gaimard; Voy. Uranie, pl. lxxix. f. 3. Dana; loc. cit. i. 451, pl. xxviii. f. 3. —Mari Pacifico.

P. setifer, M. Edw.; Hist. Nat. des Crust. ii. 225. De Haan; l. c. p. 209.—Mari Orientali.

P. euopsis, Dana; loc. cit. i. 452, pl. xxviii. f. 6.—Mari Pacifico.

P. fabimanus, Dana; loc. cit. i. 454, pl. xxviii. f. 7.—Mari Pacifico.

P. scabrimanus, Dana; loc. cit., i. 455, pl. xxviii. f. 8.—Mari Orientali.

P. difformis, M. Edw.; Hist. Nat. des Crust. ii. 222. Dana; l. c. i. 449.—Mari Orientali.

P. asperus, Berthold; Gottingische Gel. Anz., 1845; iii. Nach. p. 45.——Mari Sinensi.

P. pedunculatus, (Herbst,) Owen; in Beechey's Voy. Zool., p. 83.—Mari Pacifico.

P. carinatus, Randall; Jour. Acad. Nat. Sci. Philad. viii. 133.—Ins. Hawaii.

P. asper, De Haan; (non M. Edw.) loc. cit. 208, pl. xlix. f. 4. Dana; l. c., i. 450.—Mari Orientali.

P. cavipes, White; Ann. Mag. Nat. Hist. i. 224.—Australia.

P. venosus, M. Edw.; Ann. des Sci. Nat., ser. 3tiæ v. 61.—Ins. Antillarum.

P. sinistripes, Stm.—Panama.

P. callidus, Roux, M. Edw.; Hist. Nat. des Crust. ii. 220.—Mari Mediterraneo.

P. striatus, Latr., M. Edw.; Hist. Nat. des Crust. ii. 218.—Mari Atlantico Orientali.

P. imbricatus, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ, 1848, v. 61.—"Ruffles Bay."

P. strigimanus, White; Ann. Mag. Nat. Hist., 1848, i. 224.—Tasmania.

P. ornatus, Roux; Crust. Medit. pl. xlvii.—Mari Medit.

P. scutellatus, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, v. 61.—Africa Orientali.

P. gemmatus, M. Edw.; Ann. des. Sc. Nat., ser. 3tiæ, 1848, v. 61.—Ins. "Marquesas."

P. impressus, De Haan; loc. cit. 407, pl. xlix. f, 3.—Japonia.

P. sculptipes et platythorax, infra.

?*Pagurus timidus*, Roux; Crust. de la Medit. pl. xxiv. f. 6.—Mari Medit.

ANICULUS, Dana. (U. S. Expl. Exped., Crust. i. 460.) Frons medio acuta. Annulum ophthalmicum vix apertum, sed bracteoliferum. Antennæ graciles, aciculo brevi robusto, flagello nudo. Chelipedes perbreves æquales, manûs commisuris verticalibus, sed marginalibus; digitis verticalibus apicibus excavatis corneis.

Typus, A. typicus, Dana; loc. cit. i. 461, pl. xxix. f. 1. *Pagurus aniculus*, Fabr.; Suppl. 411.—Mari Orientali.

A. ursus. *Pagurus ursus*, Olivier; Encyc. Meth. viii. 640.—Australia.

A. elegans, Stm.—Panama.

?*Pagurus annulipes*, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ, 1848, Zool. v. 60.—Papua.

CALCINUS, Dana. (U. S. Expl. Exped., Crust. i. 456.) Frons medio acuta. Annulum ophthalmicum celatum. Antennarum aciculum breve; flagellum nudum. Chelipedes inæquales, (sinister major,) manûs commisuris verticalibus sed fere marginalibus; digitis verticalibus, apicibus calcareis instar cochlearis excavatis. Pedum 2di. 3tiique paris dactyli breves.

Typus, C. tibicen, Dana; loc. cit. i. 457. *Pagurus tibicen*, (Herbst,) Latr., M. Edw.; Hist. Nat. des Crust. ii. 229. *P. levimanus*, Randall.—Mari Pacifico.

C. chilensis. *Pagurus chilensis*, M. Edw.; Hist. Nat. des. Crust. ii. 230, pl. xxii. f. 9. Nicolet; in Gay's Hist. de Chile, Zool. iii. 191.—Chili.

C. obscurus, Stm.—Panama.

C. lividus. *Pagurus lividus*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, Zool. v. 63.—Mari Orientali.

C. sulcatus. *Pagurus sulcatus*, M. Edw.; Hist. Nat. des Crust. ii. 230.—Ins. Antillarum.

C. Gaimardii, Dana; l. c. i. 457, pl. xxviii. f. 9. *Pagurus Gaimardii*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, Zool. v. 63.—Mari Pacifico Occidentali.

C. elegans, Dana; loc. cit. i. 458. *Pagurus elegans*, M. Edw.; Hist. Nat. des Crust. ii. 229. *P. pictus*, Owen. *P. decorus*, Randall.—Mari Pacifico.

C. latens, Dana; l. c. i. 459, pl. xxviii. f. 11. *Pagurus latens*, Randall.—Mari Pacifico.

C. cristimanus. *Pagurus cristimanus*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, Zool. v. 63.

?*Pagurus bimaculatus*, De Haan; loc. cit. 210, pl. 1, f. 4.—Japonia Australi.

CLIBANARIUS, Dana. (U. S. Expl. Exped. Crust. i. 461.) Frons medio acuta. Annulum ophthalmicum celatum. Oculi longi. Antennarum aciculum robustum. Chelipedes similes, subæquales, manûs commisuris verticalibus medianis, non marginalibus; digitis horizontalibus, apicibus corneis excavatis.

Typus, C. vulgaris, Dana; l. c. i. 462. *Pagurus clibanarius*, (Herbst.) Latr., M. Edw.; Hist. Nat. des Crust. ii. 227.—Mari Orientali.

C. oculatus. *Pagurus oculatus*, Fabr., M. Edw.; His. Nat. des Crust. ii. 226.—Gallia.

C. crassimanus. *Pagurus crassimanus*, M. Edw.; Hist. Nat. des Crust. ii. 227.—Mari Pacifico.

C. tuberculosus. *Pagurus tuberculosus*. M. Edw.; Hist. Nat. des Crust. ii. 229.—Ins. Antillarum.

C. tricolor. *Pagurus tricolor*, Gibbes; Proc. Am. Assoc., 1850, p. 189.—Florida.

C. lineatus, Dana; loc. cit. i. 462, pl. xxix. f. 2. *Pagurus lineatus*, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ, 1848, v. 62.—Mari Pacifico.

C. striolatus, Dana; loc. cit. i. 463, pl. xxix. f. 3.—Mari Pacifico.

C. nigritarsis. *Pugurus nigritarsis*, Lucas; Expl. Alger. Crust. pl. iii f. 4.—Algeria.

C. vittatus. *Pagurus vittatus*, Bosc.; Hist. des Crust. ii. 8, pl. xii. Gibbes; loc. cit. 189.—Carolina.

C. panamensis, Stm.—Panama.

C. sclopetarius. *Cancer sclopetarius*, Herbst; Naturg. d. Krabben und Krebse, ii. 23, pl. xxiii. f. 3.—Ins. Antillarum.

C. longitarsis, Dana; loc. cit. i. 464. *Pagurus longitarsis*, De Haan; l. c. 211, pl. l. f. 3.—Mari Orientali.

C. inequalis. *Pagurus inequalis*, De Haan; loc. cit. 210, pl. l. f. 2.—Japonia Australi.

C. symmetricus, Dana; l. c. i. 464. *Pagurus symmetricus*, Randall; loc. cit. viii. 133.—Ins. Hawaiensium.

C. tæniatus. *Pagurus tæniatus*, M. Edw.; Ann. des Sc. Nat. 3tiæ ser. 1848, v. 62.—Mari Pacifico.

C. cruentatus. *Pagurus cruentatus*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, v. 62.—Nova Zelandia.

C. aculeatus. *Pagurus aculeatus*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, v. 62.—Australia.

C. elongatus. *Pagurus elongatus*, M. Edw.; Ann. des Sc. Nat., ser. 2tiæ, 1848, v. 62.—Mari Pacifico.

C. asper. *Pagurus asper*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, v. 63.—Mari Orientali.

C. æquabilis, Dana; loc. cit. i. 464, pl. xxix. f. 4.—Ins. Madeiræ.

C. zebra, Dana; l. c. i. 456, pl. xxix. f. 5.—Ins. Hawaii.

C. virescens, Dana; l. c. i. 466. *Pagurus virescens*, Krauss; Sudafr. Crust. 56, pl. iv. f. 3.—Africa Austr.

C. brasiliensis, Dana, l. c. i. 467, pl. xxix. f. 7.—Brasilia.

C. Antillensis, Stm.—Ins. Antillarum.

C. corallinus. *Pagurus corallinus*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, v. 63.—Mari Pacifico.

C. obesimanus, (*Pagurus*) Dana; Proc. Acad. Nat. Sc. Philad., 1851, v. 271.—Mari Pacifico.

C. humilis, Dana; U. S. Expl. Expd., Crust. i. 469, pl. xxix. f. 9.—Mari Orientali.

C. pacificus, infra.

? Pagurus Labillardieri, Savigny; Egypt; Crust. pl. ix. f. 2.—Egypt.

Isocheles, nov. gen. Carapax antrorsum angustatus, lateribus rectis. Annulum ophthalmicum omnino celatum. Oculi elongato-cylindrici, basi contigui, corneis non dilatatis. Antennæ perbreves; aciculo robusto; flagello bene ciliato. Chelipedes æquales; manu horizontali, commisuris marginalibus, digitis acuminatis. Pedum 2di. 3tiique paris dactyli contorti. Abdominis maris scutellæ et appendices segmentorum validæ, longe hirsutæ.

Typus, I. æquimanus. *Bernhardus æquimanus*, Dana; loc. cit. i. 445, pl. xxvii. f. 6.

I. Wurdemanni, Stm.—Sinu Mexicano.

2. Abdomen maris appendicibus genitalibus præditum. Pedes 4ti paris non cheliformes.

Paguristes, Dana. (U. S. Expl. Expd. Crust. i. 436). Oculi longi. Antennæ breves, aciculo robusto. Chelipedes similes, plerumque subæquales, manûs commisuris verticalibus, digitis horizontalibus. Abdomen maris paribus duabus appendicium genitalium præditum. Abdomen fœminæ pari una appendicium ad basin præditum, et sacco ovifero instructum.

Typus, P. hirtus, Dana; loc. cit. i. 437, pl. xxviii. f. 2.—Chili.

P. tomentosus, *Pagurus tomentosus*, M. Edw.; Ann. des Sc. Nat., ser. 3tiæ, 1848, v. 64.—Chili?

P. turgidus. *Clibanarius turgidus*, Stm.; Crust. et Echin. Pacific Coast of N. Am., p. 44. Bost. Jour. Nat. Hist. vi. pl. xxi. f. 1.—Oregonia.

P. Weddelli. *Pagurus Weddelli*, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ, 1848, v. 64.—Peru.

P. maculatus. *Pagurus maculatus*, Risso; Roux; Crust. Medit., pl. xxiv. f. 1–4. M. Edw.; Hist. Nat. des Crust. ii. 231.—Mari Mediterraneo.

P. Gamianus. *Pagurus Gamianus*, M. Edw.; Hist. Nat. des Crust. ii. 235.—Promontorio Bonæ Spei.

P. setosus. *Pagurus setosus*, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ, 1848, v. 64.—Papua.

P. gonagrus. *Pagurus gonagrus*, M. Edw.; Hist. Nat. des Crust. ii. 233. —China.

P. pilosus. *Pagurus pilosus*, M. Edw.; Ann. des Sc. Nat. ser. 2dæ, vi. 282, pl. xiv. f. 1.—Nova Zelandia.

P. frontalis. *Pagurus frontalis*, M. Edw.; Ann. des Sc. Nat. ser. 3dæ, vi. 283, pl. xiii. f. 3.—Australia.

P. longirostris, Dana; loc. cit.; i. 436, pl. xxviii. f. 1.—Mari Orientali.

P. brevicornis. *Pagurus brevicornis*, Guerin.

P. depressus, Stm.—Ins. Antillarum.

P. digitalis et seminudus, infra.

b. Maxillipedes externi basi valde remoti, coxis quam articulis secundis vix majoribus. Pedes 4ti vix cheliformes.

Spiropagurus, nov. gen. Carapax depressus, post suturam transversam membranaceus; suturis cardiaco-branchialibus vitta cornea lineari corroboratis. Oculi breves, corneis dilatatis. Antennæ grandes, aciculo e basi gracili. Virgula (appendix genitalis coxæ pedum 5ti paris,) sinistra longe exserta, spiralis, compressa, membranacea; margine superiore vitta cornea firmata. Abdominis segmentum ultimum bifidum, furcis serratis.

Typus, S. spiriger. *Pagurus spiriger*, De Haan; loc. cit. 206, pl. xlix. f. 2.—Japonia.

S. dispar, Stm.—Ins. Antillarum.

Eupagurus, Brandt, restrictum. (Vide Middendorffii Sibirische Reise, Zool. i. 105). *Bernhardus*, Dana. Frons medio acuta. Annulum ophthalmicum apertum, non bracteo liferum. Antennarum aciculum elongatum, e basi gracile; flagellum longum. Maxillipedes externi sat grandes. Chelipedes disimiles, inæquales, (dexter major,) manus commisuris marginalibus, digitis horizontalibus.

Typus, E. bernhardus. *Pagurus bernhardus*, (Lin.) Fabr., M. Edw.; Hist. Nat. des Crust. ii. 215. *Pagurus streblonyx* Leach. *Bernhardus streblonyx*, Dana.—Maribus Borealibus.

E. ochotensis, Brandt; Sibirische Reise, Zool. i. 108. *Bernhardus armatus*, Dana; loc. cit. i. 442, pl. xxvii. f. 2.—Mari Pacifico Boreali.

E. chiroacanthus. *Pagurus chiroacanthus*, Liljeborg; Ofvers. af Kongl. Vet. Akad. Förhandl. xii. 118.—Skandinavia.

E. Dilwyni. *Pagurus Dilwyni*, Bate; Ann. Mag. Nat. Hist. 1851, vii. 320. —Europa.

E. Forbesii, *Pagurus Forbesii*, Bell; Brit. Crust. p. 186.—Mari Brittanico.

E. sculptimanus. *Pagurus sculptimanus*, Lucas; Expl. Alger. pl. iii.—Algeria.

E. lævis. *Pagurus lævis*, Thompson; Bell; Brit. Crust. p. 184.—Europa.

E. Hyndmanni, Thompson; Bell; Brit. Crust. p. 182.—Mari Brittanico.

E. ulidianus. *Pagurus ulidianus*, Thompson; Bell; Brit. Crust. 180.—Mari Britannico.

E. spinimanus. *Pagurus spinimanus*, Lucas; Expl. Alger. pl. iii. f. 3. —Algeria.

E. cuanensis. *Pagurus cuanensis*, Thompson; Bell; Brit. Crust. p. 178.—Mari Britannico.

E. Prideauxii. *Pagurus Prideauxii*, Leach; M. Edw.; Hist. Nat. des Crust. ii. 216.—Europa.

E. brevipes. *Pagurus brevipes*, M. Edw.; Ann. des Sc. Nat. ser. 3tiæ, 1848, v. 60.—Islandia.

E. perlatus. *Pagurus perlatus*, M. Edw.; Ann. des Sci. Nat. ser. 3tiæ, 1848, v. 60. *Bernhardus Edwardsii*, Dana; loc. cit. i. 447.—Chili.

E. obesicarpus. *Bernhardus obesocarpus*, Dana; l. c. i. 445, pl. xxvii. f. 5.—Chili?

E. Gayi. *Pagurus Gayi*, Nicolet; in Gayi Chile, Zool. iii. 190, Crust. pl. i. f. 6.—Chili.

E. villosus. *Pagurus villosus*, Nic.; in Gayi Chile, Zool. iii. 188, Crust. pl. i. f. 5.—Chili.

E. forceps. *Pagurus forceps*, M. Edw.; Ann. des Sc. Nat. ser. 2dæ, vi. pl. xiii. f. 5. Hist. Nat. des Crust. ii. 221; Nicolet; in Gayi Hist. de Chile, Zool. iii. 189.—Chili.

E. longicarpus. *Pagurus longicarpus*, Say; Jour. Acad. Nat. Sci. Philada. i. 165.—Virginia.

E. Mertensii, Brandt; Sibir. Reise, Zool. 112.—Mari Pacifico Boreali.

E. splendescens. *Pagurus splendescens*, Owen in Beechey's Voy. Zool. 81, pl. xxv. f. 1.—Mari Pacifico Boreali.

E. angulatus. *Pagurus angulatus*, Risso; M. Edw.; Hist. Nat. des Crust. ii. 217.—Mari Mediterraneo.

E. meticulosus. *Pagurus meticulosus*, Roux; Crust. de la Medit. pl. xlii.—Mari Mediterraneo.

E. alatus. *Pagurus alatus*, Fabr.; Suppl. 413.—Islandia.

E. pubescens. *Pagurus pubescens*, Kroyer; Naturh. Tidsskrift, ii. 251.—Maribus Septentrionalibus.

E. Kroyeri, Stm.—Maribus Septentrionalibus.

E. hirsutiusculus, Stm.; Bost. Jour. Nat. Hist. vi. *Bernhardus hirsutiusculus*, Dana; loc. cit. i. 443, pl. xxvii. f. 3.—Oregonia; Japonia Boreali.

E. Samuelis, Stm.; Crust. et. Echin. Pacific Coast of N. Am., p. 42.—Mari Pacifico Boreali.

E. granosimanus, Stm.—California.

E. scabriculus. *Bernhardus scabriculus*, Dana; Proc. Acad. Nat. Sci. Philada. Jan. 1852. *B. pubescens*, Dana; U. S. Expl. Exped. Crust. i. 444, pl. xxvii. f. 4.—America Australi?

E. Middendorffii, Brandt; Sibir. Reise, Zool. i. 108, pl. v. f. 1.—Mari Pacifico Boreali.

E. conformis. *Pagurus conformis*, De Haan; loc. cit. 206.—Japonia.

E. cristatus. *Pagurus cristatus*, M. Edw.; Hist. Nat. des Crust. ii. 218.—Nova Zelandia.

E. Novi-Zelandiæ. *Bernhardus Novi-Zelandiæ*, Dana; loc. cit. i. 440, pl. xxvii. f. 1.—Novi-Zelandia.

E. tenuimanus. *Bernhardus tenuimanus*, Dana; loc. cit. i. 447, pl. xxvii. f. 7.—Oregonia.

E. criniticornis. *Bernhardus criniticornis*, Dana; loc. cit. i. 448, pl. xxvii. f. 8.—Brasilia.

E. operculatus, Stm.—Florida.

E. brevidactylus, Stm.—Ins. Antillarum.

E. pollicaris. *Pagurus pollicaris*, Say; Jour. Acad. Nat. Sci. Philada. i. 162.—Virginia.

E. comptus. *Pagurus comptus*, White; Ann. Mag. Hist. i. 224.—Ins. "Falkland."

E. megalops, gracilipes, constans, pectinatus, trigonocheirus, pilosipes, angustus, Japonicus, sinuatus, tricarinatus, et acantholepis, infra.

E. rubrovittatus. *Pagurus rubrovittatus*, Lucas; Expl. Alger.—Algeria.
? *Pagurus lanuginosus*, De Haan; loc. cit. 207, pl. xlix. f. 5.—Japonia.
? *Pagurus Gaudichaudi*, M. Edw.; Hist. Nat. des Crust. ii. 188.—Chili.
? *Pagurus pictus*, M. Edw.; Hist. Nat. des Crust. ii. 220.—Gallia.
? *Pagurus pustulatus*, M. Edw.; Ann. des. Sc. Nat. ser. 3tiæ, 1848, v. 60.—Gorea.

ÆGLEIDEA. Genus unicum ÆGLEA;—conf. Dana; U. S. Expl. Exped., i. 476.

SYNOPSIS GALATHEIDEORUM.

GALATHEA, Fabr., Desmarest. (Consid. sur les Crust. p. 188.) Maxillipedes externi mediocres, articulis ultimo penultimoque non dilatatis. Frons rostrata, rostro triangulari.

Typus, G. strigosa, Fabr., M. Edw.; Hist. Nat. des Crust. ii. 273. *Cancer strigosus*, Lin.—Europa.

G. squamifera, Leach, M. Edw.; Hist. Nat. des Crust. ii. 275. *Cancer squamifer*, Montagu. *G. Fabricii*, Leach.—Europa.

G. nexa, Embleton, Bell; Brit. Crust. p. 204.—Mari Britanico.

G. Andrewsi, Kinahan; Nat. Hist. Review, iv. 228, pl. xvi. f. 8.—Mari Hibernico.

G. tridentata, Esmark; Forhandl. ved de Skandinaviske Naturforskeres synvende möde, i. 239.—Skandinavia.

G. intermedia, Liljeb.; Ofvers. af k. Vet.-Akad. Förh. 1851, p. 21.—Skandinavia.

G. serricornis, Lovên; Ofvers. af k. Vet.-Akad. Förh. 1852, p. 22.—Skandinavia.

G. monodon, M. Edw.; Hist. Nat. des Crust. ii. 276.—Chili.

G. latirostris, Dana; loc. cit. i. 480, pl. xxx. f. 8.—Mari Pacifico.

G. spinosirostris, Dana; l. c. i. 480, pl. xxx. f. 9.—Ins. Hawaiensium.

G. vitiensis, Dana; l. c. i. 481, pl. xxx, f. 10.—Mari Pacifico.

G. longirostris, Dana; l. c. i. 482, pl. xxx, f. 11.—Mari Pacifico.

G. elegans; White; Voy. Samarang, Crust. pl. xii. f. 7.—Ins. Phillipinis.

G. integrirostris, Dana; l. c. i. 482, pl. xxx, f. 12.—Ins. Hawaiensium.

G. Australiensis, labidolepta, orientalis, acanthomera, pubescens, subsquamata et grandirostris, infra.

MUNIDA, Leach; Desmarest. (Consid. sur les Crust. p. 190.) Maxillipedes externi eis *Galatheæ* similes. Frons tricuspis.

Typus, M. bamffia, White; Cat. Brit. Crust. 1850, p. 30. *Astacus Bamffius*, Pennant. *Galathea rugosa*, Fabr., M. Edw. *G. longipeda*, Lam'k. *Munida rugosa*, Leach. *Munida Rondeletii*, Bell.—Mari Britanico.

M. subrugosa, Dana; loc. cit., 1, 479, pl. xxx. f. 7. *Galathea subrugosa*, White.—Mari Antarctico.

M. Japonica, infra.

GRIMOTHEA, Leach, M. Edw. (Hist. Nat. des Crust. ii. 277.) Maxillipedes externi elongati, articulis ultimo penultimoque dilatatis.

Typus, G. gregaria, Leach; M. Edw.; Hist. Nat. des Crust. ii. 277. *Galathea gregaria*, Fabr.—Mari Pacifico.

Index Specierum Expeditionis.

DROMIDEA.

276. DROMIDIA SPONGIOSA, nov. sp. Parva. *Fœminæ* corpus pedesque dense spongioso-tomentosa. Carapax inequalis, puteis in tomentum excavatis. Su-

perficies sub tomento glabra. Frons valde deflexa, triangularis, acuta, longitudinaliter profunde canaliculata, ut videtur bicuspis; marginibus levibus, flexuosis, ad angulos internos orbitarum parce 1-dentatis. Margines orbitarum non dentati, sed angulis externis fissi. Margo antero-lateralis valde convexus, integer. Maxillipedum externorum merus margine antico minus quam in *D. hirsutissima* obliquus. Chelipedes mediocres, superficie læves; manu sat brevi, digitis non deflexis, intus dentatis, basi excepta nudis. Pedes penultimi brevissimi, compressi, extremitatibus truncati; pedes ultimi longiores et graciliores. Abdomen medio obtuse carinatum, utrinque canaliculatum; segmento ultimo magno, quam penultimus dimidia longiore; appendicibus penultimi celatis. Color viventium ruber. Carapacis long. 0·42; lat. 0·52 poll.

Hab.—Prope Promontorium Bonæ Spei; in fundo saxoso prof. 20 org.

277. Dromidia excavata, nov. sp. Descr. fœminæ jun. Pubescens. Carapax valde convexus, æqualis, lateribus fere parallelis; regionibus hepaticis antice excavatis. Frons parva, profunde excavata vel bifida, et dente mediano acuto inferne instructa. Dens supra-orbitalis parvus. Angulus orbitæ externus non dentiformis. Margo antero-lateralis edentatus, angulo hepatico excepto. Sulcus lateralis profundus, dentem lateralem sat validum formans. Maxillipedum externorum merus margine antico obliquus, angulo externo obtusus. Chelipedes parvi, angulosi, superficiebus læves; dente carpi superiore valido; manu edentata extus setis seriatis ornata, digitis compressis quam palma vix brevioribus. Abdomen obtuse carinatum. Pilus superficiei inferioris densus, quasi excavatus, setis longioribus segmenta abdominis et pedum circumdantibus. Carapacis long. 0·37; lat. 0·35 poll.

Hab.—In portu Jacksoni Australiæ; inter spongias e prof. sex org.

278. Cyyptodromia coronata, nov. sp. *Maris adulti* carapax latior quam longior, æqualiter convexus, subtiissime asperus, breviter pubescens; sulco distincto. Frons perlata, quinque-dentata, dentibus superocularibus inclusis;—dentibus fere æqualibus, validis, conicis, subacutis. Dens infra-orbitalis dentes frontales fere æquans. Margo antero-lateralis quinque-dentatus, dente secundo subhepatico; dentibus tertio et quarto validis, bilobatis, lobo antico acuto, postico late rotundato. Pedes nodosi, nodis validis parum numerosis, interstitiis reticulatis. Chelipedes æquales, digitis valde hiantibus, apicibus dentatis; dactylo leviter compresso extus concavo. Pedes ultimi quam penultimi multo longiores. Abdomen latum; segmento ultimo multo latiore quam longiore; segmento penultimo augustiore; tertio quartoque singulo quadrispinosis, spinis brevibus; quinto parce bispinoso. Color luteus, interdum fuscomaculatus. Digiti rosei. Carap. long. 0·525; lat. 0·56.

Hab.—Ad insulas "Bonin;" inter madreporas ad prof. pedum sex.

279. Cryptodromia lateralis. *Dromia lateralis*, Gray; Zool. Misc. p. 40.—In portu "Jackson" Austr.; inter rupes et spongias, prof. 1–6 org.

280. Cryptodromia tuberculata, nov. sp. Carapax latus, lævis, vix pubescens. Frons lata parum prominens, quinque-dentata, dentibus supra-ocularibus inclusis;—dentibus subæqualibus, obtusis, dente mediano solum sat acuto. Margo lateralis quadridentatus, dentibus duobus anticis hepaticis, validis tuberculiformibus, dente primo ab angulo orbitæ sat remoto, dente tertio elongato non prominente, quarto ad sulcum. Regio subhepatica serie arcuata dentium armata, et dentibus duobus ad angulum antero-lateralem areæ buccalis. Chelipedes valide tuberculati, tuberculis conicis, tribus magnis et decem parvis in carpo, 20 ad 25 magnitudine variabilibus in manu plerumque in ejus facie externa. Manus intus dense tomentosa. Digiti maris hiantes, valde compressi. Pedes 2di 3tiique verrucosi v. dentati; carpo superne 4–5 dentato. Abdominis fœminæ segmenta tertium quartum quintumque tuberculata, singulo tuberculis quatuor, in serie transversa; duobus medianis, duobus lateralibus. Abdomen maris minus tuberculatum. ♂ Carap. long. 0·43; lat. 0 52 poll.

Hab.—In freto "Gaspar;" ad insulam "Kikaisima," et in sinu "Kagosima;" litoralis inter lapides.

281.—Cryptodromia tumida, nov. sp. Carapax lævis, breviter pubescens, convexus, regionibus gastrica et hepaticis valde tumidus, post frontem abruptus. Frons ei *C. tuberculatæ* similis, sed dentibus lateralibus quam medianus magis prominentibus. Margo antero-lateralis dentibus tribus parvis æqualibus tuberculiformibus armatus; dente primo ab angulo orbitæ, tertio a sulco laterali,—sat remoto. Regio subhepatica tuberculo uno valido post angulum orbitæ, unoque ad angulum areæ buccalis, ornata. Chelipedes sparsim verrucosi, carpo 3–4 tuberculato; manu superne fere quadri-tuberculata, extus lævi vel obsolete granulata, granulis seriatis; digitis *maris* valde hiantibus, *fœminæ* compressis non hiantibus. Pedes 2di 3tiique forte angulosi, vix verrucosi; carpi margine superiore intus dilatato, valde convexo, lævi. Color luteus; digitis medio roseis. ♂ Carap. long. 0·38; lat. 0·45 poll.

Hab.—In sinu "Fou-kow," insulæ "Ousima."

282. Cryptodromia canaliculata, nov. sp. Carapax convexus, pubescens fere hirsutus, inæqualis, juxta margines frontales et antero-laterales canaliculatus, canaliculo fere nudo. Sulcus gastro-cardiaca sat profunda. Frons prominens, dentibus tribus medianis acutis, dentibus supra-ocularibus parvulis. Angulus orbitæ externus acutus. Dens suborbitalis valde prominens. Margo antero-lateralis dentatus, inter orbitam et dentem primum concavus, carinatus; dente primo valido, acuto, secundo mediocre, tertio ad sulcum sito. Regio subhepatica antice concava, area carinis bene circumscripta, angulis dentiformibus. Pedes hirsuti. Chelipedes iis *C. tumidæ* similes, manu sæpius superficie exteriore seriato-granulatus. Pedes 2di 3tiique subverrucosi, carpo superne fere concava. Abdomen læve. ♀ Carap. long. 0·31. lat. 0·36 poll.

Hab.—In freto "Gaspar" et ad insulas "Loo-choo" et "Kikaisima;" inter rupes algosos, littoralis vel sublittoralis.

283. Dromia Rumphii, Fabr., M. Edw.; Hist. Nat. des Crust. ii. 174. De Haan; Fauna Japon. Crust. pl. xxxii.—In portu "Hong Kong;" in fundo limoso prof. 4–10 org.

284. Pseudodromia latens, nov. sp. Descr. maris (jun.?). Corpus breviter pubescens, marginibus subciliatis. Carapax angustus, elongatus, convexus, lævissimus; antice contractus, post sulcum paullo dilatatus. Margines laterales læves. Frons valde angusta, triangularis, fere rostriformis, apice setosa, obscure tridentata. Dens supra-ocularis fere obsoletus. Orbita extus subtusque absque dentibus. Frons septo inter antennulari disjuncto, hiatu angusto. Chelipedes læves, digitis acute dentatis. Pedes 2di 3tiique læves, unguiculis longis acutis. Abdomen maris longum, extremitate acuminatum. Color pallide fulvus. Carap. long. 0·38; lat. 0·27; pedum 5ti paris long. 0·39 poll.

Hab.—In sinu "Simon's Bay" ad Promontorium Bonæ Spei; fundo arenoso prof. 12 org.

285. Petalomera granulata, nov. sp. Carapax modice convexus, sparsim sed valide granulatus. Frontis dens medianus inferior minutus; denes laterales grandes valde prominentes. Dens supra-ocularis parvus. Fissura orbitalis externa clausa. Margo antero-lateralis dentibus tribus parvis inconpicuis inter angulum orbitæ et sulcum lateralem armatus, dente primo subhepatico. Pedes sex antici granulati, quatuor postici læves. Chelipedes cristali, cristis carpi manûsque granulatis, apice tuberculigeris. Digiti breves, non hiantes, extremitatibus corneis in lateribus externis colliculis definitis. Color aurantius, rubro-maculatus. ♂ Carap. long. 0·36; lat. 0·33 poll.

Hab.—In sinu "Kagosima" Japoniæ; fundo conchoso, prof. 20 org.

286. Conchœcetes artificiosus. *Cancer artificiosus,* Herbst; Naturg. d. Krab-

ben und Krebse, iii. 54: pl. lviii. f. 5.—In portu "Hong Kong" Sinensi;—in valvis generis *Cytheræ* e fundo conchoso prof. 8–10 org.

RANINIDEA.

287. COSMONOTUS GRAYII, Adams et White; Voy. Samarang, Crust. p. 60; pl. xiii. f. 3.—In mari prope promontorium borealem insulæ Formosæ; e fundo arenoso ad prof. 90 org.

PORCELLANIDEA.

288. PETROLISTHES SPECIOSUS. *Porcellana speciosa*, Dana; U. S. Expl. Exped., Crust. i. 417. pl. xxvi. f. 8.—In portu "Hong Kong," in sinu "Kagosima," et ad insulas "Ousima" et "Bonin;" litoralis, rupicolus, sub lapidibus invenitus.

289. PETROLISTHES PUBESCENS, nov. sp. Corpus pedesque superne pubescentia; margines ciliati. Carapax subovatus, parce longior quam latior; lateribus non cristatis, obtuse rotundatis, spina minuta post orbitam armatis. Frons paullum trilobata; lobo mediano magno, obtuso, prominente; triangulari; lateralibus minutis. Maxillipedum externorum ischium apice externo non productum. Chelipedes superne læves, partim subtiliter spinulosi. Margo carpi anticus 5–6 dentatus, dentibus magnitudine variabilibus, majoribus denticulatis; margo posticus sparsim spinosus. Margo exterior dactyli denticulatus. Pedum ambulatoriorum merus margine superiore spinulosus. Color viventium cæruleo-albus, purpureo-maculatus. ♂ Carapacis long. 0·31; lat. 0·295; manûs majoris long. 0·46; lat. 0·19 poll. Affinis *P. tomentosæ*, (Dana,) sed carapace latiore, magis depresso et æquali; maxillipedibus externis transversim striatis; margine externo manûs et meri ped. amb. toto spinuloso.

Hab.—In sinu "Fu-kow" insulæ "Ousima"; littoralis inter rupes.

290. PETROLISTHES HASTATUS, nov. sp. Carapax depressus, medio lævis, antice et lateraliter transversim striatus; lateribus vix cristatis, post orbitas non spinigeris. Frons bene triangulata, prominens. Maxillipedum externorum ischium apice externo non productum. Chelipedes æqualiter depresso-granulati. Carpus antice 3-4-dentatus, dentibus elongatis parum prominentibus; margine posteriore non spinuloso, sed extus valde producto vel hastigero. Pedum ambulatoriorum merus superne sparsim spinulosus. Color viventium olivaceus, subtiliter albo-maculatus. ♀ Carap. long. 0·47; lat. 0·46 poll.

Hab.—Ad insulas "Ousima" et "Kikaisima"; littoralis in portibus.

291. PETROLISTHES JAPONICUS. *Porcellana Japonica*, De Haan; loc. cit. 199, pl. l, f. 5.—In portu "Simoda" Japoniæ, et ad insulas "Bonin", "Kikaisima" "Amakirrima". Etiam ad oras Sinenses.

292. RAPHIDOPUS CILIATUS, nov. sp. Margines corporis pedumque dense et longe ciliati. Carapax pubescens, leviter areolatus, transversim rugatus, retrorsum utrinque breviter transversim cristata. Margo lateralis valde convexus, post antennam fissus, medio bi-denticulatus. Frontis dentes parvi, medianus prominentior. Antennarum articulus primus valde elongatus; pars mobilis orbita remota. Regiones carapacis latero-inferiores forte striati, striis subdistantibus. Chelipedes grandes, angulares, valde hirsuti; mero quam carpus vix tertia parte breviore, superne aspero, inferne spina longa armato; carpo quam manus tertia parte breviore, superne aspero, medio longitudinaliter uni-costato, costa spinulata; margine carpi anteriore non dilatato, leviter concavo, serrulato; margine carpi posteriore convexo, 5-spinuloso; manu elongato-subtriangulari, superne paullo tricostata, costis asperis; digitis palma longioribus, non hiantibus, intus subtiliter denticulatis, apicibus valde curvatis decussantibus; manûs majoris dactylo superne subscristato, digito immobili intus dente valido mediano armato. Pedes ambulatorii graciles, leviter compressi, mero non dilatato; dactylis longis rectis acutis non unguiculatis. Carapacis long. 0·30; lat. 0·39; manûs majoris long., 0·50 poll.

Hab.—In portu "Hong Kong" Sinensi; fundo limoso prof. sex org.

293. PACHYCHELES PECTINICARPUS, nov. sp. Carapax latus, glaber, medio paullo depressus, lateribus obsolete striatus, sinu posteriore lævi. Lobulæ protogastricæ sat prominentes. Frons parum prominens, pubescens. Chelipedes granulati, non sulcati; granulis magnitudine variabilibus, majoribus interdum subseriatis. Carpus multo latior quam longior, margine antico convexus, dentibus octo parvis æqualibus spiniformibus pectinatus. Manûs majoris digiti hiantes, intus pubescentes. Unicolor, lacteo-flavus. Carap. long. 0·30; lat. 0·345; manûs maj. long. 0·37; lat. 0·225 poll.

294. PACHYCHELES STEVENSII, nov. sp. Carapax late ovatus, non areolatus, antrorsum paullo obsolete granulatus, medio glaber, punctatus, lateribus leviter transversim striatus, sinu posteriore non profundo, late rotundato. Frons sat prominens, subtriangularis, parce pubescens. Chelipedes robusti, granulati; majoris mero transversim striato; carpo lato, margine anteriore tridentato, dentibus prominentibus, truncatis, denticulatis, dente interno bifido; manu granulata, granulis magnis lobulatis, valde prominentibus; digitis non hiantibus; digito immobili triangulato, intus basi parce pubescente. Chelipedis minoris carpus antice convexus, prominens, leviter tridentatus; manus longitudinaliter bisulcata; digiti non tomentosi. Pedes ambulatorii sparsim setosi, setis brevibus robustis; dactylis robustis, unguiculis multo curvatis. ♀ Carap. long. 0·50; lat. 0·525; manûs maj. long. 0·64; lat. 0·36 poll.
Hab.—Ad oras occidentales insulæ "Jesso," Japoniæ.

295. PORCELLANA ORNATA, nov. sp. Carapax subovatus, antice areolatus, lobulis protogastricis et hepaticis prominentibus. Margines laterales cristati, vix denticulati. Orbita in margine superiore profunde excavata. Regio frontalis profunde canaliculata. Frons subtriangularis, utrinque excavata, dente mediano valde prominente, lateralibus obsoletis; margine subtiliter denticulata. Chelipedes fere æquales, sat lati et depressi, superne costis inequaliter tuberculatis insculpti, inferne obsolete squamulati; carpo oblongo-quadrato, longitudinaliter bi-costato, margine antico recto et lævi, lobula parvula denticulata interna excepta; margine carpi postico denticulato. Manus lata, depressa, costa mediana paullo prominente, margine externo lævi, acuto, ciliato; digitis brevibus non contortis, non hiantibus, dactylo paullo longiore. Pedes ambulatorii subpilosi. ♂ Carap. long. 0·26; lat. 0·235; manûs long. 0·36; lat. 0·18 poll.
Hab.—In portu "Hong Kong."

296. PORCELLANA SERRATIFRONS, nov. sp. Carapax depressus, non longior quam latior, fere lævis, glaber, interdum partim pubescens, lateraliter leviter striatus, antice contractus, postice late rotundatus. Margines cristati, medio 1–2 denticulati, et prope antennarum insertionem bi-spinulosi. Angulus orbitæ externus acutus. Frons tridentata, dentibus prominentibus, triangularibus, dente mediano majore sed quam laterales vix prominentiore; margine spinulis serrato. Antennarum pedunculi spinuligeri. Maxillipedes externi transversim striati, mero quam ischium longiore. Chelipedes maris glabri, punctati; meri angulo prominente, bi-denticulato; carpo utrinque tridentato, (interdum antice quinque-dentato,) dentibus parvulis, terminalibus acutis; manûs costa vel angulo mediana generaliter minus prominente, obtuso; digitis contortis, intus pilosis. Manus minor margine externo spinulosus; digiti immobilis extremitate profunde bifida. Manus fœminæ extus pubescens; crista mediana tuberculata. Pedes ambulatorii setosi. ♀ Carap. long. 0·32; lat. 0·32; manûs maj. long. 0·53; lat. 0·19 poll.
Hab.—In portu "Hong Kong."

297. PORCELLANA DISPAR, nov. sp. Carapax paullo inequalis, glaber, lateribus pubescens. Margo lateralis prope medium bidenticulatus, et supra antennæ insertionem spinula armatus. Marge orbitalis superior minus concavus. Frons superne visa fere recta, parce convexa, medio acute deflexa; angulis internis orbitarum vix prominentibus. Chelipedes valde inæquales; major lævis; carpo

medio angulato, margine antico undulato; manu lata nuda, non contorta; digitis punctatis, dactylo curvato, intus unidentato. Manus minor valde angularis, angulo mediano acuto; margine externo pubescente; digitis valde contortis et curvatis intus excavatis lanosis. Chelipedis minoris carpus margine antice bidentatus, dentibus obtusis. Color pallide coccineus; digitis purpureis. ♂ Carap. long. 0·24; lat. 0·22; manûs maj. long. 0·38; lat. 0·18 poll.

Hab.—In portu Jacksoni vel "Sydney" Australiæ; littoralis sub lapidibus.

298. Porcellana latifrons, nov. sp. Carapax subquadratus, longior quam atior, paullo convexus, lævis. Lineæ marginales distinctæ, sed non cristiformes, medio 3–4 spinulis armatæ, et spina acuta antrorsum porrecta supra antennam. Regio frontalis minute rugulosa. Frons latissima, laminata, trilobata, lobo mediano non prominentiore, quadridentato, lobis lateraliter bidentatis. Oculi grandes, lateraliter porrecti. Antennæ flagellum fere nudum, articulo primo longo. Maxillipedes externi graciles elongati. Chelipedes fere læves, superne obsolete reticulati; carpo magno, utrinque tridentato, dentibus parvis; manu serie spinularum submarginali armata; digitis contortis, intus tomentosis. Manûs majoris digiti intus unidentati; minoris digiti intus excavati. Color variabilis, obscuro-viridis, variegatus. ♂ Carap. long. 0·25; lat. 0·22 poll. *P. armatæ*, Danæ (non Gibbesii) valde affinis, (an differt?) sed fronte paullo latiore, medio quadridentata et minus depressa.

Hab.—In portu "Hong Kong" vulgaris; et ad insulam "Ousima"; e prof. 1–4 org. accepta.

299. Porcellana streptocheles, nov. sp. Corpus membraque superne nuda. Carapax vix æqualis sed regulariter parce convexus, lævis, glaber, obsolete transversim lineolatus, lobulis protogastricis prominentibus. Margines laterales convexi, acuti, medio irregulariter denticulati, denticulis duobus majoribus. Frons nec lata nec prominens, profunde tridentata, dentibus acutis, dente mediano deflexo, parce majore sed non quam laterales prominentiore, basi utrinque un-denticulato. Maxillipedes externi graciles, ischio mediocre. Oculi parvi. Chelipedes grandes, inæquales; meri apice dentiformi valde prominente; carpo lævi, utrinque obsolete 2–3 dentato; manu medio angulari; manu minore margine externo obsolete denticulata; digitis manûs minoris quam majoris magis contortis, intus late excavatis et pilosis; dactylo quam digitus immobilis breviore, intus bidentato; digito immobili unidentato, extremitate emarginato. Pedum ambulatoriorum merus gracilis, superne læviusculus. Color ruber. ♂ Carap. long. 0·23; lat. 0·215 poll. A *P. Dehaani* differt carapace nudo, fronte latiore, dente mediano minus prominente; et margine super-antennario non denticulato.

Hab.—In sinu "Simon's Bay" ad Promontorium Bonæ Spei; in fundo arenoso prof. 6–12 org.

300. Porcellana pulchra, nov. sp. Carapax sat convexus, æqualis, lævis, obsolete lineolatus, cæruleo-fuscus, longitudinaliter albo-univittatus. Margo lateralis convexus, cristatus, crista laminata paullo resupinata. Frons valde prominens, laminata, tridentata; dente mediano majore, acute-triangulato; dentibus lateralibus parvis sed acutis. Angulus orbitæ externus acutus, subtiliter serratus. Antennæ flagellum fere nudum, articulis oblongis. Regiones latero-inferiores paullo concavæ. Chelipedes parvi graciles, medio longitudinaliter angulati; meri apice valde prominente; carpi margine antico unidentato; manu triangulari, basi gracile, margine externo fere recta, acuta, ciliata. Pedes ambulatorii parum pilosi, setis plumosis; mero superne serrulato; dactylo longitudine dimidiam articuli penultimi adequante. Pedum posticorum merus brevis. ♀ Carap. long. 0·24; lat. 0·23 poll.

Hab.—In portu "Hong Kong"; fundo limoso, prof. sex org.

301. Porcellanella picta, nov. sp. Carapax oblongus, æqualis, lævis, glaber, antice et lateraliter leviter striatus; colore albus, antice maculis cæruleis, marginatis ornatus. Margo lateralis integer, vix acutus. Sutura infero-lateralis

margini approximata. Frons horizontalis, laminata, valde prominens, tridentata, dentibus acutis, dente mediano majore et magis prominente. Antennæ carapace pilus duplo longiores; articulo primo intus acuto prominente. Epimera oblique striato. Chelipedes sat graciles, crassi, obtusi, læves, glabri, albi, cæruleo-maculati; angulis anticis meri ischiique productis acutis; carpo parvo, marginibus lævi; manu elongata, basi contracta, intus linea tomentosa longitudinali ornata, intra digitos oriente; digitis gracilibus minuentibus, quasi distortis; dactylo manûs majoris quam digitus immobilis multo breviore. Pedes ambulatorii parvi læves, glabri, vix setosi; dactylo intus quadri-unguiculato, unguiculis medianis majoribus. Abdominis segmenti ultimi pars mediana triangularis parva, partes laterales grandes. ♂ Carap. long. 0·425; lat. 0·34; manûs maj. long. 0·59; lat. 0·20 poll.

Hab.—In portu "Hong Kong"; inter laminas *Pennatularum* e fundo argillaceo prof. sex org. acceptarum.

302. Polyonyx sinensis, nov. sp. Carapax convexus, subquadratns, angulis rotundatus, pallide griseus, obscuro-maculatus. Frons sat lata, leviter convexa. Chelipedes valde inæquales, læves, crassi; chelipedis majoris mero dimidiam carpi superante, antice non dilato; carpo quam manu vix breviore, margine antico dilatato: manu crassa, extus breviter ciliata, intus ad medium sparsim pilosa; dactylo quam digitus immobilis breviore; digitis brevibus, intus leviter unidentatis, apicibus hamatis. Pedes ambulatorii nudi; articulo penultimo subtus 1–2 spinuloso; dactylo tri-unguiculato, unguiculo terminali multo majore. Carap. long. 0·15; lat. 0·20; chelipedis maj. long. 0·52 poll.

Hab.—In mari Sinensi, lat. bor. 23°; e fundo conchoso-arenoso prof. 26 org. acceptus.

Hippidea.

303. Remipes testudinarius, Latreille; Gen. Crust. et Ins., v. i. p. 45. M. Edw.; R. Anim. Crust. pl. xlii. f. 1.—Ad oras insulæ "Ousima"; sublittoralis.

304. Mastigopus gracilis, nov. sp. Carapax perconvexus, æqualis, lineolis brevibus, transversis, crenulatis, breviter setosis exasperatus; antrorsum quam retrorsum magis asper. Frons tridentata, dentibus acutis, mediano triangulari, lateralibus gracilibus quam medianus longioribus. Margo antero-lateralis sexdentatus, dentibus spiniformibus, retrorsum minuentibus. Oculi graciles et dimidiam antennularum longitudine superantes. Antennulæ tertiam partem carapacis longitudine adequantes. Maxillipedes externi oblongi, fere rectangulares, dimidia parte longiores quam latiores, superficie plani glabri, sparsim punctati. Chelipedum articuli penultimus et antepenultimus cylindrici, læves, fere nudi; dactylus carapace longior, setosus, 12-articulatus, articulis elongatis. Pedes 2di 4ti modice hirsuti, dactylis eis *Remipedis* similibus. Abdominis segmentum ultimum lanceolatum, crassum, medio longitudinaliter sulcatum et versus basin bi-carinatum; extremitate acuminatum. Carapax olivaceus postice transversim albo-fasciatus. ♂ Carap. long. 0·52; lat. 0·36; chelipedis long. 1·05 poll.

Hab.—In mari Sinensi, lat. bor. 23°; in fundo conchoso ad prof. 20 org. vulgaris.

305. Hippa analoga, Stm.; Crust. et Echin. Pacific Coast of N. Am., p. 46; *H. talpoidea*, Dana; Proc. Acad. Nat. Sci., Philad. vii. 175.—California.

Lithodidea.

306. Echidnocerus cibarius, White; Proc. Zool. Soc, 1848, p. 47. Annulosa, pl. ii. iii.—In portu "Sitka."

307. Echidnocerus setimanus, Stm.; Crust. et Echin., etc. p. 37. *Ctenorhinus setimanus*, Gibbons.—California.

308. HAPALOGASTER DENTATUS. *Lomis dentata*, De Haan; Fauna Jap. Crust., 219, pl. xlviii. f. 2.—In sinu "Hakodadi" insulæ "Jesso" vulgaris; litoralis inter lapides algosos. Etiam in portu "Simoda."

PAGURIDEA.

309. CENOBITA PURPUREA, nov. sp. Carapax convexus, antice turgidus, fronte valde contractus; regione gastrica granulata, granulis antrorsum sparsis, retrorsum magis confertis, acutis et setigeris. Regiones branchiales minus prominentes marginibus fere rectis. Oculi valde compressi, superne subtiliter granulati, apicibus acute prominentibus sub angulo recto. Squamulæ ophthalmicæ acutæ non denticulatæ. Pedes marginibus sat pilosi, subtus extremitates versus dense hirsuti; superficie superiore plerumque læves, marginibus et extremitatibus spinulosis exceptis. Manus major spinulosa vel acute granulata, granulis parvulis, nigro-acuminatis, superne numerosis, extus sparsis. Dactyli pedum ambulatoriorum spinulosi et pilosi; ei lateris recti paullo depressi sed non angulati. Pedis sinistri tertii paris carpus angulo inferiore productus; articuli ultimus et penultimus extus vix convexi, læves, punctati; dactylus intus valde convexus, et spinulosus. Coxæ pedum posticorum maris valde productæ; recta longior, pedes 4ti paris longitudine adequante; sinistra prope extremitatem abrupte angustata, vel margine externo excisa. Anim. long. 4; carap. long. 1·5; regionis gastricæ long. 0·96; frontis lat. 0·31; regionis branchialis lat. 0·87 poll. *C. perlatæ*, De Haan, (an M. Edw.?) affinis, sed pedibus setosis, et pede tertio sinistro extus lævi.

Hab.—Ad insulas "Bonin" et "Amakirrima."

310. CENOBITA RUGOSA, M. Edw.; Hist. Nat. des Crust., ii. 241. De Haan; loc. cit. 212. Dana; loc. cit. i. 471. *C. clypeata*, Owen.—Ad insulas "Bonin" et "Tahiti."

311. CENOBITA CAVIPES, nov. sp. Regio gastrica quam cardiaca vix longior. Regiones branchiales angulis posticis valde salientes, lateribus paullo concavæ. Regio gastrica vel anterior superficie fere planata, medio punctata, lateribus scabricula et setosa. Frons contracta, dentibus lateralibus acuminatis. Oculi longi, compressi, superne scabriculi, apicibus obtusi. Squamulæ ophthalmicæ acutæ, marginibus integris. Pedes fere nudi, superne fere læves, versus extremitates spinulosi. Manus major superficie externa superne granulata, inferne lævissima; granulis albis, oblongis, depressis, superioribus nigro-apiculatis exceptis. Dactylus pedis tertii recti fere cylindricus. Pes tertius sinister angularis; articulo penultimo superficie externa postice convexo et subtiliter granulato, antice lævi et paullo concava, superficie superiore planata, antice angulo prominente e latere separata, margine inferiore postice concavo, antice convexo; dactylo quadriangulato, extus lævi et versus basin profunde concavo, angulis internis spinulosis. Coxæ pedum posticorum maris non productæ. Anim. long. circiter 3; carap. long. 0·95; regionis gastricæ long. 0·50; frontis lat. inter apices dentium 0·22; carap. lat. ad regiones branchiales 0·66 poll. A *C. compressa*, M. Edw., differt marginibus branchialibus non convexis. A *C. rugosa* differt coxis pedum posticorum maris non productis.

Hab.—Insula "Loo Choo."

312. DIOGENES CUSTOS, Dana. *Pagurus custos*, Fabr., M. Edw.: Hist. Nat. des Crust., ii. 236.—In portu "Sydney" Australiensi.

313. DIOGENES BREVIROSTRIS, nov. sp. Carapax fere lævis, sed lateribus scabriculus, marginibus antice 5–6 spinulosus. Rostrum mobile marginibus integrum, quam squamulæ ophthalmicæ brevius. Frontis dentes obtusi, laterales magis prominentes. Squamulæ ophthalmicæ et aciculum antennarum iis *D. Edwardsii* similes. Chelipes grandis nudus, superne granulatus, granulis minutis, subspiniformibus; superficie inferiore glaber, obsolete granulatus; carpi manûsque margine superiore serrato, dentibus minutis, (decem in carpo); manu margine inferiore acute granulata, crista obliqua faciei exterioris 7–8 spinulosa; dactylo superne costato, costis granulatis. Chelipes dexter vel minor pilosus,

margine superiore spinulatus, spinulis acutissimis. Pedes 2di 3tiique graciles chelipedem majorem superantes; articulo antepenultimo margine denticulato; penultimo superne fere lævi; dactylis compressis, hirsutis. Anim. long. 1·25; carap. long. 0·29; frontis lat. 0·135; chelip. mag. long. 0·45 poll. A *D. custode* differt rostro breviore, integro.

Hab.—In sinu "Simon's Bay" ad Promontorium Bonæ Spei; in fundo arenoso prof. 12 org.

314. Diogenes edwardsii. *Pagurus Edwardsii*, De Haan; loc. cit., 211, pl. 1, f. 2. Specimina tota quæ observavi actiniam parasiticam in manu sinistra sitam gerunt.—In mari Sinensi, lat. bor. cireiter 23°; in fundo arenoso prof. 20–30 org. Etiam in portu "Hong Kong."

315. Diogenes penicillatus, nov. sp. Frontis dens medianus obtusus, rotundatus; dentes laterales acuminati, quam medianus magis prominentes. Rostrum mobile acutissimum, spiniforme, apices squamularum ophthalmicarum vix attingens. Oculi longitudine quam frontis latitudo tertia parte breviores, sed pedunculum antennarum paullo superantes; corneis non dilatatis. Squamulæ ophthalmicæ latæ, extus subarcuatæ, apice 2–3 spinulosæ. Antennarum flagellum inferne ciliatum. Chelipes sinister robustus, formâ fere ut in *D. Edwardsii;* mero trigono, marginibus totis crenulatis; carpo manuque extus acute granulatis vel spinulosis, intus depresso-granulosis; carpo margine superiore 10–12 denticulato; manu extus pilis tenuibus densis penicillata, area pilosa postice crista transversa denticulata terminata; manu superne spinulis bi-seriatis armata. Chelipes rectus sparsim pilosus. Pedes ambulatorii eis *D. Edwardsii* fere similes. Long. 1; carap. long. 0·26; frontis lat. 0·13; chelipedis grandis long. 0·34 poll. A *D. spinifronte*, pedibus pilosis differt.

Hab.—In mari Pacifico prope oras orientales insulæ "Niphon," lat. bor. 38°; e fundo arenoso prof. 30 org. acceptus.

316. Pagurus asper, De Haan; (non M. Edw.) loc. cit., 208, pl. xlix. f. 4. Dana; loc. cit., i. 450.—Ad insulam "Ousima"; littoralis, inter lapides.

317. Pagurus difformis, M. Edw.; Ann. des Sc. Nat., ser. 2dæ, vi. 272, pl. xiii. f. 4.—Ad insulam Ousima.

318. Pagurus sculptipes, nov. sp. Carapax glaber, nudus. Oculi longitudine frontem adequantes, sed extremitatem pedunculi antennularum vix attingentes. Squamulæ ophthalmicæ prope apicem 4-spinulosæ, spinulis æqualibus. Antennarum pedunculus oculis brevior, aciculum parvum, gracile. Pedes longe pilosi, superne breviter spinulosi. Manus sinister articulum ped. amb. penultimum vix superans; marginibus æqualiter crenulatis; superficie inferiore lævi. Pedis amb. tertii sinistri articuli ultimus penultimusque lati, extus profunde excavati, superficie transversim eleganter sulcati, medio longitudinaliter costati, marginibus crenulati, et ciliati. ♂ Long. 1·5; carap. long. 0·34; frontis lat. 0·165 poll. Facies *P. punctulati.* A *P. setifero* differt pede sinistro extus transversim striato.

Hab.—In sinu "Kagosima" Japoniæ.

319. Pagurus punctulatus, Oliv.; Dana; loc., cit., i. 451, pl. xxviii. f. 4—In freto "Gaspar," et ad insulam "Loo Choo;" sublittoralis.

320. Pagurus striatus, Latr.; M. Edw.; Hist. Nat. des Crust., ii. 218.—In sinu "Funchal" ad insulam Madeiræ; e prof. 30 org.

321. Pagurus platythorax, nov. sp. Valde depressus. Carapax superficie dorsali glaber, nudus. Oculi sat grandes, pedunculos antennarum superantes. Squamulæ ophthalmicæ basi intus unidentatæ, apice bidentatæ. Aciculum parvum. Pedes irregulariter pilosi. Chelipedes parvi æquales, superne paullo asperi non spinulosi. Sternum latum, planatum, triangulare, inter chelipedes sat latum, sutura nulla inter segmenta pedum primi et secundi paris. Maxillipedes externi graciles, superficie externa planati, basi valde aperti et ad apicem

sterni distincte juncti. Pedes amb. depressi, non spinosi. Abdominis segmentum ultimum extremitate æqualiter lobatum. Long. 1·4; carapacis long. 0·32; frontis lat. 0·28; chelipedis long. 0·45 poll. *P. scabrimano* (Dana;) facie affinis sed magis depressus, sternoque dilatato.

Hab.—Ad insulam "Loo Choo"; in testis *Coni* generis.

322. Aniculus typicus, Dana; loc. cit., i. 461, pl. xxix. f. 1. *Pagurus aniculus*, Fabr.—In portu "Simoda" Japoniæ.

323. Calcinus tibicen, Dana; l. c. i. 457. *Pagurus tibicen*, (Herbst,) M. Edw·—Ad insulas "Bonin," "Ousima" et "Loo Choo."

324. Calcinus latens, Dana; l. c., i. 459, pl. xxviii. f. 11. *Pagurus latens* Randall.—Ad insulam "Loo Choo."

325. Calcinus elegans, Dana; l. c., i. 458, pl. xxviii. f. 10. *Pagurus elegans*, M. Edw.—Ad insulam "Loo Choo."

326. Clibanarius longitarsis, Dana; l. c., i. 464. *Pagurus longitarsis*, De Haan.—Ad insulam "Loo Choo."

327. Clibanarius vulgaris, Dana; l. c., i. 462. *Pagurus clibanarius*, (Herbst,) Latr.—In portu "Hong Kong"; in fundo argillaceo, prof. 4 org; et in freto "Gaspar."

328. Clibanarius striolatus, Dana; loc. cit., i. 463, pl. xxix. f. 3.—Ad insulam "Loo Choo."

329. Clibanarius globosimanus, Dana; Proc. Acad. Nat. Sci., Philada., v. 271. *C. corallinus?* D.; U. S. Expl. Exped., Crust. i. 468, pl. xxix. f. 8, (an M. Edw.?)—Ad insulam "Loo Choo" vulgaris, sublittoralis.

330. Clibanarius æquabilis, Dana; U. S. Expl. Exped., Cr. i. 464.—Ad insulam Madeiræ; e fundo arenoso prof. 20 org. acceptus.

331. Clibanarius pacificus, nov. sp. *C. æquabili* valde affinis, sed pedibus magis pilosis, manu inferne leviore, dactylo ped. amb. paullo longiore. Color obscuro-olivaceus; pedes 2di et 3tii paris flavi; digiti rubri. Long. 1·25; carap. long. 0·39; frontis lat. 0·16 poll.

Hab.—Ad insulas "Tanegasima" et "Ousima"; littoralis inter rupes.

332. Paguristes digitalis, nov. sp. Carapax paullo setosus, medio fere nudus, antrorsum paullo augustatus; scutella cardiaca mediana lanceolata, versus extremitatem acutam posteriorem paullo dilatata. Frontis dens medianus elongatus, subcarinatus, acutissimus, basin squamularum oph. superans. Oculi valde elongati, graciles, quam frontis lat. paullo longiores, sed pedunculi antennularum extremitatem non superantes. Chelipedes æquales, setosi, spinulosi, spinis nigro-apiculatis; manu sat lata, subtrigona, superne planata; dactylo extus latere planato, cristis obliquis pectinatis ad septem insculpto. Pedes postici hirsuti, secundi paris superne spinosi dactylis quam art. penultimi plus dimidia longioribus. Scuta abdominis antice sat indurata, marginibus ciliata. Segmentum abd. ultimum extremitate fere æquilobatum. Superficies pedum inferior prope bases areolis callosis prædita. Long. 3; carap. long. 0·81; frontis lat. 0·40; chelip long. 1·17 poll. *P. turgido* affinis, manibus exceptis.

Hab.—In portu "Hakodadi" insulæ "Jesso."

333. Paguristes seminudus, nov. sp. Carapax antennæque toti nudi, vel nudiusculi. Regio gastrica grandis, quam cardiaca multo longior. Scutella cardiaca mediana prope basin paullo contracta, extremitate obtusa. Latera antice sparsim spinulosa. Rostrum longum, gracile, extremitate acutum, deflexum, medium squamularum oph. superans. Oculi longi, robusti, fronte longitudine multo superantes, etiam pedunculum antennularum superantes. Squamulæ ophthalmicæ apice acuminatæ extrorsum flexæ; marginibus integræ. Antennarum flagellum parum pilosum, pilis tenuisimis; aciculum magnum. Cheli-

pedes similes, sinister major; carpo manuque pilosis, spinulosis, spinulis calcareis albis, in marginibus superioribus majoribus; digitis superne nudis, extus pilosis, marginibus internis acutis, apicibus acutis nigris. Pedes 2di 3tiique paris sat graciles; articulis ultimo penultimoque superne spinosis; dactylis utrinque ciliatis. Pedes 4ti paris paullo elongati, areola scabricula manûs minima. Abdominis segmentum ultimum multo elongatum, inæqualiter lobatum, lobo sinistro longiore. Superficies pedum inferior areolis callosis carens. Long. 1·78; carap. long. 0·44; frontis lat. 0·22; oculi long. 0·23 poll.

Hab.—In sinu "Kagosima" Japoniæ.

334. Spiropagurus spiriger. *Pagurus spiriger*, De Haan; Fauna Jap., Crust. 206, pl. xlix. f. 2. Paguri hujus speciei pedibus natant etiam testas gerentes. —Prope oras Sinenses, lat. bor. 22°; in fundo argillaceo prof. 16 org.

335. Eupagurus megalops, nov. sp. Carapax nudus, parte anteriore deplanatus, glaber. Dens rostriformis angulo obtusus, quam dentes inter oculorum et antennarum bases minus prominens. Oculi remoti, perbreves; cornea valde turgida, pedunculo duplo crassiore. Antennarum aciculum e basi gracillimum, parum ciliatum, apicem oculorum longitudine adequans; flagellum nudum, quam pedes longius. Chelipedes quam ped. amb. paullo breviores, marginibus ciliati, superficie inferiore confertim granulati et pubescentes. Chelipedis dextri articuli eis *E. gracilipedis* rationibus similes; carpus superne scabrosus et pubescens; manus media parte paullo convexus et fere lævis, lateribus depressa, sparsim granulata; digiti pilosi, palmâ breviores, apicibus calcarei, uncinati. Chelipes sinister gracilis; carpo trigono, superne spinoso; manu quam carpus dextri non breviore, palmâ convexa obsolete bicarinata, carinis granulatis, digitis curvatim subdeflexis. Pedes 2di 3tiique paris pæne nudi, superficie glabri, marginibus superne spinulosi; dactylis longis, quam manus dexter longioribus, gracillimis, versus extremitates contortis et superne ciliatis. ♀ Long. 1.70; carap. long. 0·36; frontis lat. 0·20 poll. Ab *E. gracilipede* differt oculis crassioribus et manibus ciliatis; a *P. conformi* (De Haan,) chelipedis minoris carpo superne spinoso.

Hab.—In mari Sinensi Boreali, lat. bor. 23°; ad prof. 26 org.

336. Eupagurus gracilipes, nov. sp. Dens rostriformis grandis, prominens, acutus. Oculi breves, crassi; cornea inflata. Antennarum aciculum oculum superans, utrinque ciliatum; flagellum nudum. Chelipes dexter gracilis, quam pedes amb. brevior; carpo subspinuloso ut in *E. bernhardo;* manu depressa, subtenui, elongato-ovata, duplo longiore quam latiore, margine externo paullo dilatata, crenulata, superficie superiore leviuscula, sparsim minute granulata; digitis lævibus valde depressis, apicibus calcareis, uncinatis, decussantibus; dactylo supra marginem carinato. Pedes 2di 3tiique paris eis *E. bernhardi* similes, dactylis gracilioribus. Long. 1·8; carap. long. 0·35; frontis lat. 0·19 poll. Differt ab *E. splendescente* et ab *E. Mertensii*, dactylis pedum ambulatoriorum quam manus sinistra longioribus. Ab *E. bernhardo* pedibus gracilioribus, manum dextra tenuiore, etc.

337. Eupagurus ochotensis, Brandt. *Pagurus bernhardus* var. C., *spinimana;* vel *P. ochotensis*, Brandt; Sibirische Reise, Zool. p. 108. *Bernhardus armatus*, Dana. *Eupagurus armatus*, Stm.—In sinu "Hakodadi" insulæ "Jesso," Japonicæ.

338. Eupagurus constans, nov. sp. Thorax robustus; abdomen sat parvulum. Carapacis pars anterior v. gastrica convexa, valde indurata, modice fasciculata. Frontis dens rostriformis acutus prominens; dentes laterales acuminati, rostro minus prominentes. Oculi sat longi, corneis vix dilatatis. Antennarum aciculum longum, pilosum, oculos superans. Chelipedes grandes, (dexter pedes amb. multo superans,) spinulosi et setosi, tuberculis setiferis inter spinulos sparsis, setis longitudine spinas non superantibus. Chelipedis dextri ischium angulo interno spina acuta longiuscula armatum, merus margine antico superne spinis sex pectinatus; carpus paullo longior quam latior, et quam

palma manus paullo longior; manus superne planata, spinulis subseriatis, seriebus mediana et marginalibus distinctis; margine sinistro ad basin dactyli sinuato; digiti palmâ breviores, superne marginibus internis dense fasciculati, setis introrsum versis. Chelipedis sinistri dactylus non spinosus. Pedes ambulatorii graciles, sparsim fasciculati, fasciculis transversis; carpo superne 1–2 spinoso; dactylis gracilibus, non contortis, quam art. penultimus longioribus, setis rigidis sparsim armatis, unguiculo brevissimo. Pedes 4ti paris lati compressi, superne longe ciliati, dactylo brevissimo, processu art. penultimi parum superante. Segmentum thoracicum secundum margine inter bases maxillipedum dentibus duobus acutis armatum. Color aurantius; pedes transversim rubro-fasciati. Long. 3·6; carapacis long. 0·8; frontis lat. 0·4; chelipedis dextri long. 2·3 poll. Carcinœcium corneum spirale, base convolutum, muricatum, a polypo hydroideo (*Hydractinia sodalis*, nob.) constructum; apice testam minutam continente.

Hab.—In sinu "Hakodadi" insulæ "Jesso"; e fundo saxoso prof. org. 4.

339. EUPAGURUS PECTINATUS, nov. sp. Carapax modice fasciculatus. Dens rostriformis parvus, acutissimus, parum prominens. Oculi graciles, aciculum antennarum superantes, corneis non dilatatis, squamulis acuminatis. Flagellum antennarum chelipedes superans, articulis minute setosis. Chelipedes mediocres, mero leviusculo margine antice 2–4 spinoso, carpo manuque spinosis et setosis, spinis acutis, erectis, fere æqualibus, setis spinis triplo longioribus. Chelipedis dextri carpus non longior quam latior, sed quam palma manûs longior, superficie postero-exteriore fere lævis; manus paullo convexa, superficie superiore tota spinosa, spinis longitudinaliter 8-seriatis, eis marginis externi paullo longioribus, pectiniformibus, sursum flexis; digiti depressi, palmâ breviores, apicibus cornei acuminati; dactylus margine externo pectinatus. Chelipedis sinistri carpus seriebus duabus spinarum armatus, interstitia lævi; manus convexa, spinosa, spinis medianis longioribus; digiti vix spinosi. Pedum 2di 3tiique paris chelipedes superantes, sat lati, superne longe hirsuti, dactylis haud contortis, perlatis, compressis, lateribus paullo excavatis, supra intusque pilosis, margine inferiore nigro 10-spinuloso, ungiuculo robusto, nigro, acuto. Pedum 4ti paris dactyli sat grandes, processu art. penultimi multo superantes, unguiculo nigro acuto. Long. 3; carap. long. 0·7; frontis lat. 0·34; chelipedis dextri long. 1·42 poll. *E. constanti* facie affinis, sed chelipedibus brevioribus, dactylis pedum 4ti paris longioribus, etc.

Hab.—In sinu "Hakodadi" insulæ "Jesso."

340. EUPAGURUS TRIGONOCHEIRUS, nov. sp. *E. pubescenti* affinis. Chelipedis dextri carpus sat brevis, quam manus latior, turgidus, superficie subspinulosus; manus non duplo longior quam latior, granulatus; digiti robusti apicibus cornei. Manus sinistra late trigona, quam manus dextra quartâ parte minor; carina valde prominente, introrsum dilatata, denticulata; margine exteroinferiore valde dilatato; superficie obliqua lata, concava. Pedes amb. lateris dextri chelipedem dexterum superantes. Long. 3 poll.

Hab.—In Oceano Arctico et in freto Beringiano vulgaris; sublittoralis, et ad prof. 10–20 org. inventus.

341. EUPAGURUS PUBESCENS, Brandt; in Middendorff's Sibirische Reise, Zool. 111. *Pagurus pubescens*, Kroyer; Tidsskrift, ii. 251. (partim.)—In mari Pacifico boreali.

342. EUPAGURUS PILOSIPES, nov. sp. Dens rostriformis setosus. Pedes valde hirsuti. Chelipes dexter superne spinulosus, carpo prope marginem internum spinosum longitudinaliter canaliculata, canaliculo lævi, absque spinis; manu elongata, minuente, spinulis æqualibus non crebris. Chelipes sinister superne spinulosus, carpo superne canaliculato; manûs digitis quam palma fere duplo longioribus, late hiantibus. Pedes 2di 3tiique paris longitudinaliter rubrovittati, dactylis quam art. penultimi paullo brevioribus. Long. 1 poll. *E. hir-*

sutiusculo valde affinis, sed chelipedibus magis spinulosis, digitis hiantibus, et ped. amb. vittatis. Ab *E. Samuelis* differt manu dextra augustiore, etc.
Hab.—Ad insulam "Loo Choo."

343. Eupagurus hirsutiusculus, Stm.; Crust. et Echin. P. C. N. Am., p. 44. *Bernhardus hirsutiusculus*, Dana; U. S. Expl. Exped., Crust. i. 443; pl. xxvii. f. 3. —In sinu "Hakodadi" insulæ "Jesso."

344. Eupagurus Samuelis, Stm.; Crust. and Echin. Pacific Coast of N. Am. p. 42. Chelipedum merus subtus tuberculo obtuso valde prominente, interdum spiniformi armatus. Manus dexter sat lata, depressa, margine externo arcuata. Pedes 2di 3tiique paris transversim rubro-fasciati, dactylis brevibus. *E. hirsutiusculo* perquam affinis, differt manûs dextrâ formæ.
Hab.—In sinibus "Hakodadi," "Simoda" et "Kagosima" Japoniæ.

345. Eupagurus angustus, nov. sp. Carapax angustus. Pedes modice longe pilosi. Dens rostriformis vix prominens sed acutus. Oculi sat longi, sed pedunculum antennarum non superantes, corneis parum dilatatis. Squamulæ ophthalmiacæ acuminatæ. Aciculum parvulum, pedunculo antennæ multo brevius; flagellum longum, nudum. Chelipes dexter elongatus, pedes amb. superans, carpo manuque nudis, granulatis, granulis æqualibus subspiniformibus; carpo tertia parte longiore quam latiore; manu convexa, quam carpus paullo latiore; versus extremitatem minuente; digitis parvis, palmâ dimidia brevioribus, apicibus calcareis; dactylo extus seriebus duabus granulorum majorum. Chelipes dexter inferne granulatus, mero tuberculo uno prominente medio ornato. Chelipes sinister carpum dextri vix superans, spinulosus et pilosus, medio subcarinatus, carpi spinulis longioribus; manu extus turgidula; digitis longis paullo hiantibus. Pedes 2dii 3tiique paris sat compressi, carpo superne 4–5 spinuloso, dactylis haud contortis, quam art. penultimi parum longioribus, unguiculo longo gracili præditis. Long. 1·6; carapacis long. 0·35; frontis lat. 0·16; chelipedis dextri long. 0·96 poll.
Hab.—Ad insulam "Kikaisima."

346.—Eupagurus Middendorffii, Brandt; in Middendorff's Sibirische Reise' Zool., p. 108, pl. v. f. 1–16.—In sinu "Hakodadi" insulæ "Jesso."

347.—Eupagurus Japonicus, nov. sp. Descr. *maris.* Carapacis pars anterior bene indurata, glabra, convexa. Dens rostriformis valde prominens, acutus. Oculus dimidiam frontis lat. superans, cornea paullo dilatata. Squamula ophthalmica apice oblonga, sulco mediano hirsuto, extremitate non acuminata. Antennarum aciculum longum, oculum superans, dense fasciculatum, flagellum articulis setosum. Chelipedes grandes, utrinque pedes amb. multo superantes. Chelipes dexter dense pilosus; mero superne lævi, margine antica non pectinato, subtus valde dilatato, hirsuto, margine dextro pectinato; carpo manuque superne granulo-scabroso; carpo quam palma manûs non breviore, spinis purpureis intus armato, superficiei linea mediana lævi; manu grandi, plus duplo longiore quam latiore, palma serie mediana spinarum armata; digito immobili extus denticulato; dactylo extus serie dentium validorum cæruleorum ad 12 armato. Chelipes sinister scabrosus et setosus, mero carpoque eis dextri æqualibus sed angustioribus et magis compressis; manu subtetragona, superne extusque carinata, carina superiore mediana, spinosa. Pedes ambulatorii breves, robusti, superne dense hirsuti non spinulosis; dactylis latis, haud contortis, quam art. penult. brevioribus, unguiculis robustissimis. Color luteo-rufus, partim subtiliter maculatus; pedes ambulatorii rubro-annulati. Long. 3·2; carap. long. 0·83; frontis lat. 0 38; chelipedis dextri long. 2·08 poll. A *P. lanuginoso* differt chelipedibus longioribus.
Hab.—In portu "Simoda" Japoniæ.

348. Eupagurus sinuatus, nov. sp. Dens rostriformis acutus prominens. Oculi robusti, aciculo breviores, corneis paullo dilatatis, squamularum apicibus elongatis. Chelipes dexter pedes amb. non superans, breviter pubescens,

granulatus; margine interno ad manûs dactylique commisuras sinuato; carpo subtriangulari, margine interno spinoso, superficiei linea mediana lævi; manu lata, seriebus mediana et marginalibus spinularum armata in fœminis; dactylo superne serie mediana tuberculorum acutorum ornato. Chelipes sinister subtrigonus, hirsutus et granulatus, carpi margine superiore spinoso; manu non spinulosa, carina obtusa submediana. Merus chelipedum subtus profunde excavatus, marginibus longe ciliatus, margine externo spinosus. Pedes 2di 3tiique paris superne hirsuti non spinulosi, dactylis sat latis, haud contortis, corneo-spinulosis. Maris long. 2·2; carap. long. 0·6; frontis lat. 0·3; chelip. dext. long. 1·28 poll.

Hab.—In portu Jacksoni vel "Sydney" Australiensi.

349. Eupagurus tricarinatus, nov. sp. Oculi remoti, grandes, aciculum superantes, sed pedunculum antennarum non superantes, basi constricti; corneis dilatatis. Annulum ophthalmicum sat apertum. Dens rostriformis obsoletus. Pedes nudi vel nudiusculi. Chelipedes similes, sinister quam dexter parum minor. Manus longitudinaliter tri-cristatæ; crista una mediana, duabus marginalibus, denticulatis; carpus paullo bi-cristatus. Pedes 2di 3tiique paris gracillimi, nudi; dactylis quam art. penult. multo longioribus, haud contortis. Color antrorsum fuscus; manus albidæ; pedes amb. rubro- et olivaceo-fasciati. Long. 0·5; carapacis long. 0·11; frontis lat. 0·07; chelip. dext. long. 0·17 poll.

Hab.—In sinu "Kagosima"; e fundo nigro-arenoso, prof. quinque org.

350.—Eupagurus acantholepis, nov. sp. Dens rostriformis obsoletus. Annulum ophthalmicum apertum, bracteoliferum, bracteola sub-bifurcata. Oculi graciles, pedunculos antennarum superantes, quam frontis lat. non breviores, extrorsum curvati, corneis non dilatatis; squamulis parvulis, apice bi-dentatis. Aciculum parvum. Pedes graciles, sparsim longe hirsuti. Chelipedes superne spinulosi, (dexter major) manibus paullo depressis, spinulis triseriatis; carpis superne paullo canaliculatis. Pedes 2di 3tiique paris chelipedes superantes, dactylis non contortis, compressis, fere falciformibus, unguiculis gracilibus. Abdomen latere dextro basi inferiore processu conica instructum apice corneo. Speciminis unici (junioris?) long. 1; carap. long. 0·21; frontis lat. 0·12; chelipedis long. 0·35; ped. amb. dextri long. 0·51 poll.

Hab.—In portu Jacksoni Austr.; e fundo argillaceo prof. 8 org. acceptus.

Galatheidea.

351. Galathea australiensis, nov. sp. Fœminæ carapax retrorsum latus, strigosus, strigis sat longe ciliatis; regione gastrica modice circumscripta, antice bi-spinulosa. Margo lateralis octo-spinosus, spinis supra infraque antennam inclusis. Rostrum latum, triangulare, superficie dense pubescens, margine utrinque quadridentatum, dentibus longis acutis, spiniformibus. Chelipedes sat robusti, superificie superiore scabrosi et setosi, marginibus pauci-spinosi; digitis depressis non hiantibus, intus 1–2 dentatis, dentibus levibus. Carapacis long. 0·29; lat. 0·215; rostri long. 0·09; chelipedis long. 0·56 poll.

Hab.—In portu Jacksoni Australiensi, in fundo limoso prof. sex org.

352. Galathea labidolepta, nov. sp. Descr. *maris.* Carapax sat brevis, antice augustatus, strigosus, strigis pubescentibus; regione gastrica non circumscripta, antice spinulis duabus armata. Margo lateralis octospinulosis, spinulis supra infraque antennam inclusis, spinulis minutis. Rostrum longum, triangulare, acutum, utrinque quadridentatum, superficie pubescens. Margo supra-orbitalis integer, angulo externo acuto. Chelipedes sat robusti, superficie superiore æqualiter scabrosi, spinulis setosis; marginibus pauci-spinosis. Manûs palma crassa, digiti angusti, recti, nec hiantes nec dentati.

Hab.—Ad Promont. Bonæ Spei.

353. Galathea orientalis, nov. sp. Carapax sat augustus, antice minuens, strigosus, brevissime pubescens, regione gastrica non circumscripta, antice bispinulosa. Margo lateralis sex-dentatus, spina supra-oculari inclusa. Rostrum grande, sat latum, nudum, utrinque 4-dentatum, dentibus acutis, dente basali minuto. Chelipedes maris longi crassiusculi, spinulosi, sparsim hirsuti, setis longis; carpo intus spina una magna armato; manu sat depressa, aspera; digitis vix hiantibus, dactylo intus paullo bidentato. Merus pedum ambulatoriorum sat augustus, margine superiore confertim spinulata, spinulis minutis æqualibus. Carapax ruber, medio albo-vittatus; pedes pallide luteoli. ♂ Carap. long. 0·26; lat. 0·19; rostri long. 0·99; chelip. long. 0·60 poll.

Hab.—In freto "Ly-i-moon" prope "Hong Kong"; fundo conchoso, org. 25.

354. Galathea acanthomera, nov. sp. *G. orientali* affinis, dentibus rostri basalibus majoribus. Pedes ambulatorii eis *G. spinosirostris* similes, superne pilosi, setis fasciculatis plumosis: mero paullo dilatato, margine superiore spinulis robustis ad 11 armato, latere posteriore valide strigoso. Color griseus. Carap. long. 0·22; lat. 0·18; rostri long. 0·07 poll. *G. spinosirostri* affinis, rostro longiore.

Hab.—Ad insulas "Bonin"; inter corallia ad prof. 1 org.

355. Galathea pubescens, nov. sp. Carapax convexus, æqualis, strigosus, strigis sat longe ciliatis vel pubescentibus. Regio gastrica non bene circumscripta, antice trispinulosa. Margo lateralis sex dentatus. Rostrum longum valde pubescens, triangulare, acutum, utrinque quadridentatum, dentibus acutissiimis longitudinaliter porrectis. Chelipedes lineares, gracillimi sparsim setosi et spinulosi; digitis depressis parallelis nec hiantibus nec dentatis. ♀ Carap. long. 0·12; rostri long. 0·08 poll.

Hab.—In portu "Hakodadi" et ad insulam "Ousima;" in fundis sabulosis prof. 25–35 org.

356. Galathea subsquamata, nov. sp. Carapax depressus; regionibus gastrica et hepaticis non bene circumscriptis; strigis non numerosis fere nudis in medio valde profundis; strigis antice lateraliterque undulatis, quasi squamiformibus. Regio gastrica spinulus ad 10 sparsis armata. Margo lateralis septem-dentatus. Rostrum bene triangulare, utrinque dentibus acutis quatuor armatum. Chelipedes mediocres, digitis depressis parallelis, nec hiantibus nec dentatis. ♀ Carap. long. 0·26; lat. 0·16; rostri long. 0·10; chelipedis long. 0·56 poll.

Hab.—Ad insulam "Ousima."

357. Galathea grandirostris, nov. sp. Corpus superne purpureo-fuscum, albo bi-vittatum. Carapax superficie æqualis, strigosus, strigis ciliatis numero ad 12. Regio gastrica non circumscripta. Margo lateralis novem-denticulatus. Rostrum grande elongato-triangulare, superficie pubescens subtiliter asperum; marginibus obsolete serrulatis, dentibus minutis utrinque sex distantibus. Chelipedes robusti, purpureo-fusci, albo uni-vittati, transversim scabrosi, mero carpoque intus ad apicem 2–3 spinosis; manu absque spinulis; digitis modice pilosis non hiantibus. Carap. long. rostro incluso, 0·342; lat. 0·19; rostri long. 0·16; rostri lat. ad basim 0·06; chelipedis long. 0·53 poll. *G. longirostri* et *G. eleganti* affinis, sed rostri grandiore.

Hab.—In sinu "Kagosima" Japoniæ; fundo arenoso org. 5.

358. Munida Japonica, nov. sp. Carapax oblongns. Margo lateralis medio 5-spinulosus. Spinæ ad basin antennarum non majores. Suture laterales et margines abdominis penicillizeræ. Frons tricuspis, spinis aculeiformibus, mediana quam laterales duplo longior. Regio gastrica superficie utrinque trispinulosa et antice serie transversa spinularum numero ad 13 armata; spinulis duabus medianus maximis paullo remotis. Chelipedes prælongi, recti, subcylindrici, scabriculi, sparsim spinulosi; digitis longis, gracilibus, manûs sinistræ ad basim hiantibus. Antennæ externæ chelipedibus paullo longiores. ♂ Carap. long. 0·48; lat. 0·28; rostri long. 0·18; chelip. long. 1·30 poll.

Hab.—In sinu "Kagosima" Japoniæ; e fundo conch. org. 20.

Description of New Genera and Species of North American Lizards in the Museum of the Smithsonian Institution.

BY SPENCER F. BAIRD.

Family IGUANIDÆ.

Euphryne, Baird.—Body very heavy and clumsy. Tail shorter than the body; very thick and conical. Scales very small, but imbricated and angular throughout. A median dorsal band of about 20 rows, and a largepatch on the sides of scales larger than the rest. Infra-orbitals in a series of small, nearly equal plates. Supra-cephalic plates all small, least on the outer part of the supra-orbital region. Upper labials rectangular, not imbricated. Posterior molars with five cusps; palate toothed. Claws very thick and stout, anterior much the longer.

Euphryne obesus, Baird.—Width of head nearly equal to distance from nose to ear. Tail shorter than the body. General color of the young, olive green, with five broad transverse bars above from head to base of tail, and about as many on the tail; these rings yellow, dotted with red. Beneath pea green dotted with black. With increasing age, the bands become obsolete and disappear, the general color becoming reddish olive.

The largest and heaviest of American *Iguanidæ*, sometimes exceeding a foot in length. Abundant in the canons of the Colorado, of California, collected by Maj. Thomas, Mex. Boundary Survey, and Lt. Ives' Expedition. Type No. 4172

Crotaphytus reticulatus, Baird.—Infra-orbital chain in a series of 6 or 8 nearly equal plates. Scales on the gular fold much smaller than those between the fore legs. Above ashy gray, with a hexagonal reticnlation of lighter, the interstices here and there dark brown. Chin and throat reticulated. Neither black collar nor light spots. More closely related to *Crotaphytus collaris*, than to *Crotaphytus (Gambelia) wislizenii.*

Hab.—Laredo and Ringgold Barracks, Tex. Mex. Boundary Survey. J. H. Clark and A. Schott. Type 2692.

Uta symmetrica, Baird.—Larger dorsal scales in four regular series, two on either side of the median smaller ones. Head short, depressed, one and a half times as wide as deep. Tail one and a half times the head and body. General color light brown above, the belly white. Sides with broad transverse bands of blackish. Size of *U. ornata.*

Hab.—Fort Yuma, Cal. Mex. Boundary Survey. A. Schott. Type No. 2760.

Uta schottii, Baird.—Dorsal scales and size as in the last. Head pointed, narrow, nearly or quite as high as wide. General color nearly black, scarcely lighter beneath. Back with small blue spots. Tail banded laterally with the same.

Hab.—Sta. Madelina, Cal. Mex. Boundary Survey. A. Schott. Type No. 2761.

Uma, Baird.—Ears distinct. very long infra-orbital plate. Palate without teeth. Outer face of upper labials plane and broadly vertical; the labials themselves much imbricated, and very oblique. Scales of body above equal, much smaller than ventral ones. Inter-orbital space with two series of plates. Claws very long, slender and straight. Sides with a round black spot. Tail? (broken off.)

Uma notata, Baird.—Head about two-fifths the head and body. Above light pea green, spotted with darker green. Beneath white. Head and body about two inches long.

Hab.—Mohave Desert. Lt. Williamson, Dr. A. L. Heermann. Type No. 4124.

Holbrookia approximans, Baird.—Similar in size and general character to *H. maculata.* Tail shorter than body. Two small vertical indigo black patches on the side of belly, entirely visible from below; with a light blue areola.

Central point of belly about opposite the middle point between the two patchse. No light stripe on side of neck. Upper parts and sides gray, sprinkled with whitish. Head broad, very convex above. Hind foot about one-third the head and body.

Hab.—Lower Rio Grande. Mex. Boundary Survey, and Lt. Couch.

Sceloporus floridanus, Baird.—Cephalic plates smooth. Three series of supra-orbitals, a broad central one, and an external and internal of very small plates. Scales large, rough. 33 oblique rows of dorsal scales from head to anns. Scales on inside of tibia carinated. Free portion of longest hind toe exceeding the cephalic plates. Color above greenish yellow, with two broad yellow stripes, five scales apart. Back with distinct transverse blackish bars. Larger than *S. undulatus*.

Hab.—Pensacola, Fla. Dr. Jeffries, U. S. N. Type No. 2874.

Sceloporus ornatus, Baird.—Dorsal scales in about 64 oblique series, with but slight carination, mucronation and denticulation. Femoral pores 12. A well marked black cervical collar, complete above, and margined with yellowish. Color dark green above, nearly black towards the median line. Back with small yellowish spots.

Hab.—Patos, Coahuila, Lt. Couch. Type No. 2845.

Sceloporus longipes, Baird.—Similar to *S. occidentalis*, in general characters of shape, coloration and smoothness of the scales on inside of tibia. Limbs and tail much lengthened. Free portion of hind toe longer than the cephalic plates. The hind leg as long as the body and neck. Hind foot contained about two and a half times in the head and body.

Hab.—Fort Tejon, Cal. John Xantus. Type No. 4358.

Sceloporus couchii, Baird.—General appearance of *S. marmoratus*, Hall. Cephalic plates smooth. Scales very small. About 80 oblique dorsal rows from head to tail. Femoral pores 25. Color above dark green, with two lateral light stripes, separated by 18 rows of scales. Back with irregular spots. Sides with a white band from groin. An obsolete dark indigo patch on each side the belly, widely separated below. Sides of jaw banded transversely with blue and whitish. A subcircular indigo patch in front of shoulder, surrounded by light blotches.

Hab.—Santa Caterina, N. Leon. Lt. Couch. Type No. 2739.

Anolis cooperi, Baird.—Cephalic plates smooth. Inter-orbital ridges running to the side of the rostrum, posterior to the nostrils which are rather lateral. Digital pallets inconspicuous. A few central dorsal rows of scales abruptly larger than the rest, but the lateral all much smaller than the ventral. General color grayish above. Less than *A. carolinensis*.

Hab.—California. Dr. J. G. Cooper. Type No. 4165.

Family GECKOTIDÆ.

Sphæriodactylus notatus, Baird.—Scales on back and sides large, equal, strongly carinated; those on belly smaller, smooth, hexagonal. Above light brownish yellow, uniformly dotted above with reddish brown, most distinct on the head, least so on the belly.

Hab.—Key West, Fla., Prof. Agassiz and Prof. W. H. B. Thomas. Type No. 3215.

Stenodactylus variegatus, Baird.—Head very broad. Hind foot contained six times in head and body. Above brownish yellow, with irregular small blotches of light reddish brown, sometimes in broad transverse bands. Edges of eyelids and whole under surface opaque white.

Hab.—Rio Grande and Gila Valleys. Mex. Boundary Survey. A. Schott. Type 3217.

Family XANTUSIDÆ.

General form lacertian. No crests nor spines. Head with very large, polygonal plates. Scales of back small, granular; those of belly large, square, in transverse series. Tongue broad, linear, not retractile, firmly attached except at tip, which is only slightly notched, the base not emarginate. Surface of tongue with a series of oblique converging ridges on each side. Teeth simple, pleurodont. Digits with one series of transverse smooth lamellæ beneath.

XANTUSIA, Baird.—Body slender; cylindrical. Femoral pores. Three folds on the throat, the anterior connecting the ears inferiorly and encircling the head. Pupil vertical. No eyelids.

Xantusia vigilis, Baird.—Hind leg extended forwards, reaches the first gular fold, and is contained about $2\frac{3}{4}$ times in head and body. Claws small. Color above dark brownish yellow, varied with blackish spots on single tubercles. Young vermiculated with yellowish on a brown ground. A yellowish line on each side of the neck, with two others on the nape, making four parallel ones. Under parts whitish. Head and body about two inches long.

Hab.—Fort Tejon, Cal. John Xantus. Type No. 3063.

Family LACERTIDÆ.

Cnemidophorus inornatus, Baird.—Scales on the gular fold, smaller than those on the breast anteriorly, and scarcely larger than those on the middle of the chin. Scales of back tubercular and elevated. Hind feet about two-fifths the head and body. General color light greenish olive, paler beneath. No lines on the body.

Hab.—New Leon. Lt. Couch. Type No. 3032.

Cnemidophorus octolineatus, Baird.—Gular fold as in the last. Hind foot not two-fifths the head and body. Scales of back depressed. General color light greenish olive, paler beneath. Back with eight equidistant and approximated light lines.

Hab.—New Leon. Lt. Couch. Type No. 3009.

Family ZONURIDÆ.

Gerrhonotus webbii, Baird.—Tail $2\frac{1}{2}$ times the head and body. Scales strongly carinated. Dorsal scales in 48 transverse rows. Body encircled by 26 rows of scales, of which 12 are ventral. Hind feet longer than from snout to ear. Above leaden olivaceous brown, lighter beneath. Back with ten or twelve blackish bars, bordered in front by brownish or reddish yellow.

Hab.—Near San Diego, Cal. Dr. Webb. Type No. 3078.

Gerrhonotus infernalis, Baird.—Dorsal scales carinated in 16 longitudinal rows; ventral in 12. Nasal plate in contact with the 2d labial only. Tail twice as long as head and body. 51 transverse rows of scales from head to tail. Color clear light olive, with 8 cross bars of dusky. Beneath yellowish, marbled faintly with dull olive. Head plain.

Hab.—Devil's River, Tex. Mex. Boundary Survey. Dr. Kennerly. Type No. 3090.

Gerrhonotus olivaceus, Baird.—No single frontal. A series of three pairs of plates between the vertical and rostral, becoming successively smaller. Two post-nasals; one loral. 39 transverse rows of scales on back from head to tail. 12 longitudinal rows above; the 6 central, strongly carinated. Color dark olive green, with a series of faint dusky bars. Beneath greenish white.

Hab.—Near San Diego. Mex. Boundary Survey. A. Schott. Type No. 3096.

Lepidosternon floridanum, Baird.—Body as thick as a large goose quill. No limbs. A large pentagonal plate on the head above, encircled by nine others, the rostrum ending in a broad horizontal crescent, overhanging the mouth. No ears nor visible eyes. Tail contained 18 times in the body, much depressed, its upper surface with large tubercles. Color white in alcohol.

Hab.—Micanopy, Florida. Dr. J. B. Barratt. Type No. 3202.

Family SCINCIDÆ.

Plestiodon leptogrammus, Baird.—Two post-nasals, the posterior one behind and above the much smaller anterior. Color black, with five narrow, white lines, the two lateral along the middle of single rows. Median light line not bifurcated.

Hab.—Platte River Valley. Lt. Warren, Dr. Hayden. Type No. 3119.

Plestiodon inornatus, Baird.—Two post-nasals of equal size, one above the other. Hind leg applied three times forwards, reaching the ear.

Hab.—Sand Hills of Platte. Lt. Warren, Dr. Hayden. Type No. 3110.

Plestiodon tetragrammus, Baird.—One post-nasal plate; post-frontal and inter-nasals separated by the post-nasal. Five supra-orbitals. Dorsal scales of equal width. Light olive green above; sides with two yellowish lines, separated by six rows of darker olive scales. Upper labials pure yellowish. Body encircled by about 28 rows of scales. No dorsal stripe.

Hab—Lower Rio Grande. Dr. Berlandier, Lt. Couch. Type No. 3124.

Plestiodon egregius, Baird.—One post-nasal plate; post-frontal and inter-nasals separated by the post-nasal. Four upper labials. Ears very small. Two central dorsal rows largest. Body cylindrical. Color reddish ash, with two or three white lines on each side, margined with dusky, sometimes a third; all these along the centres of single rows of scales. Upper lateral lines separated by two plain rows. Body encircled by about 22 rows of scales.

Hab.—Indian Key, Fla. G. Wurdemann. Type No. 3128.

Plestiodon septentrionalis, Baird.—One post-nasal plate which does not separate the inter-nasals and post-frontals. Color above olive, with four equidistant and equal dark stripes on adjacent half rows of scales. Two narrow white lines on each side, traversing the centres of single rows, and margined above and below by black. Upper lateral light stripes separated by six rows of scales. Beneath light greenish.

Hab.—Minnesota and Nebraska. Rev. S. W. Manney. Type 1356.

Remarks on the lower Cretaceous beds of Kansas and Nebraska, together with descriptions of some new species of Carboniferous fossils from the valley of Kansas river.

BY F. B. MEEK AND F. V. HAYDEN.

The Cretaceous system as developed in Nebraska, is clearly divisible into five distinct formations, which have, for the sake of convenience, been numbered 1, 2, 3, &c., from the base upwards. Although at first entertaining some doubts as to whether No. 1, or the lowest formation, might not be older than Cretaceous, we always placed it provisionally, in our published sections, in the Cretaceous system. More recently, after a careful review of the subject, we became satisfied from the modern affinities of numerous dicotyledonous leaves found in this formation, that we hazarded little in regarding it as a settled question that it could not be older than Cretaceous, and so expressed ourselves in our paper read before the Academy of Natural Sciences, Philadelphia, March, 1858.

The reference of this formation to the Cretaceous, however, was not without some exceptions generally admitted, for Professor Jules Marcou, in his work on the "Geology of North America," page 143, refers it to the New Red Sandstone, and in a subsequent publication,* he places it in the Jurassic; while some investigators in this country also inclined to the opinion that it must be Triassic. In the midst of these conflicting opinions, although satisfied we were right, we wished, in order to remove all doubts from the minds of others, to have the opinion of some good authority in fossil botany, (a department of palæontolo-

*Notes pour server a une description geologique des Montagnes Rochenses, page 20.

gy to which we have given little attention,) respecting the fossil leaves on which we mainly based our views in regard to the age of this formation. Consequently, we sent outline sketches of a few of them to Professor Oswald Heer,* the distinguished authority in fossil botany at Zurich, Switzerland, informing him they were from a formation we regarded as Cretaceous and requesting him to let us know to what genera and geological epoch he would refer them. This letter was sent to Professor Heer in August last, before we started to Kansas, and on our return, in the latter part of October, we were disappointed at finding no reply from him. After waiting some days longer, and receiving no answer from Professor Heer, we concluded our letter had either failed to reach him, or that he was unwilling to express an opinion based upon mere sketches of the leaves; consequently we submitted the whole to Dr. Newbury, who had then returned to Washington, and in whose opinion on this subject we have the fullest confidence.

After examining the specimens, Dr. Newbury gave us a written statement bearing date Nov. 12, containing a list of the genera to which he had referred the leaves, together with some interesting remarks and generalizations, in which he expressed the opinion that they are certainly Cretaceous, some of them belonging to genera peculiar to that epoch, and that the whole belong to more highly organized plants than anything known in the Triassic or Jurassic flora.

Knowing as we did that the rocks from which these plants were obtained,—beyond all doubt,—hold a position beneath, at least, eight hundred feet of Cretaceous strata, containing great numbers of *Ammonites*, *Scaphites*, *Baculites*, *&c.*, it of course never once occurred to us that any person might suppose it Tertiary.

About the thirteenth of November we sent on to the American Journal of Science, a communication containing Dr. Newbury's list of the genera to which he had referred our plants, with some extracts from his remarks, all of which will appear in the January number of that Journal. Some two or three weeks after we had corrected the last proof of this paper, we received (13th of Dec.) a letter from Professor Heer, bearing date of Nov. 20, in which he informed us that our letter had reached him at a late date, in consequence of his absence from home, and that after his return, other engagements had prevented him from replying sooner. In this letter Professor Heer, in accordance with our request, sent us a list of the genera, as near as it was possible for him to make them out from hastily drawn sketches, and also kindly furnished brief diagnoses of the species,† stating at the same time that although one of the outlines resembles a Cretaceous genus (Credneria,) the nervation being obscure, and the others being more like Tertiary forms than anything known in the Cretaceous of the old world, he was inclined to the opinion that they are Tertiary.

Along with Professor Heer's letter, we also received a printed pamphlet, entitled "*Letters on some points of the Geology of Texas, New Mexico, Kansas and Nebraska;* addressed to Messrs. F. B. Meek and F. V. Hayden, by Jules Marcou." In this pamphlet Professor Marcou quotes Professor Heer's conclusions in regard to our fossil plants, and expresses the opinion that No. 1, of the Nebraska section, is both Miocene and Jurassic, or in other words, that we have included in it strata belonging to each of these two widely different geological epochs.

Having a very high regard for Professor Heer's opinions on any question in fossil botany, where he has had an opportunity to examine the specimens themselves, or to study good figures and descriptions, we are quite sure, had the whole collection been submitted to him, instead of mere sketches of a few of the species, his opinion would have been very different. At any rate, we can assert with the fullest confidence that it is absolutely *impossible* that this formation, or any part of it, can be Tertiary, for we know it passes, as already stated, beneath at least eight hundred feet of Cretaceous strata. This is not mere conjecture, nor an inference drawn from having seen this formation under cir-

* Our friend Dr. Newberry was then in New Mexico.

† For descriptions of these plants by Prof. Heer, see the last two pages of this paper.

cumstances leading us to *suppose* from the dip of the strata, that it must pass beneath the Cretaceous if continued in a given direction at the same angle of inclination, but from the fact that it has actually been seen, directly beneath the other Cretaceous rocks, not merely at one place, and by one observer, but by several persons at numerous localities.

In order to satisfy others we are not mistaken in this, we will give a few of the many facts in our possession, bearing on this question. In the first place, we would remark that the farthest point towards the south at which we have seen this formation, is near Smoky Hill river, in Kansas, latitude 38° 30′ north, and longitude 97° 30′ west. Here we found it forming the upper part of several isolated elevations known as the "Smoky Hills," at an altitude of about 1200 feet above the Missouri at Fort Leavenworth. At this locality, however, we saw no rocks overlying it, and consequently have no *stratigraphical* evidence that it is the same rock seen by us at other localities under Cretaceous beds; but our lithological and palæontological evidence is quite conclusive on this point, for this rock in color, composition, and all other respects, is undistinguishable from No. 1, of the Nebraska section, as seen near the mouth of Big Sioux river on the Missouri, and contains numerous fossil leaves, some of which are identical with those occurring in No. 1, at the last mentioned localities. Amongst these leaves Dr. Newberry has also identified at least one genus (*Ettingshausiania*) peculiar to the Cretaceous system.

Bearing in mind that all the rocks here have a gentle but uniform inclination or dip to the north west; and that the formation under consideration consists of red and yellowish sandstones, and various colored clays, with generally more or less impure lignite and ferruginous concretions, we will be prepared to recognize it at lower and lower elevations as we proceed northward.

Without undertaking to mention in detail the intermediate exposures, we will pass northward at once to localities where it has been seen beneath Cretaceous rocks by three different observers at various times; this is near the Kansas and Nebraska line—latitude 40° north, and in the vicinity of 97° of west longitude. Here at an elevation of about seven hundred feet above the Missouri at Fort Leavenworth, or some five hundred feet below the level of the exposures mentioned at the Smoky Hills, our deceased friend, Mr. Henry Pratten, saw near Wyeth's creek, in 1853, the following exposures in descending order;

1st. Slope, thickness not given.	
2nd. Yellow and whitish limestone filled with casts of *Inoceramus*, referred by him to *I. myteloides* = *I. problematicus*.	No. 3, Nebraska Sec.
3rd. Slope, thickness not given.	No. 2, Nebraska Sec.
4th. Red ferruginous sandstone with leaves of dicotyledonous trees.	No. 1, Nebraska Sec.

A short distance west of this exposure Dr. J. G. Cooper informs us he saw outcrops of a red sandstone in the valleys at about the same elevation; and above this, exposures of dark gray laminated clay answering exactly the description of No. 2, of the Nebraska section, while above the latter, near the tops of the hills, he met with outcrops of light colored limestone containing numerous casts of *Inoceramus*.

At other localities not far to the southwest of the foregoing, Mr. Hawn saw exposures of light colored limestone forty-five feet in thickness, containing great numbers of *Inoceramus* which we referred, from specimens sent by him, to *I. problematicus*. * Below this there was a slope of twenty-seven feet in which he saw no exposures, while still lower he observed outcrops of dark ferruginous and yellow sandstone, and various colored clays with impressions of leaves

* It is with some doubt we have referred this species to *I. problematicus;* it is the same species described by Dr. Schiel in the second volume of the Pacific Rail Road Report, page 108, plate 3, figure 8. It is rather longer on the hinge than is common in *I. problematicue*, from which it may be distinct. We always refer to this shell in speaking of *I. problematicus*.

resembling, as he supposed, those of oaks and willows. (See his section published by us in the Proceedings of the Academy of Natural Sciences of Philadelphia, May, 1857.)

Proceeding northward from the last mentioned localities, we find on reaching the Loup fork of Platte river, near the eastern limits of the Pawnee reservation, outcrops of the light colored *Inoceramus* beds already mentioned, (No. 3, Nebraska section,) near the water's edge; and at the mouth of Loup fork, on the Platte, the red sandstone No. 1, so often referred to, crops out near the river margin, while the *Inoceramus* beds are seen in the bluffs above it. Going down the Platte in a direction nearly contrary to the dip of the strata, we find this sandstone rising up so as to form near the mouth of Elk Horn river, bluffs some sixty feet in height. Here it seems to rest directly upon Carboniferous rocks. Continuing on down the Platte, we find this red and yellow sandstone rising higher and higher in the hills until we come within five or six miles of the Missouri, where it is seen with its base elevated near sixty feet above the Platte; and there are probably outlines of it between that point and the Missouri at greater elevations. So that we here find the same formation which at Smoky Hill river is elevated about twelve hundred feet above the level of the Missouri at Fort Leavenworth, and seven hundred feet above the same horizon near Little Blue river, has by the gradual north-western dip of the strata, sunk to within about one hundred feet of the Missouri at the mouth of the Platte.*

Ascending the Missouri from the localities just mentioned, we see occasional exposures of the upper Carboniferous rocks, which gradually sink lower and lower until they pass beneath the river near Florence, to be succeeded by the reddish and yellow sandstones, &c., of No. 1,—(Nebraska section.) Above this, occasional exposures of this formation are seen with its characteristic fossil leaves, along the river; and at several localities, some thirty miles below the mouth of Big Sioux river, it forms perpendicular escarpments of yellowish sandstone rising from the water's edge to an elevation of about eighty feet; while at a higher point, back on the summits of the Hills, the same calcareous beds are seen, containing *Inoceramus problematicus*. Here at a quarry in the sandstone (formation No. 1,) some twenty feet above the level of the river, one of us (Dr. H.) collected a large number of fossil leaves, some of which are identical with species found by us in this rock at the Smoky Hill locality already mentioned. The sketches of leaves sent by us to Professor Heer were mostly drawn from specimens collected at this locality.

At the mouth of Big Sioux river a low bluff of this formation, not more than fifteen or twenty feet in height, is seen, and on the hills back a little from the river at a higher elevation the same *Inoceramus* bed crops out at several places, and is used for making lime. At another locality, about eight or ten miles up the Big Sioux river, which comes in from the north west, one of us (Dr. H.) saw No. 1, containing its characteristic fossil leaves, *directly beneath* No. 2, of the Nebraska section. This exposure presented the following beds in the descending order:

1st. 20 feet exposed of light gray limestone and marl, containing *Inoceramus Problematicus*.	No. 3 of Nebraska Sec.
2d. 45 feet dark laminated clay with ferruginous concretions containing fish scales	No. 2 of Nebraska Sec.
3d. 15 feet exposed above the edge of the water, consisting of yellowish friable sandstone, with a thin bed of impure lignite above, and some layers of various colored clay below, containing dicotyledonous leaves.	No. 1 of Nebraska Section.

* The gradual descent of the Missouri river makes its surface at Fort Leavenworth, about three hundred feet lower than at the mouth of the Platte, hence the exposures of No. 1, seen at the latter locality, one hundred feet above the Missouri, are some four hundred feet above the level of the Missouri at Fort Leavenworth, and of course about three hundred feet lower than the Little Blue river outcrops. The dip, however, is greater than this would indicate, for the strata incline towards the north *west*, while the mouth of Platte river, is north *east* of the Blue river localities.

One of the sketches of a long lanceolate leaf, like some of the existing species of Salix, sent by us to Prof. Heer, was drawn from a specimen collected from one of the lower sandstones here.

Again at another locality on the Missouri, about thirty miles above the mouth of Big Sioux river, No. 1, was seen by one of us (Dr. H.) only five feet above the water's edge, and *immediately overlaid* by No. 2, of the Nebraska section, containing its characteristic species of *Ammonites;* and directly over the latter, he saw No. 3, containing *Inoceramus Problematicus.** At this locality he also found in No. 1 some of the same fossil leaves characterizing it at the other places already mentioned.

On ascending the Missouri, above the last named locality, formations No. 2, 3, 4 and 5 are seen to sink at the same gradual uniform rate of dip, in regular succession, beneath the level of the Missouri; so that on reaching Heart river, we find the top of No. 5 nearly down on a level with the water's edge, and a short distance above that locality it passes out of sight, to be succeeded by the Great Tertiary Lignite basin of the upper Missouri, which overlaps it on the hills along the river for some distance below.

From the foregoing statement, we think it will be clearly understood, that formation No. 1 of the Nebraska section holds a position *beneath* the other cretaceous deposits of that region; while the occurrence in it of highly organized angiosperm dicotyledonous plants proves that it cannot be older than Cretaceous. It may be argued, however, that it may in part be Cretaceous and part Tertiary, or at any rate that *some* of these leaves may have been obtained from overlying Tertiary beds which we have confounded with the Cretaceous below. This, however, is impossible, simply because specimens of nearly all the species found at the various localities, have been quarried from the same bed at Blackbird Hill, and the whole, not a part only of this formation, passes beneath all the other Cretaceous rocks of the north west. In addition to this, we have extensive collections of plants from the Tertiary of Nebraska, not a single species of which is identical with those from No. 1.

When we stated in some of our papers that it was possible we might have included in this formation beds not belonging to the Cretaceous, it was not because we thought any part of it might be Tertiary, but because we suspected some of the lower beds referred to it in Kansas might possibly be Jurassic; and we are even now prepared to believe it may yet be found to repose on Jurassic rocks in that Territory, as it does at the Black Hills.

Descriptions of new Carboniferous Fossils.

The carboniferous species described in the following pages of this paper, were collected by us in Kansas, from the upper coal measures, extending up to the base of the Permian, through a series of strata holding a higher stratigraphical position than most of the coal deposits of the west. We found this series of rocks abounding, at places, in organic remains, mostly of the same species occurring in the coal measures of Missouri, along with a few others approximating to Permian forms.

Amongst our collections from these rocks we have identified most of the carboniferous species figured by Prof. Marcou in his work on the geology of North America, which represents a group of fossils characteristic of our western coal measures. We had hoped to have ready for this paper some remarks on the upper carboniferous and Permian rocks of Kansas, illustrated by many local sections, showing the range of the various fossils, but we have, for want of time, been compelled to defer these for another occasion.

Fusulina cylindrica, Fischer.

In our collections from the upper members of the Coal Measures of Kansas, we have great numbers of *Fusulina*, many of which agree so very nearly with figures

* It is of course unnecessary for us to inform geological readers that a rock overlaid by strata containing *Ammonites* and *Inoceramus*, cannot be Tertiary, because these genera became extinct at the dawn of the Tertiary epoch.

and descriptions of the species above cited, that we have thus far failed to find any reliable differences by which they can be distinguished. If these are really identical with *F. cylindrica* it not only proves that species to have had an immense geographical range, but to have existed through vast periods of time, since, according to Murchison de Verneuil and Keyserling, it is widely distributed in Russia, where it only occurs in the upper part of the lower carboniferous or mountain limestone series; while in Kansas it ranges through a great thickness of upper carboniferous rocks, much of which appears to be even more modern than most of the western coal measures.

F. cylindrica var. *ventricosa.*

Along with the forms above mentioned, which we regard as probably identical with *Fusulina cylindrica*, we find in some of the upper members of the coal measures in Kansas, others differing so much in size and form, that we even suspect they may possibly belong to a distinct species. These we propose to designate for the present as a variety of *F. cylindrica*, under the name of *ventricosa*, which will be a good specific name, should they prove to be distinct. They differ from *F. cylindrica*, as figured in Murchison de Verneuil and Keyserling's work on the geology of Russia, in being much larger, some of them measuring nearly half an inch in length, and 0.20 inch in diameter at the middle; they are also proportionably much more ventricose, and differ in being usually less symmetrical, in consequence of one side being more gibbous than the other. The transverse grooves marking the position of the septa also pass across the central ventricose region with more of a lateral curve than in the Russian specimens; while the edges of the septa themselves, when the outer shell is removed, are seen to be apparently less distinctly waved. Again the aperture in all our specimens is so very narrow as to appear entirely closed.

In the description of the Russian specimens it is said that young individuals are proportionably so much shorter and more fusiform than the old, that they might readily be mistaken for a different species; exactly the reverse, however, is the case with our Kansas specimens, the smaller individuals being more nearly cylindrical, while they appear to have become more gibbous with age, until in some cases they might be described as subglobose.

Locality and position.—This variety is found at Juniata on Blue river, and at Manhattan on the Kansas, far above all the coal beds yet discovered in Kansas.

ORTHISINA CRASSA, n. sp.

Shell thick, of medium size, subquadrate, rather compressed; hinge, generally a little less than the greatest breadth of the shell, but sometimes equalling it. Front broadly rounded; lateral margins more or less arcuate,—in some examples nearly straight. Surface ornamented by numerous straight radiating striæ, numbering near the beaks about thirty to forty on each valve, but increasing by the implantation of others between them, from one hundred, to about one hundred and twenty four, around the margin; these striæ are crossed by numerous fine elevated concentric lines, which are not only quite distinct in the spaces between, but on well preserved specimens are prominent on the striæ, to which they impart a sub-crenulate aspect, as seen by the aid of a lens. Adult specimens also generally have several strong concentric imbricating marks of growth.

Larger or ventral valve nearly flat, cardinal edge sloping a little towards the lateral margins; beak not very prominent or distinct, not incurved, sometimes a little twisted to one side; area rather broad, flat, and inclined obliquely beyond the cardinal edge of the other valve; deltedium thick and prominent.

Smaller or ventral valve moderately convex in the middle, concave on each side of the umbo, which is generally depressed: mesial tooth strong, and prominent, bifid. Length of a specimen a little above the average size 1·25, inch, breadth, 1·30 inch: transverse diameter of the two valves

Locality and position—Leavenworth City, K. T., in Coal Measures.

CHONETES MUCRONATA, n. sp.

Shell rather large, semicircular, having its greatest breadth on the cardinal border, which is usually extended into mucronate angles. Surface ornamented by a few sub-imbricating concentric marks of growth, crossed by fine regular closely set striæ, about one hundred and fifty of which may be counted around the border, where eight or nine of them occupy the space of one line.

Larger valve depressed, having generally a broad, shallow, undefined, mesial sinus extending from the front towards the beak. Ears sometimes separated from the central region by very shallow depressions, and often slightly curved upwards at the extremities. Cardinal margin sloping a little from the beaks, on each side of which it is ornamented by from eight to eleven tubular spines, directed obliquely outwards. Area rather wide and, having a broad deltoid aperture, with elevated margins.

Smaller valve following nearly the curve of the other; beak and central region concave; ears flat; area rather broad, but narrower than the other, and rectilinear. Interior provided with a small very slightly projecting bifid median tooth, which nearly closes the aperture of the other valve. From the base of this tooth there are five radiating ridges, two of which are rather obscure, and extend obliquely outwards near the cardinal edge, while a third extends at right angles to the hinge, a little more than half way across towards the front of the valve. The other two ridges are much shorter, and occupy an intermediate position between this median ridge and the lateral one, and are directed obliquely forwards and outwards. The whole interior is more or less granulose, the granules near the border being much smaller than the others, and ranged in rows parallel to the striæ on the outside. Breadth of largest specimen 1.13 in.; length 0·62 inch.

This species is very nearly allied to *C. Smithii*, of Norwood and Pratten, to which we we were at first inclined to refer it; a careful examination, however, of a large number of individuals in all conditions of preservation, has satisfied us that the striæ of the shell now before us are always entirely destitute of the pits so characteristic of *C. Smithii*. Our shell is also much more extended on the hinge line, which terminates in more acute angles; while there are not unfrequently eleven, instead of ten tubes on each side of the beak.

Locality and position.—Near Fort Riley, K. T., Upper Coal Measures.

AXINUS (SCHIZODUS) OVATUS, n. sp.

Shell ovate, most gibbous slightly in advance of the middle; anterior extremity broader than the other, somewhat narrowly rounded; posterior end narrow and compressed, obliquely truncate above, sub-angular below. Base semiovate in outline, the most prominent part being in advance of the middle; cardinal edge very short, straight and horizontal, meeting the obliquely truncate posterior margin at an angle of about one hundred and thirty degrees. Beaks located slightly in advance of the middle, elevated, and incurved at right angles to the hinge, rather distinctly angular down the posterior slopes and obliquely towards the lower part of the posterior extremity. Surface unknown. Length 0·65 inch; heighth 0·45 inch; transverse diameter of the two valves 0·20 inch.

This species appears to be about intermediate between *Schizodus truncatus*, King, and *S. rotundatus*, Brown, as represented by figures 27 and 30, plate xv., King's Permian fossils of England. From *S. rotundatus*, it differs in being more elongate, less broadly rounded in front, and much more obliquely truncate posteriorly; the hinge line is also shorter and more nearly horizontal. It differs from *S. truncatus* in the more nearly central position of the beaks, much shorter and less sloping cardinal edge; while its anterior extremity is more narrowly rounded.

Locality and position.—Cottonwood Creek, K. T., high up in Upper Coal Measures.

ALLORISMA ? ALTIROSTRATA, n. sp.

Shell oblong oval, very gibbous in the umbonal region ; beaks much elevated above the cardinal edge, incurved, and located over the anterior end. Posterior extremity more compressed, but apparently more or less gaping, rounded in outline, anterior end vertically subtruncate, somewhat gaping ; base nearly straight, or a little concave near the middle, rounding up towards the extremities. Cardinal border rather short, straight and inflected so as to form a moderately distinct, impressed area for the reception of the ligament. Surface of cast marked by concentric undulations, which are narrower, more regular, and distinct on the umbones and over their slopes, than towards the base and extremities. From the anterior side of the beaks, there is on each valve, an obscure sulcus descending obliquely and widening towards the middle of the base. Length 3·06 inch ; height from the base to dorsal margin 1·63 inch ; do. to highest part of beaks 1·74 inch ; greatest transverse diameter.

Having only seen an internal cast of this shell, showing neither the muscular nor pallial impressions, and giving no clue to the character of the hinge, there must remain some uncertainty respecting its generic relations. Its most marked peculiarity is the unusual elevation of the beaks, which gives it much the form of some of the Jurassic *Pholadomyas*. We know of no other shell from the whole Carboniferous System with which it can be confounded.

Locality and position.—Grasshopper Creek, K. T., Upper Coal Measures.

ALLORISMA SUBCUNEATA, n. sp.

Shell large, clavate, cuneate, gibbous in the anterior and umbonal regions, contracted and compressed posteriorly. Beaks depressed, incurved and removed about one eighth the length of the shell from its anterior extremity. Posterior end narrowly rounded, and apparently gaping a little; buccal end obliquely truncate above, rather narrowly rounded, and somewhat gaping below. Base nearly straight along the middle, curving up very gradually behind, and abruptly in front ; dorsal outline sloping slightly from the beaks towards the anal extremity. Surface of cast marked by more or less regular concentric undulations ; hinge long and straight ; lunule oval, not very well defined ; ligament area long and narrow, bounded on either side by a narrow obscure ridge, on the outside of which there is a long, parallel, shallow undefined sulcus. Anterior muscular impression lunate, the upper extremity curved back over itself so as to give the whole somewhat the form of the letter G ; posterior muscular impression, large, oval, ovate, or rhomboidal, located about one third the length of the shell from the posterior end ; pallial impression faint, having a deep angular sinus. Length 5·10 inch ; height 2·25 inch ; greatest thickness near the anterior end 1·70 inch.

This species is very similar to *Sanguinolites clava* of McCoy, but its ventral margin is straighter, its beaks rather more depressed, and its anterior border more narrowly rounded below the beaks. The lunette on the anterior side of the beaks, in our shell, appears to be less distinctly defined than is represented in Prof. McCoy's figure, while the anterior muscular impression in *S. clava* appears to be orbicular instead of lunate as in our shell.

Locality and position.—Leavenworth City, in upper coal measures.

ALLORISMA ? LEAVENWORTHENSIS, n. sp.

Shell very thin, oblong, subcylindrical behind, more compressed anteriorly; posterior end broad, rather obliquely truncate, very widely gaping, or even dilated at the margins ; buccal end narrowly rounded and nearly closed. Base almost straight, or but slightly convex, rounding up gradually in front and much more abruptly unto the truncate posterior border. Dorsal outline concave from the beaks to its elevated posterior extremity. Beaks moderately elevated, slightly flattened, more or less angular behind, incurved, and located about half way between the middle and the anterior end. Surface marked by obscure concentric undulations, which curve abruptly upwards parallel to the truncate anal margin; these undulations are crossed by radiating rows of very small granules, only visible by the aid of a lens.

The anterior muscular impression is oval, arcuate, and surmounted by a small accessory impression nearly detached from it. The posterior muscular impression is broad oval, not very deep, and placed close up under the posterior extremity of the dorsal edge ; from this impression, the pallial line descends, with a broad gently concave curve, so as to form a broad very shallow sinus.

Length 2·85 inches ; height from ventral margin to middle of dorsal edge 1·36 inch ; do. from ventral margin to a line drawn from summit of beaks to the elevated posterior extremity 1·50 inch ; greatest transverse diameter (near the centre) 1·11 inch ; breadth of posterior hiatus 1·07 inch , height do 1·44 inch.

Locality and position.—Leavenworth City, Kansas Territory, Coal measures.

Allorisma? Cooperi.

Panopæa Cooperi, Meek and Hayden. Trans. Albany Inst. vol. iv. p. 11. March 2d, 1858.

This species bears such a striking similarity, in form and general appearance, to some of the Jurassic and Cretaceous Panopæas, that we were at first lead to refer it to that genus, supposing as we then did, that it was a Permian species. Since that time we have collected specimens of it in Kansas, showing that the hinge is edentulous, consequently it cannot be a *Panopæa*; we therefore now refer it provisionally to the genera *Allorisma*, King, to which it appears most nearly related, though we are not quite sure it is a true *Allorisma.*

We found it ranging through a considerable thickness of the upper coal measures, but we do not think it ranges quite up into the Permian.

Locality and position.—Near Helena, Kansas Territory, Upper Coal Measures.

Pleurotomaria subturbinata, n. sp.

Shell rather thick, obliquely conical; spire moderately elevated, pointed at the apex; volutions six to six and a half, convex and angular in the middle, obliquely concave above, and having around the middle of the last one, just below the angle, a rather narrow revolving shallow sulcus. Umbilical region not much depressed, but perforated by a very small pit; aperture suborbicular. Surface ornamented by small revolving lines, only preserved on the under and outer sides of the body whorl in our specimen, which is somewhat worn, and shows no lines of growth. The angle on the middle of the whorls appears to be double, or composed of two closely set parallel lines ; suture linear but distinct.

Length 0·36 inch ; breadth 0·29 inch ; spiral angle regular, divergence 69°.

Locality and position.—Same as last.

Pleurotomaria humerosa, n. sp.

Shell ovate turbinate; spire turreted, moderately elevated and pointed at the apex. Volutions five to five and a half, very convex, more or less obliquely flattened or a little concave above, rounded below, and distinctly angular at the outer margin of the upper flattened side. Suture distinct; umbilical region slightly depressed, and having a very small perforation. Surface ornamented by about ten rather strong revolving lines, only four of which are visible on the turns of the spire, below the angle ; on the obliquely flattened space above, there are usually six or seven revolving striæ, which are not more than half as large as those below the angle. Aperture suborbicular. No lines of growth are visible on our specimens, which are somewhat worn.

Length 0·62 inch ; breadth 0·50 inch, spiral angle about 62°.

Locality and position.—Grasshopper creek, K. T., Coal Measures.

The following are the descriptions by Prof. Heer of the fossil plants from No. 1 of the Nebraska section, referred to on page 257.

1. *Liriodendron Meekii*, Mihi.

L. foliis trilolbatis, lobo medio apice rotundato, late emarginato, basi angustato, lobis lateralibus obtusis.

Differt a *L. Procaccinii*, Unger, et a *L. tulipifera*, L., lobis rotundatis et lobo medio basi angustato.

This leaf is furnished with a slender petiole, towards which it gradually diminishes ; the midrib extends to the apex ; towards the middle of the lobes on each side proceeds a secondary nerve, which also sends out on both sides tertiary nerves at rather acute angles. Further down on each side (near the base) is another secondary nerve, which inosculates with the former. This is a mode of structure which characterizes Liriodendron ; further up there arises very delicate secondary nerves, which likewise branch off from the petiole.

2. *Sapotacites Haydenii*, Mihi.

S. foliis obcordato-ellipticis, basi sensim attenuatis integerrimis penninervis, nervis secondariis numerosis, ramosis angulo-acuto egredientibus.

Affinis *S. mimusops*, Heer. Flora Tert. Helv. I. Taf. ciii. f. 4.

The leaf gradually diminishes toward the base, rounded toward the apex, rather deeply emarginate, margins entire. From the midrib which gradually becomes slender and dies out, proceed at acute angles very numerous secondary nerves which have the peculiarity of ramifying very much.

3. *Laurus primagenia*, Unger. Taf. 13, fig. 1 ?

Heer, Flora tertiar Helvet. Taf. lxxxvi. fig. 1.

The form and nervation agree as far as the leaf has been preserved, with the preceding species, only the leaf is diminished in a somewhat less degree toward the petiole, and prolonged toward the apex as in Unger.

It looks quite similar to the leaves of Laurus primagenia, which I have received from Corfe, in the Isle of Wight.

Dunker (Paleontographica, iv. Taf. 34, f. 2,) has figured a similar leaf as *Salicites Hartigi*, from the chalk of Blankenburg. But in this, along with stouter secondary nerves, there are always several more delicate ones.

4. *Leguminosites Marcouanus*, Mihi.

L. foliis magnis, obovalibus, apice obtusis, emarginatis nervis secondariis sparsis ; basilaribus approximatis.

The leaflet is very large, but ceasalpinia-like, at the base somewhat unequal, obtusely rounded. It is also rounded at the apex and deeply emarginate. The midrib dies out toward the apex ; secondary nerves very sparse and delicate, one on each side near the base, the next following ones distant and much curved.

In its form it reminds one strongly of *Cæsalpinia Falconeri*, but is much larger. It would, however, be important to know whether the leaf is leather-like or thin skinned. If the latter is the case, the leaf probably belongs to Cæsalpinia, but if it is leather-like, the Dalbergia are to be compared, as among them similarly shaped leaves are found.

5. *Populus leuce*, Unger. Taf. 15, fig. 6 ?

Phyllites leuce, Rossmassler, Blatter Von Altsaltel, Taf. 3, fig. 12 ?

Unfortunately this leaf is not preserved entire, and the margin is no where complete. So far, however, as the form can be determined, it agrees with *Populus leuce*, as also in the nervation. Thus we have a stout midrib, and from this mid rib above the base of the leaf proceeds on either side stout secondary nerves, which then send off outwardly two or three rather stout tertiary nerves, which are curved toward the apex. Besides these, springs forth on each side below them, but almost at the same spot, a delicate secondary nerve which does not ramify any further, but dies out near the margin. At about the middle of the height of the leaf, there springs from the midrib on each side, another secondary nerve, which runs nearly parallel with the basal one, and further above are two other similar ones. The nervules are curved, soms remaining single, others forked. In all these points the Nebraska leaf agreee with *Populus leuce*, but for a positive determination we must wait for leaves whose margins have been preserved.

A similar leaf from the Isle of Wight has been figured by Prestwieh (on the structure of the strata between the London clays, &c., Quart. Jour. x. pl. iv. fig. 1, 2), but in this (of which I have specimens before me) the lower basal nerves are much stouter, and the two upper ones are curved much more toward the apex, while the midrib cannot send forth any more such stout secondary nerves farther up.

At first sight the leaf also appears similar to *Credneria integerrima* Zenker, Paleontographica, but in this leaf the midrib is much stouter, and the side nerves are more bent and curved towards the apex, otherwise the nervules are of similar structures.

6. *Populus cyclophylla*, Mihi.

P. foliis orbiculatis, basi attenuatis, triplinervis, integerrimis.

Similar to the preceding, and may perhaps belong to that species as a younger leaf, yet the base of the leaf is attenuated toward the petiole, and there are at the base of the leaf only three nerves. On the supposition that the former leaf is *Populus leuce* it is assumed that it is rounded at the base, but should more perfectly preserved specimens show that, like the small one, it is diminished at the base into the petiole, it would form a species different from *Populus leuce*, as in this latter species the leaves are rounded at the base, and moreover possess some obtuse teeth on the margin.

7. *Phyllites obtusi-lobatus*, Mihi.

Folium trilobatum, lobis integerrimis, obtusiusculis.

Perhaps belonging to *Liriodendron Meekii*, but Liquidambar and Acer are also to be taken into consideration. It is, however, too imperfectly preserved to be determined with certainty. It seems to have three lobes with entire margins.

8. *Phyllites obcordatus*, Mihi.

Folium obcordatum, basi angustatum, integerrimum, nervo-primario ponecto, nervis secondariis angulo acuto, egredientibus, debilibus, subramosis.

Valde affinis Ph. clusiodes, Rossmassler, Beitrage 33, Taf. 6, fig. 24, et non nisi nervis secundariis fortioribus et ramulosis distinguænim.

The Corresponding Secretary read his report for the last two months.

The following reports from the Recording Secretary, the Librarian and the Curators were read:

REPORT OF THE RECORDING SECRETARY FOR 1858.

During the past year, Dec. 1, 1857, to November 30, 1858, there have been elected sixty-nine members and eight correspondents.

Of these thirteen members were not residents of the city at the time of their election.

Two members have resigned.

Three have forfeited their membership.

Seven have died, to wit: Mr. Charles McEuen, Mr. W. Frederick Rogers, Professor John K. Mitchell, M. D., Professor Robert Hare, M. D., the Hon. Job R. Tyson, Edward Minturn, M. D., and Gavin Watson, M. D.

The deaths of the following correspondents have been announced: Mr. George R. Gliddon, Mr. John A. Vancleve.

The following Papers have been read before the Academy, and ordered to be published in the Proceedings or Journal.

By Spencer F. Baird, "Description of a new Phyllistome Bat from California."

By W. G. Binney, two, to wit: "Notes on American Land Shells, No. 3 and No. 4."

By John Cassin, two, to wit: "Description of a new Tanager from the Isthmus of Darien, and Note on Selenidera spectabilis;" "Catalogue of Birds collected by A. A. Henderson, M. D., U. S. N., at Hakodadi, Island of Jesso, Japan, with notes."

By T. A. Conrad, "Observations on a group of cretaceous fossil Shells from Tippah Co., Miss., with descriptions of fifty-five new Species," published in the Journal.

By John Xantus de Vesey, "Descriptions of two new Species of Birds from the vicinity of Fort Tejon, California."

By George W. Fahnestock, "Memoranda of the effects of Carburetted Hydrogen upon a collection of exotic Plants."

By James C. Fisher, M. D., "Description of a new Species of the Genus Argynnis."

By Charles Girard, M. D., "Notes upon various new Genera and new Species of Fishes in the Museum of the Smithsonian Institution," etc.

By Edward Hallowell, M. D., "Descriptions of several new North American Reptiles."

By Edward Hallowell, M. D., and Joseph W. Jones, M. D., "Notes upon the Anatomy and Habits of Reptiles."

By Wm. A. Hammond, M. D., U. S. A., two, to wit: "Secondary formation of Blood Crystals," read before the Biological Department, "Observations on the effects of certain Vegetable Diuretics," read before the Biological Department.

By Henry Hartshorne, M. D., "Abstract of the Proceedings of the Biological Society of Philadelphia," read before the Biological Department.

By F. V. Hayden, "Notes to a Second Edition of a Geological Map of Nebraska and Kansas," etc.

By T. Charlton Henry, M. D., U. S. A., "Description of a new Toxostoma, from near Fort Thorn, New Mexico."

By Isaac Lea, LL. D., eight to wit: "Descriptions of exotic Genera and Species of the Family Unionidæ." "Descriptions of a new Helix and two new Planorbes." "Descriptions of eight new Species of Unios." "Descriptions of four new fresh water Mollusks from the Isthmus of Darien and Honduras." "Description of seven new Species of Margaritana and four new Species of Anodonta." "Descriptions of twelve new Species of Uniones and other fresh water shells of the United States." "Description of the embryonic forms of thirty-eight Species of Unionidæ," published in the Journal. "New Unionidæ of the United States," published in the Journal.

By John L. Le Conte M. D., three, to wit: "Descriptions of new Species of Coleoptera, chiefly collected by the U. S. and Mexican Boundary Survey under Major W. H. Emory." "Catalogue of Coleoptera of the regions adjacent to the Boundary Line between the United States and Mexico," published in the Journal. "Note on the Species of Eleodes found within the United States."

By Joseph Leidy M. D., two, to wit: "Notice of Remains of extinct Vertebrata from the Valley of the Niobrara River;" "Contributions to Helminthology."

By F. B. Meek and F. V. Hayden, M. D. "Descriptions of new organic Remains, collected in Nebraska Territory, etc."

By J. H. Slack, "Catalogue and notes on the Egyptian Antiquities in the collection of the Academy of Natural Sciences of Philadelphia."

By William Stimpson, four, to wit: "Prodromus Descriptionis Animalium evertebratorum, quæ in Expeditione ad Oceanum Pacificum septentrionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rogers ducibus, observavit et descripsit W. Stimpson, Partes tertia, quarta, quinta et sexta."

By W. J. Taylor, "Mineralogical Notes."

By P. R. Uhler, "Descriptions of new species of Neuropterous Insects, collected by the North Pacific Exploring Expedition, under Com. J. Rogers.

By Alexander Wilcocks, M. D., "Researches on an Optical Illusion."

During the year the By-Laws have been amended as follows :

A new Chapter has been made, entitled Chapter XII ; on the Creation and Government of Departments. (See Proceedings 1858 p. 15.)

Under these laws the Department A. has been organized and denominated the Biological Department. It has been in active operation since April last, and its contributions to the Proceedings of the Academy attest the zeal and activity of its members.

The By-Laws have been also amended, as follows :

CHAPTER X.

Committee on Proceedings.

Art. I.—The Committee on Proceedings, immediately after its election shall appoint from among its members a Secretary, a Treasurer, and a Distributor.

The Secretary shall attend to the editorial management of all matters assigned to the care of the Committee for printing or publication.

The Treasurer shall have charge of whatever relates to the finances of the Committee. He shall keep a careful account of its receipts and expenditures, and pay quarterly to the Treasurer of the Academy all monies received. He shall also keep a correct account of the number of copies of the Proceedings printed, the number issued to subscribers and the number exchanged, and report the same with a statement of his accounts for the year to the Academy, at the meeting for business in December of every year, and the Distributors shall attend to the prompt transmission of copies of the Proceedings to subscribers, as well as to Societies and Periodicals with which exchanges are made.

Art. II.—It shall be the duty of the Committee to receive all Papers ordered by the Academy to be published in the Proceedings, and to print the same in a proper manner, and as far as practicable in the order in which they have been reported by Committees. Also, to prepare and publish such abstracts from the Proceedings of the Academy as it may deem expedient, as well as summaries of verbal communications, made at meetings of the Academy or any of its Departments, but only from notes furnished by the author, which the Committee is hereby authorized to modify or decline, subject, however, to an appeal to the Academy.

Also, to superintend the printing and distribution of such memoirs, catalogues, etc., as the Academy may order to be published : and

Also, to read and correct the proof sheets of all papers, which shall likewise be submitted, when practicable to their respective authors.

Art. III.—The Committee is hereby authorized to exchange the Proceedings for other periodical publications, connected with the Natural Sciences, provided that the Academy may at any time direct the discontinuance of such exchanges.

Art. IV.—No copy of the Proceedings shall be presented to any individual or society, except by order of the Academy, but the Committee may sell single volumes at twenty-five per cent. advance on the price to subscribers.

Article V.—No author shall be permitted to make any other than verbal alterations in a Paper while it is in the hands of the Committee on Proceedings, without the consent of the Academy, nor shall the Committee make any alterations in a paper committed to it, without the consent of the author. All alterations proposed, (other than verbal), must be read to the Academy, and if the types have been set, they shall be made only at the expense of the author.

Article VI.—All illustrations of publications in the Proceedings shall be at the cost of the author, unless otherwise ordered by the Academy ; and drawings of the same shall be considered his property, and shall be returned when called for.

Article VII.—Authors of communications printed in the Proceedings are privileged to obtain any number of separate copies thereof from the printer on such terms as the parties may agree; but in no instance shall the Academy be held responsible for the expense.

Article VIII.—The Committee shall be responsible for the proper and methodical arrangement of the material published, and for the prompt appearance of the Proceedings, whenever sufficient matter has accumulated for the completion of sixteen pages; and if any portion thereof, in the opinion of two-thirds of the members present at the meeting for business next succeeding its publication, shall be negligently prepared, the same shall be reprinted at the cost of the Committee.

Article IX.—On all points connected with the management of the Proceedings, not provided for in this Chapter, the Committee shall be governed by special direction of the Academy.

Amend Article III. Chapter IX. by inserting after the word publication in the second line, the words "in the Journal."

Also, amend Article I. Chapter VI. by striking out all after the words "in the library" in the 6th line, and inserting "13, the Auditors each to consist of three members; 14," the Publication Committee, and 15, Committee on Proceedings, each to consist of five members, whose term of service shall be one year; and all these, except the Auditors and Publication Committee, shall be elected at the last meeting in January of each year.

Amend Chapter VI. Article VIII. by inserting after the words "Chapter IX." in the 2d line, "and the Committee on Proceedings shall have charge of the other publications of the Academy under the rules prescribed in Chapter X, and they," and strike out the word "and" after the words "Chapter IX."

Change chapters X. and XI. to XI. and XII. and Chapter XIII. to Chapter XIV. All of which is respectfully submitted

B. HOWARD RAND, M. D.
Recording Secretary.

Hall of the Academy, 28th December, 1858.

LIBRARIAN'S REPORT FOR 1858.

During the present year, ending December 28th, 1858, 422 volumes and 1146 periodicals and pamphlets have been added to the Library of the Academy. The various subjects on which these treat, and the number belonging to each subject, are shown in the following table:

General Natural History and Mammalogy	136
Ornithology	146
Conchology	53
Entomology	59
Botany	47
Geology, Palæontology and Geography	126
Anatomy, Physiology, &c.	59
Mineralogy	24
Herpetology and Ichthyology	6
Ethnology	3
Physics and Chemistry	39
Transactions, Journals, Proceedings, Reports, &c. of Societies	759
Voyages and Travels	73
Medicine	3
Biography	4
Miscellaneous	31
Total	1568

Of the above works 76 have been contributed by authors, 84 by editors, 51 by members, correspondents and others, 351 by societies and corporations, and 996 by Dr. T. B. Wilson, making a total of 1768 additions to the Library in 1858.

During the year 962 volumes have been substantially bound; 365 are still in the hands of the binders, making in all 1327 volumes.

It will thus be seen that the Library was never in a more flourishing condition, nor in a better state of preservation than at the present time.

Respectfully submitted,
JAS. AITKEN MEIGS.

REPORT OF THE CURATORS FOR 1858.

The Curators, through their annual report, take the opportunity of expressing their pleasure in announcing to the Academy, that the Museum, so long confided to the supervision and care of the same gentlemen, is in the best state of preservation, and is gradually and steadily advancing in its arrangement. They also take occasion to express regret at the resignation of one of their number, Mr. Ashmead, who has for seventeen years devoted attention to the increase and preservation of the collections of the Academy.

In most of the departments of the Museum, for some years past, members have been actively engaged in the arrangement and labelling of specimens, but up to the present time, two important collections, those of recent Radiates and Invertebrate Fossils, have been entirely neglected. The collection of Fossils, just mentioned, is a very large and important one, but loses much of its value from the difficulty of applying to it in its present condition. We hope, before long, some of the members may be induced to give it the attention that has been devoted to other departments.

During the past year Mr. Slack has given his aid in the labelling of the collection of Mammalia. Our collection of Birds, which has few parallels in the world, is in excellent condition, and is steadily advancing in its arrangement through Dr. Wilson; who has also further enriched it, during the last year, with many rare specimens. The collection of Reptiles, well arranged and labelled by Dr. Hallowell, has unfortunately lost the services of the latter, temporarily it is to be hoped, from illness, as many of the members are aware. The collection of Fishes continues to be arranged by Drs. Bridges and Morris.

Mr. Binney, who has been engaged for several years in arranging the collection of Mollusks, has given us the following information.

The collection of shells consists of about 9,000 species of many varieties. About one half are labelled. All the terrestrial and fluviatile species have been carefully studied; and the names attached to them may be depended upon. The marine genera have been labelled from monographs, and through the assistance of friends familiar with them. A large part of them have the names attached by Sowerby, Cuming, and Verreaux, from whom they were purchased. In the arrangement of the collection, Jay's catalogue has been used, and the author's system followed. The Gasteropods commence in the western part of the hall: the Tropiopods in the eastern part; and the labels are on cards adopted in the other departments of the Museum—distinguishing the principal parts of the world by colors. A large portion of the Conchological collection is contained in the drawers beneath the cases in which the others are exposed to view. The Academy is indebted to Mr. J. G. Anthony, of Cincinnati, for the determination and labelling of the Naiades. The principal contributors to the cabinet of conchology have been Messrs. Say, Griffith, and Wilson.

The collection contains many of the types of American authors, as follow: 2 species *Anculosa*, Anthony; 4 *Amnicola*, Say, Anth., Lea; 2 *Ampullaria* Say; 2 *Amphidesma* Say; 1 *Astarte* Say; 1 *Achatina* Say; 1 *Cochlodesma* Conrad; 1 *Corbula* Say; 5 *Cyclas* Say; 1 *Crepidula* Say; 2 *Cylindrella* Gould; 1 *Cerithium* Say; 1 *Donax* Say; 1 *Dentalium* Stimpson; 2 *Helicina* Say; 14 *Helix* Say, 6 Binney, 4 Gould, 1 Green, 1 Lea; 17 *Limnea* Say, 1 Adams; 1 *Mya* Conrad; 1 *Mactra* Say, 1 Con.; 1 *Merodesma* Con.; 1 *Modiola* Say; 1 *Mytilus* Say; 8 *Melania* Say; 8 Con., 4 Anth., 2 Ravenel, 1 Lea; 1 *Melampus* Say; 1 *Natica* Couthouy; 1 *Nassa* Say; 2 *Nucula* Couth.; 1 *Patella* Say; 2 *Physa* Say; 4 *Planorbis* Say; 1 *Porena* Say; 3 *Pupa* Say; 8 *Paludina* Say, 2 Lewis, 1 Con.; 1 *Pandora* Say; 1 *Sigaretus* Say; 2 *Succinea* Say, 2 Binney, 1 Gould; 1 *Solecurtus* Con.; 2 *Sanguinolaria* Con., Say; 1 *Saxicava* Say; 2 *Turbo* Say, Couth.; 8 *Unio* Say, 1 Lea; 2 *Valvata* Say.

Mr. Durand informs us that the North American Herbarium of Phaenogamous plants and ferns, containing about 10,000 species, is now completed.

The donations to the different departments of the Museum for 1858, are as follows:

Mammals.—Of these, 40 specimens of 14 species from Kansas, were presented by Dr. W. A. Hammond, U. S. A. Ten other specimens of 8 species were presented, principally by Dr. Corse, and his excellency W. F. Packer.

Birds.—Fifty-seven species from Japan, the Phillipines, and China, were presented by Dr. A. A. Henderson, U. S. N.; 15 specimens of 10 species from Kansas by Dr. Hammond; and 15 of 12 species by Messrs. Vaux, Sergeant, J. H. Powel, etc.

Reptiles.—Of these, R. Swift, Esq., of St. Thomas, W. I., presented 60 specimens of 12 species; S. Drinker, of China, 18 of 12 species; J. H. Slack, 47 of 11 species; Dr. J. C. Fisher 16 of 9 species; Dr. Henderson 9 of 3 species; and 18 of 10 species were presented by Messrs. Wood, Richardson, etc.

Fishes.—S. Drinker of China presented 6 species; W. C. Taylor 8 species; Mr. Slack 24 of 9 species; Dr. Fisher 15 of 4 species, Dr. Goddard 5 of 2 species; and 12 of 10 species were presented by Edward Harris and others.

Mollusks.—Mrs. R. Pierpont of this city, presented a choice collection, containing about 1,000 species of shells from all parts of the world. W. G. Binney presented 110 species of rare land and fluviatile shells; James Postell 517 specimens of 74 species of shells; Rev. E. R. Beadle 20 species; W. A. Haines 12 species; F. A. Sauvalle 52 of 20 species; J. G. Anthony 15 species; and about 500 specimens of 100 species were presented by Messrs. Pease, Farquhar, Moore, Allen, Henderson, B. H. Coates, Thompson, Wurdeman, and the Smithsonian Institution.

Articulates.—Of Crustacea 20 specimens of 15 species were presented, principally by W. C. Taylor and Dr. J. L. Le Conte.

Of Insects, F. Schafhirt presented 2129 of 709 species of coleoptera and 280 of 75 species lepidoptera; Dr. Leidy 1484 of 500 species lepidop., hymenop., orthop., dip., neurop., and coleoptera; Dr. J. C. Fisher 614 of 193 species do.; S. Powel 295 of 90 do.; C. C. Abbott 167 of 129 do.; Dr. J. L. Le Conte 140 of 65 do.; E. T. Cresson 511 of 400 do.; Dr. R. Bridges 90 of 36 do.; James Ridings 50 of 30 species of diptera; J. S. Hawkins 79 of 62 lepidoptera; Dr. F. V. Hayden 95 of 55 species orthop., dip., hemip., hymenop.; Samuel Powel, Jr., and J. Hare Powel, Jr., 415 of 215 lepidop., dip., hymenop., hemip., orthop., neurop., and coleop.; E. Tilghman 50 of 20 do.; J. D. Sergeant 32 of 20 do.; and Messrs. A. A. Henderson, Drexler, and Remont 124 of 60 do.

Of Arachnides and Myriapods there were presented 94 specimens of about 40 species by Messrs. C. C. Abbott, E. T. Cresson, S. Drinker of China, J. S. Hawkins, and Dr. J. M. Sommerville.

Radiates.—Dr. A. A. Henderson presented 16 species of corals from Singapore; besides which we have received 9 specimens of corals and echinodermus.

Anatomy.—Dr. Hammond presented 2 Indian skulls; Dr. J. E. Semple, U. S. N., 2 Oriental skulls; and 11 others were deposited by Drs. T. J. Turner and J. A. Meigs. Of skulls of mammals, 5 have been presented, by Messrs. Hammond, Vaux, J. B. Fisher, and J. M. Naglee. Two skeletons were presented by Mr. Ashmead, and Dr. S. W. Mitchell.

Organic Remains.—Of vertebrate remains, those of the *Hadrosaurus Foulkii* recently presented to the Academy by W. Parker Foulke, are the most valuable. To Dr. J. M. Hines, W. A. B. Norcom and Eppes we are indebted for numerous miocene cetacean remains from North Carolina and Virginia. Of other vertebrate fossils, there were 76 specimens, principally presented by Messrs. Jeanes, Sergeant, Powel, Slack, Camac, Johnston, and Moore. There were further obtained by exchange, 180 specimens of vertebrate fossils and casts from France. Of invertebrate fossils, Dr. W. Spillman presented 70 of 21 species from the Greensand formation of Mississippi; and there were about 103 from various localities, presented by Messrs. J. M. Hines, T. P. Cleveland, S. W. Clanton, H. and R. Cox, D. Christy and others.

Of fossil plants 12 specimens were presented.

Mineralogy.—Besides a small collection of minerals from Dr. S. W. Mitchell, we have received 63 specimens from Messrs. Trautwine, Le Conte, R. C. Ludlow, Vaux, Coleman, etc.

Miscellaneous.—Of miscellaneous specimens there were received 33 specimens.

Through the Biological Department we have received 213 mounted microscopic specimens, principally from Messrs. S. Powel, J. H. Slack, J. Queen, W. A. Hammond, and J. C. Morris. In addition, we have obtained in this way 11 miscellaneous specimens.

In conclusion the Report is respectfully submitted by

JOSEPH LEIDY,
Chairman of the Curators.

The Treasurer's report was read and referred to the Auditors.

The Publication Committee laid on the table Part 1, Vol. 4, of the second series of the Journal, and by permission their report was postponed until the next meeting for business.

The following was unanimously adopted:

Resolved, That it is with regret the Academy has received the announcement from the President, Mr. George Ord, that he no longer can retain the office he has held with so much satisfaction to the members and advantage to the interests of the Academy, and that in his retirement he carries with him the best wishes of his fellow members for his future welfare and happiness.

The election of officers for the ensuing year was held in accordance with the by-laws, with the following result:

President,	Isaac Lea.
Vice-Presidents,	Robert Bridges, John LeConte.
Correspondent Secretary,	John L. LeConte.
Recording Secretary,	B. H. Rand.
Librarian,	J. Aitken Meigs.
Curators,	Joseph Leidy. Wm. S. Vaux, John Cassin, J. D. Sergeant.
Auditors,	Joseph Jeanes, Wm. S. Vaux, Aubrey H. Smith.
Publication Committee,	Wm. S. Vaux, Robert Bridges, Isaac Lea, W. S. W. Ruschenberger, Joseph Leidy.

Elections in 1858.

The following gentlemen were elected members, viz:

Jan. 26. Edward S. Clarke, T. G. Richardson, M. D., James W. Queen, James McClune.

Feb 23. Daniel R. Bennett, Wm. D. Hoyt, M. D., Edward Tilghman, Charles P. Williams, Henry D. Schmidt, Henry Wharton, William Y. McAllister, Henry C. Wayne, U. S. A., James M. Sommerville, M. D.

March 30. Joseph Johnson Brown, Philip R. Uhler, Harry C. Hart, M. D.

April 27. Ezra T. Cresson, Charles Neff, M. D., Henry E. Drayton, M. D., William Stimpson, Robert Kennicott, Henry Ulke, James H. Hutchinson, M. D., T. P. Dimpfel, David L. Huntington, M. D., Blencour E. Fryer, George Dawson Coleman, Thomas Kimber, Jr.

May 25. Lemuel Stephens, George W. Norris, M. D., William D. Parrish, Samuel Kneeland, Jr., M. D., Myron Tompkins, M. D., John Hare Powel, William F. Norris, Thaddeus Norris.

June 29. Rev. Wm. P. Breed, John S. Kitchen, M. D., U. S. N. Charles Izard McEuen, A. Snowden Piggot, M. D., William Lowber M. D., U. S. N., James Starr.

July 27. James Ridings, Atherton Blight, J. Gibbons Hunt, M. D., Samuel B. Buckley, Joseph E. Parker, M. D.

Aug. 31. Pierce Butler, George Davidson.

Sept. 28. John M. Dow, Charles A. McCall, M. D., John H. Janeway, M. D., Arthur M. Edwards.

Oct. 26. William H. Stewart, George Thurber, Daniel Egbert, M. D., U. S. N., Arthur H. Grimshaw, M. D., Oliver A. Judson, M. D., Victor Guillou, George I. Dacosta, Pierce B. Wilson.

Nov. 30. Jas. A. Darrach, M. D., Jos. Jones, M. D., H. Frazer Campbell, M. D.

Dec. 28. Samuel W. Wilson, M. D., Christopher Johnson, Barnet Phillips, James S. Whitney, T. Edwards Clark.

The following gentlemen were elected Correspondents, viz:

Feb. 23. Thomas Bland, N. Y.

April 27. Henry Clifton Sorby, Sheffield, Eng.

June 29. Auguste le Jolis, Cherbourg, France, Prof. Arnold Guyot, Princeton, N. J.

Oct. 26. Prof. O. M. Mitchel, Cincinnati, Ohio, Prof. Benj. Peirce, Cambridge, Mass., Baron R. von Osten Sacken, Russian Legation, Washington.

Nov. 30. Prof. F. W. Beneké, M. D., Hesse Cassel.

BIOLOGICAL DEPARTMENT,

OF THE

ACADEMY OF NATURAL SCIENCES

OF PHILADELPHIA.

Hall of the Academy of Natural Sciences.
April 27th, 1858.

In compliance with Art. XVIII, of the 13th chapter of the By-Laws of the Academy, the following Summary of the Proceedings of the Biological Department, for the present month, is respectfully submitted:

The organization of the Department was completed April 5th, by the election of the following Officers and Committees.

Director.—Jos. Leidy, M. D.

Vice Director.—Wm. A. Hammond, M. D.

Recorder.—Henry Hartshorne, M. D.

Conservator.—J. Cheston Morris, M. D.

Treasurer.—Jas. W. Queen.

Auditors.—B. H. Coates, M. D., Geo. Spackman, M. D., and J. H. Slack.

Committee on Anatomy and Histology.—Jos. Leidy, M. D., T. G. Richardson, M. D., H. D. Schmidt.

On Physiology.—F. G. Smith, M. D., J. Aitken Meigs, M. D., S. W. Mitchell, M. D.

On Pathology and Pathological Anatomy.—E. Hartshorne, M. D., J. J. Woodward, M. D., Emil Fischer, M. D.

On Organic Chemistry.—W. A. Hammond, M. D., B. Howard Rand, M. D., F. G. Smith, M. D.

On Micrology.—J. Cheston Morris, M. D., Edward Minturn, M. D., Edward Tilghman.

On Embryology and Teratology.—Walter F. Atlee, M. D., J. M. Corse, M. D., C. Stewart Wurts, M. D.

On Etiology and Hygiene.—Henry Hartshorne, M. D., G. R. Morehouse, M. D., Alex. Wilcocks, M. D.

The following is a Catalogue of the Specimens and Books donated to the Department by the Philadelphia Biological Society:

Specimens.—1. Model of a foot of a Chinese lady; from Dr. Hammond.

2. Peracephalous fœtus; from Dr. W. F. Atlee.

4. Œolus; from Jas. W. Queen.

5. Human Embryo and Membranes, (2nd month).

Books and pamphlets.—1. Medical Statistics of U. S. Army, from 1839 to 1854; from the War Department.

2. U. S. Army Meteorological Report; from the same; through Dr. Hammond.

3. Byrne on Cholera; from Dr. Hammond.

4. Transactions of Am. Med. Association, for 1857; from Dr. Hammond.

5–8. Smithsonian Reports, for 1854, 5 and 6; from the Smithsonian Institute.

9. Der Harnstoff als maas der Stoffwechsels, von T. L. W. Bischoff; from Dr. Hammond.

10–12. Works of Robert Boyle, 1699; from J. H. Slack.

North American Medico-Chirurgical Review, 1858, Nos. 1 and 2.

50 copies of Dr. Hammond's Essay on the Alterations induced by Intermittent fever in the physical and chemical qualities of the Urine, and on the action of the Disulphate of Quinine.

Dr. James' Medical Dictionary, 3 vols., quarto; deposited by Dr. Hammond.

Also, a portrait of Prof. Ehrenberg, of Berlin, presented by Mr. James W. Queen.

The following were presented April 19th, 1858.

American Journal of Medical Sciences, Jan. and April, 1858.

Leeuwenhoekii Arcana Naturæ: Swammerdammii Historia Insectorum Generalis; from Mr. W. G. Tilghman, through Mr. Edward Tilghman.

The *papers* read before the Department during the present month, were as follows:

Observations on the Blood of the Sturgeon. By S. W. Mitchell, M.D. Referred to a Special Committee.

Summary of the Transactions of the Philadelphia Biological Society; by Henry Hartshorne, M. D., Recording Secretary. Referred to a special Committee.

Essay on the Supra-renal Capsules; by J. Darby, M. D. Referred to the Committee on Physiology.

A case of Fatty Degeneration of the Heart. in which death followed the inhalation of chloroform. By W. A. Hammond, M. D., U. S. A. Referred to the Committee on Pathology.

A *verbal communication* was made by J. Cheston Morris, M. D., April 5th, in connection with the exhibition of a human embryo, ten or twelve days old. A report of the *discussions* which have taken place in the Department during the month will be prepared and submitted hereafter.

HENRY HARTSHORNE, *Recorder.*

Observations on the Blood Crystals of the Sturgeon.

BY S. WEIR MITCHELL, M. D.

While studying the blood of the sturgeon some time ago, I observed certain facts of interest in regard to the crystallization of the albuminoid contents of the blood corpuscles. In man, it is difficult to obtain blood crystals, and in some cases I have totally failed to form them from his blood. In the sturgeon, the tendency on the part of the blood to undergo this change is so great that it is difficult to check the formation of crystals where their presence is undesirable. Two methods of procuring the crystals may be employed:

1st. A drop of fresh blood is placed on a slide, and allowed to evaporate to one half of its bulk. An equal quantity of distilled water is next added, and an over glass superimposed. The crystals sometimes appear in a few minutes, but more often they are first seen within periods varying from one hour to ten. Once begun, the process continues slowly for some time.

2d. A readier mode, where time is not an object, is to allow the whole mass of blood to stand in an open vessel exposed to light, and to a temperature of 60° or 70° F. Decomposition occurs slowly. The clot dissolves within a week, and the mass of blood becomes dark and very fluid. When evaporation is allowed to take place for a length of time, the blood becomes very offensive, and of a tar-like consistency.

At any time after forty-eight hours, a drop of this blood will yield by slight evaporation, without added water, the most beautiful crystals. After this period, the crystals form abundantly in the mass of blood, and may be easily examined.

The crystals formed in the two ways just described are essentially alike, but, as other crystals of a different character occur with them, it is necessary to describe all the forms which present themselves.

The first crystals which form, in whatever mode the blood be treated, are of two kinds, neither of which are of albuminous nature. On plate 1, fig. 1, are drawn certain short abruptly acuminated crystals of a pyramidal form. These occur early, and are colorless, or nearly so. They strongly refract light, and are soluble in excess of ether, and in liq. potassæ, and insoluble in water. They disappear from the decomposing blood within two or three days after their formation. They are probably of a fatty character. We also observe in the blood very beautiful groups of long, shining, colorless needles, and slender, double pyramids. See pl. 7, fig. 2. These also appear before the true albuminoid crystals are seen; the addition of a little water readily dissolves them. They are undoubtedly of a saline character.

The 3rd set of crystals in order of formation are the true albuminoid crystals. These magnificent microscopic objects present themselves in the sturgeon blood either as hexagonal columns, or as sections of these, constituting hexagonal tablets of the utmost beauty, pl. 2, 3, and 7. Granting these crystals to be of albuminoid character, as Lehmann, Franke, and others have clearly made out there are some additional points of sufficient interest to deserve remark.

The mechanical behaviour of the crystals adds to the proofs of their animal character. Thus in place of being dissolved by certain re-agents, they become contracted and deformed, but lose no bulk. Again, if the cover glass be pressed down upon a large tetrahedron from the Guinea pig's blood, the crystal will sometimes break up, but occasionally one will yield to the pressure, and flatten out into a disc, resuming its angular form again when the pressure ceases. Here then are elastic crystals.

The persistency with which these delicate albuminoid bodies retain their form when left in the putrefying blood is very remarkable. Thus, on the third of July I placed some sturgeon blood in a vial. It soon presented an abundance of crystals which remained in it quite perfect up to the April following, when I threw it away. During this period the blood was utterly putrid, and developed foul gases to such an extent as to drive the cork out repeatedly.

This fact is the more singular, because almost every chemical re-agent acts on these crystals destructively, and because I have failed to preserve them as microscope specimens after very numerous efforts.

These columns and hexagons are, I believe, larger than any blood crystals hitherto studied. I have formed them of one-eighth to one-twelfth of an inch in length.

One chemist, Lehmann, is of opinion that the red coloring matter of the blood, which so adds to the beauty of these crystals, is an essential chemical constituent. Against this view it may be urged: first, that the color varies even in crystals of equal thickness; second, that I have often been able to bleach a crystal, or at least destroy or wash out its color with alcohol and water, without injury to its form. Third, that I have been able to re-dissolve the crystals in water and obtain them again by careful evaporation, devoid of color, but unchanged in crystalline type. My friend Prof. C. Johnston, of Baltimore, has obtained a like result with the blood crystals of the opossum.

The blood crystals of the sturgeon I have found to be the same in form, from whatever part of the body obtained. In the spring of 1854, I opened a young sturgeon, whose spleen was very large, and absolutely stuffed with blood crystals, whose form was the same as that of the crystals obtained by artificial means. Very frequent examinations of the blood crystals of man have afforded me like results for him, and have shown how permanent is the type of crystalline form in his case. The blood of the male, the female, the fœtus and placenta; and the blood of many diseases, as dysentery, measles, cholera, typhoid fever, yellow fever, pneumonia, etc., gave in every case the same form of blood crystal.

Prof. Johnston, of Baltimore, informs me as a contrast to this statement, that the splenic vein blood of the opossum affords tetrahedral forms, whilst all the other blood of this animal yields rhombic crystals.

The reactions afforded by the blood crystals of the sturgeon are difficult to follow, since many agents completely disintegrate or fibrillate them, without acting as solvents. Others, as liq. soda and liq. potassæ dissolve them readily, and at the same time so affect their coloring matter as to give rise to a succession of tints, usually resulting in some shade of green.

Hot water acts readily as a solvent; cold water, in excess, has a like effect after some hours.

Hydrochloric and sulphuric acids dissolve the crystals easily. Nitrate of silver merely blackens them. Alcohol contracts, swells, and at last granulates them.

In good glycerine, the crystals lose color, but remain intact as to form for many days, so that it may be possible to use this agent as a means of preparing them for the microscopic cabinet.

Otho Franke, who has made numerous researches upon blood crystals, first observed the occurrence of crystals *within* the envelope of the human blood corpuscle. I have frequently seen examples of this phenomenon in the large corpuscles of the sturgeon. The crystals are as usual hexagonal plates, capable of being re-dissolved, so as to give back to view the original outline of the corpuscle. In some instances the nucleus is seen through the crystal, or along side of it, but I am not sure that it is caught or included within the crystal itself, pl. 6.

The last fact to which I desire to call attention, is, I think, quite novel, and certainly very interesting, as illustrative of some points in pathology. When a glass slide containing a group of the crystals is kept for some weeks, the crystals slowly dry, crack in many directions, and by degrees alter in color so as to exhibit very beautiful tints, such as yellow, orange, purple, and varied shades of green.

The same phenomenon may also be seen in the nebulous masses of pigment, in dried blood which has not crystallized. It is to be presumed that these changes of color are due to the slow oxidising influence of the atmosphere. They recal very strikingly the alterations of tint undergone by the leaf in Autumn, and are best comprehended by a glance at the illustrations which accompany this paper. Pl. 2, 3, 4, 5.

March, 1858.

Summary of the Transactions of the Philadelphia Biological Society.

Reported by Henry Hartshorne, M. D., Recording Secretary.

Jan. 18*th*, 1858. Dr. Wm. A. Hammond read a paper "*On the Injection of Urea and other substances into the blood;*"* giving an account of several series of experiments instituted in order to determine the correctness of Frerich's explanation of uræmic intoxication, by the conversion of urea into carbonate of ammonia, and resulting, among other conclusions, in the opinion, that this theory fails to be sustained, and that the carbonate of ammonia is not, itself, more poisonous than urea.

In the brief discussion which ensued, the fact, mentioned in the paper, of the non-appearance of ammonia in the breath after the injection into the blood of urea mixed with vesical mucus, was noted, as being contrary to expectation based on other facts. Dr. Hammond explained that, in his view, the conversion of urea into carbonate of ammonia, which occurs in the presence of mucus out of the body, will not take place in living blood.

Dr. S. W. Mitchell remarked that *healthy* mucus has not been found to hasten this decomposition of urea; but that, out of the body, urea will, without any ferment, undergo spontaneous conversion.

Reduction of temperature by depletion.—Dr. S. W. Mitchell mentioned that, having occasion, recently, in a case of insanity, to take from a patient a very large amount of blood—189 fluid ounces—in a short space of time, he observed

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* See N. Amer. Medico-Chiurg. Review, March, 1858.

that the temperature of the blood underwent a marked decrease with each depletion. Being, at the first, 100° Fahr., it fell by degrees to 96.2°. During subsequent convalescence it again gradually rose, being at the time of the last examination, 98.7°.

Intestinal absorption.—Dr. JOSEPH LEIDY made the following remarks :

The observation of Goodsir, that the epithelium of the intestine appears frequently to be thrown off in laminæ, exposing the basement membrane so as to absorb directly, has been generally denied by others ; but the true mode of shedding the columnar epithelium of the intestine has not yet been demonstrated. In examining the intestinal canal of insects, as flies, beetles, grasshoppers, &c., the structure of which, although very delicate, is essentially the same as that of the intestine of higher animals, having a columnar epithelium upon a basement membrane, and beneath this a muscular tunic—on placing the mucous membrane upon the object-glass of a microscope while yet living, Dr. LEIDY observed that, when a little water was added, endosmose taking place, the oldest and thinnest cells received the fluid most rapidly, while these were pushed out by the presence of others, thus squeezing the liquid through them. It is, therefore, probable that the epithelium is shed *cell by cell*, the oldest cells being crowded out by the new ones forming beneath. This can be seen by any one under the microscope in the intestine of the common house-fly. The nutritious matter in contact with the epithelial cells passes into them by endosmose, and thence through the basement membrane into the subjacent vessels. Dr. LEIDY has never seen the epithelium stripped off in layers, although he has often watched the process in mice, serpents, salamanders, and frogs, in all of which the mucous membrane has a similar structure. He has, however, very often observed the new cells pushing themselves between the old ones, altering their shape,—the round ones being seen at the bottom, and the elongated oval or pear-shaped ones above.

Feb. 1st. Oxaluria.—Dr. J. CHESTON MORRIS remarked that it is only within the last 35 years that the occasional occurrence of oxalate of lime in the urine has been noticed. At first it was only surmised to exist in this excretion from the fact that calculi were often found to consist partly of it. But soon after the perfection of the microscope, and its general employment in clinical investigation, octohedral crystals of various sizes and great brilliancy were observed, which were proved by chemical investigation to consist wholly of this salt. The discovery of the nature of these crystals would probably have been made earlier, had not observers been led astray by the fact that oxalate of lime, when precipitated ordinarily from solutions of lime-salts by oxalate of ammonia, is amorphous. Lehmann, however, states that when extremely dilute solutions are used, and the precipitate is examined with high powers, minute octohedra may be distinguished. It is obvious, however, that in physiological chemistry some circumstance must exist, modifying the mode of formation of this most insoluble salt, as we find it occurring in quite large and beautiful crystals, as in the cells of various plants, and even in the urine of man and other mammalia. This modifying circumstance I take to be the extremely gradual formation of oxalic acid in the course of the chemical changes constantly taking place in all organic fluids. The formation of oxalic acid is always due to the partial oxidation of the substance when it is procured, whether in the processes of nature, in the vegetable and animal kingdoms, or in our laboratories by the action of nitric acid on sugar. Probably no other substance has undergone so rapid a change of opinion as to its pathological importance. Regarded at first as a sure fore-runner of mulberry calculus, it was supposed to depend upon a peculiar diathesis as its cause. Then it was supposed to be due to the consumption of vegetables containing oxalates ; a view refuted by the utter insolubility of oxalate of lime in any of the fluids of the body, and the consequent impossibility of its penetrating the blood-vessels—yet supported by Wilson and Donné. It has been found to be increased by the use of carbonated liquors and of nitrogenous food ; after epileptic convulsions, in chorea, chronic bronchitis, typhus fever, spermatorrhœa, and dyspepsia. In these diseases, we have either a disturbed respiration or an excessive retrograde tissue-metamorphosis; and to these we must look to discover the cause of the appearance of oxalate of lime in the urine. The changes which the substances introduced into the animal system undergo, are those of progressive oxidation; hence it is easily seen that a diminished supply of oxygen, or an increased waste of tissue, would be accompanied by an imperfect oxidation.

But from being regarded as a pathological constituent of high importance, oxalate of lime has now come to be considered an almost normal substance in the urine. It may be found in almost any specimen of urine which has been allowed to stand until the acid fermentation has occurred. Dr. Golding Bird believes the cause of this to be its deposition from a sort of solution in the urine, an opinion in which I cannot concur, as proof is wanting that it is soluble in *any* urine. It is well known that urine undergoes an acid fermentation, commencing soon after its expulsion from the bladder, and continuing for some days, during which uric and oxalic acids are formed; after a time, however, a second fermentation occurs, in which the urea is converted into carbonate of ammonia. What explanation can we give of the occurrence of these apparently opposite phenomena in the same liquid under the same circumstances? The ferment which acts in both cases is probably the vesical mucus; and the substance changed must be either this mucus, the coloring matter, or the creatin and creatinin, as these are the only other nitrogenized substances present. That it cannot be the mucus is proved by filtering the urine, after which it still ferments, though more slowly. That it is connected with the presence of creatin may be inferred from the fact that Dr. Miltenberger and I (Med. Examiner, 1854) have found crystals of creatin formed by spontaneous evaporation in microscopic specimens of urine containing oxalate of lime. If we take $C_8 H_9 N_3 O_4$ as the composition of creatin, two equivalents of the latter, with 14 of the oxgen would yield 1 equiv. of uric acid, 1 of urea, 2 of oxalic acid, and 8 of water, thus:

$$2\,(C_8 H_9 N_3 O_4) + 14\,O = C_{10} H_4 N_4 O_6 + C_2 H_4 N_2 O_2 + 2C_2 O_3 + 8HO.$$

I suppose some such reaction as this to take place as long as any creatin remains in the urine, thus explaining the acid fermentation; when this has ceased to occur, the urea decomposes into carbonate of ammonia. This will also explain the crystallization of the oxalate; for, as this is a slow process, the oxalic acid is very slowly presented to the lime-salts of the urine, thus fulfilling the condition given by Lehmann as necessary for the formation of the crystals. Prof. Jones, of Georgia, succeeded in obtaining them by endosmose, to which he attributes this formation; but this is obviously only another method of *very gradually* presenting the oxalic acid to the lime, the main condition requisite for their formation.

Dr. Hammond observed, that he had frequently found oxalate of lime in the urine, in his own person and that of others, during *health*; large crystals, both of the dumb-bell and octohedral forms being presented. Dr. Hammond does not credit the existence of an "oxalate of lime disease," nor of a diathesis, such as is described by some English pathologists, characterized by excess of urea.

Feb. 15th. Dr. T. G. Richardson read an elaborate paper by Dr. George Paton, of Galt, Canada West, npon the *Functions of the Spinal Cord, as illustrated by experiments on cold-blooded animals;** endeavoring to show occasion for some modification of the theory of reflex action of Marshall Hall, and for the opinion that *perception* is one of the attributes of the spinal cord, and especially of the medulla oblongata.

Dr. Leidy remarked that the experiments narrated in the paper did not appear to him entirely conclusive, as the movements described might be auto-

* See N. Amer. Medico-Chiurg. Review, May, 1858.

matic. This was the view taken by Dr. LEIDY of the results observed by him in analogous experiments made several years since, upon frogs, flies, &c. He believed that the conveyance of impressions, in insects, for instance, to the chain of ventral ganglia, should be expected, without supposing perception to produce the apparently voluntary movements. While experimenting at one time upon pigeons, Dr. LEIDY kept one alive, after the removal of the cerebrum, for nearly two months. It spent much of the day in walking up and down the room, but never passed through the open door into the room adjoining, the dark shade of which appeared to have the effect, through the retina, of a bar or obstacle. All its motions seemed, to Dr. LEIDY, to be automatic and unreasoning; approaching the fire, for example, for warmth, but getting so near as to burn itself, having, repeatedly, to be picked out of the ash-pan. Acts are often set down as evincing consciousness, which are really automatic, such as the darting of a frog at a bright object, or of a fly against a window-pane. The same act will be repeated a thousand times in the same way, without learning by the experiment, it being the mere result of an *impression* on the organs of sense.

Mr. W. PARKER FOULKE suggested an enquiry, in regard to the somewhat complex and determinate movements of newly-born animals, which could not possibly have learned by experience how to perform such acts; if these were automatic, how do they differ from those described in the paper of Dr. Paton? Moreover, in using the term "perceptive act," does Dr. Paton mean that the animal is believed to be *conscious* of the impression through the spinal cord, and to act voluntarily?

Dr. RICHARDSON considered that this was his meaning, and urged, that in some of the experiments related in the paper, sensibility appeared to be shown by the *purposive* character of the movements made. Thus, when an animal, whose brain has been removed, is lightly touched about the neck, and makes a special movement to brush off the irritant, this motion is only one of many movements possible to the same muscles, and one of the *least frequent* or natural to them. We must, therefore, infer sensibility to account for this determinate movement, instead of the more simple and uniform contraction, such as reflex action produces.

Dr. H. HARTSHORNE believed that different *modes* or *degrees* of irritation of the same surface might produce variable contractions of muscles, under reflex action alone.

Dr. LEIDY confirmed this opinion, by examples, in the movements of frogs, flies, &c, from which the brain had been removed.

Dr. RICHARDSON :—Do not these examples really show the possession of sensibility by the cord or ventral ganglia, for which the author of the paper contends?

Dr. H. HARTSHORNE considered that the statement of the paper, that reflex actions are always uniform under impressions upon the same part, is true only when the impressions are like in degree, and are conveyed by the same nerve-fibres, to the same central ganglia. Thus, the impression of light upon the retina, which, by one reflex circuit causes the contraction of the pupil, will, by another, induce a more general movement of muscles, or the act of sneezing, or the flow of tears. Moreover, a purposive or determinate character in movements does not remove them from the category of automatic actions. Thus, for instance, those called instinctive in lower animals, and others, in the higher, designated as sensori-motor by some physiologists, are still *reflex*, that is, dependent on an *impression* from without, acting through a complex nervous apparatus. Dr. Hartshorne has not, in fact, seen satisfactory evidence of the existence of *will* in any animal except man,—the actions of all the others being explicable upon the idea of more or less complex automatism; and, where the subject is so obscure, it is most philosophical to assume only the one idea or supposition, which will account for the facts, rather than two, as we must do when, in such experiments as those alluded to, we suppose consciousness and will to exist.

Dr. S. W. MITCHELL observed that many very similar experiments to those of Dr. Paton had been performed and recorded by Dr. Dowler, of New Orleans; one of which was more extraordinary than any narrated in Dr. Paton's paper; in which an alligator, whose brain, spinal marrow, and viscera had been removed, yet exhibited movements apparently as intelligently guided as those common to the animal in its natural state.

Dr. HAMMOND had seen a rattlesnake, the head of which had been cut off, and its skin and viscera removed, yet coil itself up and strike.

Dr. HAMMOND then read a paper *On the alterations produced by Intermittent Fever in the excretion of urine, and on the action of the Disulphate of Quinine*;* tending to show, so far as one case, carefully observed, can prove, that the excretion of uric and phosphoric acids is increased during the paroxysm, and that this excess disappears under the use of quinine.

Dr. H. HARTSHORNE made some remarks *On the best means of advancing Biological Science at the present time*, adverting to the danger, which he considered a principal one in the science of the present century, of *logismophobia*, *i. e.* the dread of reasoning, as opposed to simple observation, and expressing the view, that, in every scheme of scientific inquiry, there should be, after the model of Bacon's "New Atalantis," room, not only for observers and experimenters, but also for "depredators," "compilers," and "interpreters of nature." Dr. Hartshorne made an appeal, also, in favor of the organization of a system of *joint investigation*, by observation, experiment and otherwise, by members volunteering for the purpose, in connection with important questions or problems, illustrating this proposition by a series of questions, which might be found capable of determination in such a mode.

Dr. LEIDY, Dr. RICHARDSON and others expressed their approbation of this proposal for organized investigation.

Dr. HAMMOND, in connection with it, gave an account of the German "Verein für gemeinschaftliche Arbeiten," which has been in existence for several years, numbering many hundreds of members, on the Continent and in Great Britain, and issuing, in its archives, a remarkable number of interesting and valuable productions.

March 1*st*. Dr. WALTER F. ATLEE presented a preparation of an acephalous child, and read a paper, giving a description of the monstrosity.†

Dr. LEIDY described a similar one, having neither head nor arms, now in the Museum of the University of Pennsylvania.

Dr. J. C. MORRIS inquired whether the state of the placenta had been examined into in either of those cases? Dr. Morris had noticed, that in several instances of acephalous fœtus, fatty degeneration of the placenta had occurred. Dr. M. had also attended a patient, who was delivered at full term of a fœtus, which had died at the 7th month; fatty degeneration of the placenta was found to be complete. The same mother was afterwards delivered of a child at full term, but which was not more developed than is usual at the 7th month. It has been imagined by some, that fatty degeneration of the placenta at the end of pregnancy, may be the cause of labor; but such a case as that just mentioned, tends to disprove this.

Dr. LEIDY remarked, that the condition of the placenta could not acccount for such a monstrosity as the one exhibited by Dr. Atlee; as this, from its nature, must have been determined in the embryo: having no upper extremities, as well as no head. The upper extremities always pullulate before the formation of the placenta. In this case, also, the placenta must have been healthy enough to furnish nutriment for all parts of the body, which were present.

* See Amer. Journ. of Med. Sciences, April, 1858.
† See Am. Journ. of Med. Sciences, April, 1858.

Dr. Hammond described a canine monstrosity obtained by him at Fort Riley, Kansas, in which, besides the presence of six legs and several supernumerary toes, there was an entire absence of intestines and anus, the stomach ending in a *cul de sac*.

Dr. Atlee said, that he had, in his paper, said nothing of the *causes* of monstrosities, they being, in fact, altogether *unknown*. Only three modes of causation appear to be possible: 1. Defect in the germ; 2. Emotion, such as fright, &c, in the mother; 3. Accidental violence acting upon the fœtus during gestation. In regard to neither of these can we obtain, at present, accurate knowledge.

Dr. Corse observed, that some modifying causes are occasionally obvious; as, irregular contractions of the uterus, such as are known to occur, and which, by pressure, may act upon the fœtus. Dr. Corse possesses a specimen which illustrates this; in which there is no neck, and only a vesicle in place of the brain. In many cases of acephalous monstrosity, Dr. Corse would suppose external causes to be most probable.

Dr. Leidy thought it difficult to conceive how external causes could act upon the embryo at so early a stage, and while so minute as it must be at the time when such a deformity is produced. Dr. Leidy alluded to the experiments of Newport upon the fecundation of the frog, as suggesting the possibility that the defect might occur, in connection with the act of conception itself.

March 15th. Dr. S. W. Mitchell read a paper, entitled "*Observations on the Blood of the Sturgeon*," illustrated by drawings of crystals obtained from the albuminoid corpuscles of that fish; and containing, amongst other interesting points, new reasons for the belief, that Lehmann's opinion of the coloring matter of the blood being essential to the constitution of blood-crystals, is erroneous.

Dr. Mitchell further remarked, upon his having noticed, with surprise, that, when a drop of sturgeon's blood was left at rest until its *edges* began to dry, the nuclei of its corpuscles, which are easily seen, approached one another; so that, if there were several corpuscles, their nuclei would seem to be in contact. The phenomenon resembled, somewhat, the nummulation of the corpuscles, at the beginning of an inflammation. The mere drying up of the corpuscles did not explain this; the explanation was not obvious.

Dr. H. Hartshorne inquired, whether ordinary *gravitative* attraction might not explain it, as it does the approaching of light particles floating in a liquid to each other, or to the sides of the vessel?

Dr. Mitchell thought not; doubting, even, whether the latter phenomena were explicable by gravitative attraction alone.

Dr. Hammond called attention to the fact, mentioned in Dr. Mitchell's paper, that he had not succeeded in obtaining blood-crystals from the fresh blood of the human finger. Dr. Hammond had made the attempt with blood of the soft-shelled turtle (Trionyx); during the first week he could find no crystals; but, two months afterwards, they were distinctly observable.

Dr. Mitchell had repeatedly failed in the attempt with blood of the water-turtles of the vicinity of Philadelphia. He had, however, in such experiments, observed certain *saline* crystals, which did not undergo granulation and fibrillation before solution; which Dr .M. believes to be a test.

Dr. Morris considered, nevertheless, that the crystals, mentioned by Dr. Hammond, were true blood-crystals; being, as he himself had witnessed, within the blood-corpuscles.

Dr. Leidy remembered having once seen a similar occurrence in the blood of a salamander. He had, also, noticed octohedral crystals within the epithelial cells of a lepidopterous insect, the *Arctia isabella;* which is a caterpillar, found in winter under stones and leaves: each nucleus of an epithelial cell was the centre of an octohedron.

Dr. Mitchell mentioned, that he had found the greatest facility in obtaining human blood-crystals from *pneumonic clots.*

Dr. Morris expressed the opinion that blood-crystallization is a result of change in the albuminoid matter of the corpuscles, under the action of oxygen; the crystals being seldom formed without exposure to the air, or, at least, without time for partial cadaveric decomposition. They are, therefore, *derivative* in their nature.

Leaving this subject,—Dr. Morris stated, that he had been interested, while observing some plants in bloom near a closed window, in finding a deposit of moisture upon the glass, immediately opposite to each *flower;* there being none opposite to the *leaves.* This was not what he should have been led to expect, from the recognized action of the leaves, in concentrating the sap of plants by evaporation. Opposite to the flowers of a Camellia, there had also been found a collection of a viscid sweet substance.

Dr. Leidy supposed this sweet substance to be the secretion ejected by an *aphis,* which sucks the juices of flowers, and throws out continually what is called, as it appears on many plants, *honey-dew;* which constitutes the value of the aphides to ants, whence they have been called *ant-cows.* On grape-vines, in summer, the black aphides abound, and black ants may be seen running up and down, eating this substance, thrown out when the aphis is irritated. It has the power of ejecting it to a considerable distance. On the flowers and other parts of the Ailanthus and Tulip-poplar, drops of it, darkened by dust, are often visible; the Camellia is especially well adapted for their display.

Mr. E. Tilghman exhibited and explained briefly his *application of photography to the construction of goniometers and micrometers.* It consists, essentially, in taking by a microscopic camera a photograph on glass of a graduated semicircle, of proper size to place on the diaphragm of an ordinary Huygheman eye-piece, so as, by super-position, to measure the angle of microscopic crystals. The base of the graduated semicircle may also be divided as a micrometer, so that the same instrument may be used for the two purposes. By advancing or withdrawing the microscopic camera to or from the negative, put up against the light, the graduated semicircle may be adapted to any sized eye-piece. The cost of this construction is very small. Mr. Tilghman anticipates making a fuller report upon the subject at some future time.

Dr. Leidy exhibited a number of *sections of the human cranium,* illustrating the beautiful mechanism by which union of the different parts of the skull is effected, not only in man, but throughout the whole animal kingdom; and which is especially striking before the sutures are co-ossified. One section was horizontal, one vertical antero-posteriorly, and four vertical laterally. In all, minute examination displayed the most exquisite overlapping and inter-junction of parts, completing that adaptation to its contents, which is obvious in the form and whole construction of the cranium.

April 19th. Dr. J. Darby read an elaborate paper *on the Supra-Renal Capsules;* advancing the opinion, based on original observation and research, that those organs are so important to the normal condition of the blood, and to the functional actions of the nervous system, as to be almost indispensable to life.

Dr. W. A. Hammond read a description of a *Case of Fatty Degeneration of the Heart, in which death followed the inhalation of chloroform.* The impurity of the chloroform (or chloric ether) used in this case was such, that Dr. Hammond supposed it possible that this might aid in accounting for the fatal result.

Dr. H. Hartshorne, in connection with the same subject, gave an account of some experiments made by himself with the inhalation of *deodorized alcohol.* An inhaling apparatus on the ordinary principle was used, air being introduced only through the alcohol. After breathing through the tube of the apparatus for ten minutes, a feeling of exhilaration was produced, without somnolence or circulatory excitement, but with some diminution of sensibility; and, in one instance, with forcible, though not accelerated palpitation of the heart. The conclusion arrived at was, that any increase in the danger of anæsthesia from chloroform could hardly be expected to result from the addition to it of pure alcohol. This, of course, would not apply to the ethereal or other substances often associated with it.

Dr. Hammond mentioned that the preparation alluded to in his paper contained, besides other impurities, a small percentage of *muriatic acid;* very much less, however, than had been reported as contained in a specimen employed in one of the London hospitals.

Dr. J. C. Morris supposed that the muriatic acid might have had some influence in causing death: the lungs being congested, and the right side of the heart loaded with blood, while the left side was empty; as would be the case if the pulmonic circulation were interfered with by an irrespirable substance.

Dr. W. F. Atlee considered the occurrence of vomiting, shortly before death, to have been an evidence that the brain was powerfully affected, which alone might suffice to cause death.

Dr. Hays observed that it is impossible to account for the deaths which occur under the inhalation of chloroform. Very recently a case has been recorded which strikingly exhibits this: in which the chloroform employed was carefully examined, and found entirely pure; the quantity used was small, the person administering it, one experienced in its use in an English Hospital; and every care was exercised even as to its sufficient dilution with air. The body of the patient was examined after death, and *nothing* was found to explain the result. In cases of undoubted fatty degeneration of the heart, chloroform has repeatedly been given with safety: one writer upon the subject going so far as to say that such degeneration affords *no objection* to its use. In some instances the same patient had inhaled chloroform, from the same bottle, two or three times, without disadvantage, and yet it proved fatal to him at last.

Dr. Leidy had noticed the same uncertainty or variability of action of chloroform in experiments upon animals. A strong, healthy cat was destroyed by breathing an amount of chloroform, which several others, at the same time, inhaled harmlessly. In his own person, Dr. Leidy had found one of the most marked effects of chloroform to be a total loss of muscular power.

Dr. B. H. Coates believed chloroform to act poisonously, by directly diminishing the action of the heart. The absolute amount of vital power in different individuals or organs cannot be calculated; but, if the heart be in a state of fatty degeneration, its vitality must be thereby diminished. The rapidity of absorption by the lungs, as demonstrated in experiments recorded by Dr. Coates and others, aids in baffling our calculations. The admixture of other articles with chloroform increases the ambiguity; and to avoid danger, the greatest care is needed in regard to the *dose.*

Dr. F. G. Smith inquired whether the state of *consciousness* of the patient was noted in either of the cases alluded to?

Dr. Hammond stated that the man whose case had been narrated in his paper was not conscious during the period immediately preceding death.

Dr. F. G. Smith observed that the action of chloroform may be traced more directly in the *muscular* than in the nervous organs; causing a destruction of the irritability of muscular fibre. An analogy is presented to this in some experiments reported by Dr. Rand, in which the leaflets of *mimosa pudica,* exposed to chloroform, lost all their contractibility. Some, at least, of the cases of sudden death under anæsthesia may be explicable upon this principle. Having been repeatedly placed under anæsthetic influence, Dr. Smith had found, that while his consciousness was not at all affected, being able to note the beating of his heart, and to hear and see all that was going on around him, perhaps with even excited sensibility, a total inability to exert the voluntary muscles was produced. The sensation might be described as that of being *flattened out.*

Dr. W. F. Atlee recalled the suggestive fact, that a few drops of chloroform let fall on a bundle of ciliated epithelium of the frog, will arrest the ciliary motion at once.

Dr. J. C. Morris narrated the singular case of a lady, by whom a considerable amount of chloroform was inhaled to relieve morbid vigilance, producing the appearance of sleep, and even stertorous respiration, yet without annulling consciousness; as was shown by her soon re-acquiring the power of motion, and describing the movements made by those about her. There seemed here to be a retention of sensibility, with a loss of voluntary motion.

Dr. Woodward had noticed similar phenomena in persons using chloroform by inhalation as an intoxicating agent. He had known several persons, one a medical man, who were in the habit, for months together, of using it in this manner every day after dinner. In all of these there appeared to be a loss of muscular power with retention of consciousness.

Dr. H. Hartshorne had formed the opinion that the principal action of chloroform is upon the cerebro-spinal axis, resembling, in its suddenness of effect in fatal cases, some of the experiments of Wilson Philip, and others, in which immediate arrest of the heart's action was produced by destroying the brain with a hammer, or the spinal cord by inserting a heated rod into the canal. The destruction of the spinal marrow will produce, also, general relaxation of the voluntary muscles. At the same time, the cases mentioned suggest the probability that the influence of chloroform may be exerted upon the different nerve-centres in greater or less degree in different cases. It is not impossible that fatal anæsthesia of the medulla oblongata, destroying life by arrest of respiration, might occur, without prior annihilation of sensorial consciousness.

May 3d. Dr. Leidy exhibited a drawing of the *Echinococcus hominis*, commonly known under the name of hydatid. The specimen from which it was taken was found in a tumor seated in the muscles of the right iliac region, which had been supposed to consist of impacted fæces in the colon. The patient had been dead several days, when the body was injected with chloride of zinc; yet two days afterwards the parasites were still alive. None of the injection, however, had come into contact with it, as it had no direct communication with the body. The Echinococcus is the larval form of a tape worm. Dr. Leidy described its mode of propagation and of locating itself in the body.

May 17th. Dr. J. J. Woodward read a paper* describing three cancerous tumors, which displayed interesting peculiarities, illustrating one mode of development of carcinoma from a liquid blastema, enveloped in a cyst. The paper opposed the opinion expressed by Rokitansky, that cancer is essentially an albuminosis.

Dr. Leidy exhibited a minnow, caught in the Schuylkill, having disease of the scales of the upper part of the head and about the orbit. The scales were dilated, and filled with delicate organic cells, much resembling carcinomatous cells. They were certainly not confervoid or fungous, but were purely pathological, and thus of interest as a specimen of diseased formation in a fish. Disease, in the inferior animals, and even in plants, is deserving of study by medical men, since it may throw light upon the nature of disease in man.

June 7th.—Dr. Henry Hartshorne read a paper "*On the bearing of Physiology on Paleontology.*" Referred to a special Committee.

Dr. J. J. Woodward made the following verbal communication, in regard to the "*Examination of a fungous growth upon the head of a Hydrargyra fasciata,*" caught in the Schuylkill river, and referred to him by Dr. Leidy at the last meeting of the Department.

This fish presented a dark greenish blue fungous mass upon its head, and several greenish discolorations on various parts of its body. Examination showed the mass to consist of a cryptogamous plant, in the meshes of which loosened and partially disentegrated cells from the epithelium of the scales were abundantly entangled. The dark color was due to the presence of isolated

* See Am. Journ. of Med. Sciences, July, 1858.

pigment cells identical with those of the pigmentary layer of the scale. The same plant occurred, though less abundantly, on all the discolorations above referred to. The plant resembled more closely the *Torula cerevisiæ* than any other. Like it, it was composed of cells with distinct nuclei, isolated, or disposed in rows, the terminal cells of any row being always of diminished size. But it differed from the Torula in presenting a distinct greenish hue.

He has been unable to find it figured in any of the books.

Dr. J. H. Slack alluded to the fungous growth sometimes met with on the sides of fishes, and not unfrequently fatal to them.

Dr. Leidy remarked that this had been ascertained to be the *Achlya prolifera;* a mycelium, with processes terminating in capsules, which emit ciliated and contractile sporules. Weakness of the fish appears to predispose to the attack. It is often found on the gold-fish.

Mr. Queen exhibited a series of beautiful micro-photographs, prepared by Mr. Rehn, presenting views of blood, spicula of sponge, Acarus scabiei, &c.

Dr. J. C. Morris related the particulars of a case of extra-uterine pregnancy, which occurred in the practice of a friend of his, and which will be given to the profession in a short time through a medical journal. The fœtus remained four years in a sac within the abdomen; at the close of this time a fistulous connection was established with the rectum, and the child (of eight months) was brought through the anus by the aid of narrow-bladed forceps.

Dr. Morris also called the attention of the Department to the fact stated by Dutrochet, that the endosmotic current takes place with great rapidity from an acidulated fluid towards a neutral or slightly alkaline one. The amount of acidity exercises a marked influence upon the current; and if it be considerable, destroys it altogether. We are more in a condition now to see the application of this fact in the economy of digestion, than when it was believed that all of the food, after being chymified in the stomach, was sent to the intestines to be converted into chyle, prior to its absorption into the circulatory system. It may be readily conceived that the gastric mucous membrane secretes, especially during digestion, a watery fluid containing a principle capable of splitting, by a sort of fermentation, into lactic acid, such a process being rendered still more probable by the considerable amount of atmospheric air which finds its way to the stomach, mixed with the saliva and food. The presence of this acid will fully account for the occasional occurrence of free muriatic acid, as chloride of sodium is readily decomposed by it at an elevated temperature into lactate of soda and muriatic acid; and the neutral phosphates may in the same way be rendered acid. This would then account readily for the occurrence of the free acid in the gastric juice; while the free acid would again promote a rapid current into the blood-vessels of the fluid now charged to a greater or less extent with the nitrogenised elements of the food.

An explanation is thus afforded also of the nausea and vomiting produced by an excess of free acid in the stomach, quantities of fluid being thus evacuated sometimes, which almost exceed credence. In this case the excess of acid *prevents* the endosmose of the fluid into the blood-vessels, and causes it to accumulate, while the fresh exudations undergo the same change; until, finally, the overburdened stomach disgorges its troublesome load.

If we next consider the acid fluid of muscles as opposed to the alkaline capillary fluid we have a similar condition of things manifested; and the concentrated arterial blood becomes loaded with the water, carbonic acid, and other products of muscular disintegration, a counter-current meanwhile carrying albuminoid material to the fibrilla for their renovation. Here we may find the explanation of the increased nutrition of a muscle that is frequently exercised; the very act of destruction of the tissue by its contraction, causing the endosmotic currents to flow with increased rapidity.

There is some reason to believe, that all secretions are neutral or alkaline when they leave the blood, and only become acid by the fermentative processes set up in them, sometimes with extreme rapidity, as in the case of the urine. We know that oxalic acid must be the result of some such change; and yet *renal* calculi of oxalate of lime are not very rare.

June 21st.—Dr. J. J. Woodward read a paper entitled "*Histological Remarks upon a Secondary Cancer of the Pleura;*" in which evidence was given in support of the assertion that cancerous blastema contains fibrin as well as albumen. The most remarkable points set forth in the examination of the case narrated in the paper, were, 1st, the extent of the pleural surface occupied by the new formation; 2nd, the quantity of the latter and of its exudation; 3rd, the failure of development of its elementary forms beyond the stage of nuclei.

A brief discussion took place upon the subject of the paper, between Dr. Woodward and Dr. Morris; the paper was referred to the Committee on Pathology.

Sept. 6th. Dr. J. J. Woodward described briefly some recent observations made by him upon the cell-wall of pus-cells, separated from their contents by endosmose in urine. A more elaborate communication will be made by him upon the subject, hereafter.

Dr. J. C. Morris remarked upon the results of a post-mortem examination of a horse, which had been affected with frequent urination, along with other symptoms, for some time before death. Bright's disease of both kidneys, in the fatty stage, was discovered.

Dr. Woodward stated that he had observed fatty degeneration of the liver, very often, in animals exposed in our markets and elsewhere. Much of the mutton of our markets, moreover, he had ascertained to be the meat of tuberculous sheep.

In connection with the same subject, Dr. Morris alluded to an epidemic among horses, in Philadelphia, two years ago, which he considered to have had the characters of typhoid fever. Careful examination, in fact, may detect the occurrence of most of our ordinary diseases in the domestic animals.

Dr. Corse had inspected the lungs of three or four hundred sheep, from which he had obtained some ten specimens of well marked tuberculosis. Nearly twenty-five per cent., however, of the sheep exhibited more or less tuberculous deposit; the existence of which he was enabled to trace to an evident connection with bad feeding and keeping. Dr. Corse had also repeatedly found well-marked cancer of the liver in oxen.

Dr. Woodward stated that the general symptoms and local history of tuberculosis in animals are quite parallel to those connected with its occurrence in the human subject; although the proportionate amount of general or sympathetic disorder is somewhat less in the former.

Catarrhal and bronchitic affections frequently occur in cattle. Cysts in the kidney, and calculi in the bladder, are common in cattle. Dogs are especially liable to cancer; but it occurs in cats also. Rats appear to be particularly liable to a number of diseases.

Mr. Tilghman inquired whether artificial or abnormal circumstances could be shewn by observation to account for tuberculosis in animals?

Dr. Woodward affirmed the opinion that such will prove to be the case; although full evidence is at the present time wanting in regard to it. The close resemblance of the normal structures in the anatomy of all the vertebrata should lead us to expect similarity in their pathology and etiology also.

Sept. 20th. Dr. W. A. Hammond read a paper "On the Secondary Formation of Blood-crystals;" which was referred to a special committee.

Dr. Corse exhibited a specimen of morbid growth of hair upon the cornea of an ox.

Dr. Leidy mentioned, in explanation of this monstrosity, that the hairs in the specimen were the result of the excessive development of very minute hairs naturally existing at the inner canthus of the eye, in connection with the caruncula lachrymalis, and corresponding with the nictitating membrane.

Dr. Hammond stated that he had been requested by the "*Verein für gemeinschaftliche Arbeiten*" to present to the Department the new forms of "*Krankheits Tabelle*" issued by the *Verein*, and to desire some action of the Department thereupon. A Committee was appointed upon the subject, consisting of Drs. Hammond, Woodward and H. Hartshorne.

On the Secondary Formation of Blood Crystals.

BY WILLIAM A. HAMMOND, M. D.

Assistant Surgeon, United States Army.

A few days ago, whilst viewing a slide on which I had four years since mounted some blood-discs of a common prairie snake, (*Eutainia elegans*) I was surprised to find scattered amongst their corpuscles a number of well marked acicular crystals, most of them connected in groups, and radiating from a centre as shown in the drawing.

I had not inspected this slide for about five months, and at that time I am confident the crystals were not present. I had constantly before been in the habit of looking at these corpuscles, but had never previously perceived crystals.

This is the second time it has occurred to me to discover crystals on slides containing blood-discs which must have been formed at a considerable period after the preparation of the specimen. The first instance was on a slide on which were mounted blood-corpuscles of the soft-shell turtle, (*Trionyx ferox*). Crystals were found on this, some months after it was prepared. On a previous occasion, I mentioned this circumstance to the Department.

The discs in both cases were mounted dry, and covered with paper in the usual manner. They were obtained by the ordinary process. The slides, previously to the mounting, were well washed in water, and subsequently in ether, as were also their glass covers.

The crystals are in too small a quantity to definitely determine their nature, but I presume them to be hæmatoidin. They approach somewhat in form to a set of figures of this substance given by Funke, in his Atlas, but its crystaltine characters are so various, that it is difficult to establish its presence from them alone.

It is probable that if the members would go over carefully with the microscope, their specimens of blood-corpuscles, especially those of reptiles, they might also meet with instances such as the foregoing, and that the cause of the formation of blood-crystals at so advanced a period, after the mounting of the corpuscles and their apparently thorough drying, might be thereby discovered.

The accompanying drawing was made by the Camera Lucida. The discs and crystals are magnified 300 diameters.

Oct. 4th. The General Committee of the Department presented a partial report, relating to its organization, in compliance with the regulation therefor, and the preparation of a series of questions for investigation. The questions were referred again to the Committee, with directions to add to their number, and report to a future meeting.

Oct. 18th. Dr. Morris exhibited a young Emys, having a hernial protrusion, which appeared to be at the point of connection with the umbilical vesicle. The most interesting feature of the specimen was its early stage of development, illustrating the period of transition of cartilage into bone.

Dr. Woodward mentioned, that since the time of his remarks to the Department in regard to pus-corpuscles, he had had no less than ten opportunities of examining pus under somewhat similar circumstances to those then alluded to; the pus having found its way into urine, in which it remained for several hours. He had, in all these instances, found that on *one side* (seldom on both) an elevation of the cell-wall took-place, which he referred to endosmose.

Dr. Leidy remarked, that these facts agreed with his own observations; as he had never recognized the adherence of the granules of the pus-corpuscle to the cell-wall, and considered the diagnosis of the pus-corpuscle, based upon this adherence, to fail altogether.

Drs. Woodward and Leidy further agreed in the view that no positive diagnostic exists between exudation-corpuscles and pus-corpuscles; that proposed, for example, in regard to the number of nuclei, being quite insufficient. Dr. Woodward favored the opinion of Carl Wedl, that the pus-corpuscle is a pathological deformation of the white corpuscle of the blood.

A discussion also took place in regard to the existence of *mucus-corpuscles* in the mouth, &c.

Dr. Leidy considered these to be normally present in the fluids of the mouth, as he had constantly found them in his own saliva, during perfect health.

Drs. Hammond, Mitchell and Morris adhered to the same conclusion. If the saliva be collected in a test tube, and the mucus be allowed to separate from the secretion of the true salivary glands, the mucus-corpuscles will be found in abundance.

Dr. Atlee mentioned the statement of some observers, that they were found in the saliva of domestic animals, but not in that of the wild.

Passing to the subject of *cancer*, Dr. Leidy alluded to some preparations which he had seen in the valuable collection of Kiernan, in which the structure of the tumor having been by a peculiar process removed from the vessels, the latter, in many instances, presented a marked *spiral* arrangement; the cancers having been obtained from all parts of the body, and being of various magnitudes.

Dr. H. Hartshorne inquired whether the mode of separation might possibly account for this appearance of the vessels?

Dr. Woodward mentioned that the wood cuts in Carl Wedl's "Rudiments of Pathological Histology" show a splendid arrangement of the vessels in a number of new formations, cancerous and otherwise.

The Report of the General Committee was presented by its Recorder, Dr. Walter F. Atlee, and adopted.

The subjects recommended by the Committee for immediate investigation are the following;

1. The formation of fat in the bodies of animals, when fed only on food containing no oleaginous matter.
2. The changes occurring in the excreta during fevers and inflammations.
3. The exact cause and nature of the rigor mortis.
4. The influence of the alkaloids, morphia, quinia, cinchonia and strychnia, upon the metamorphosis of tissue.
5. The circumstances which determine the existence of sugar in the blood, and which occasion its presence in the urine.
6. The physiological position of the blood-fibrin.
7. The elimination of ammonia from the lungs in health and disease.
8. The absorption of muscular fibre; in which portion of the alimentary canal is it effected?
9. The statistics of height, weight, &c., of the human race in North America.
10. The variations in the amount of ozone in the atmosphere, and their connection with epidemics.
11. The influence of ingesta on the composition of milk.
12. The existence of an epithelium in the air-vesicles of the human lung.
13. The comparison of mucus, pus and exudation-corpuscles, &c., with each other, and with the white corpuscles of the blood, and their relation to epithelial structures.
14. The minute anatomy of nerves and nerve-centres.

Other subjects, which had been proposed to the Committee, were also reported as appropriate for future investigation.

A member of the Department was named in connection with each of the above subjects, to act as Chairman or Director of a voluntary committee of such members, or others, as may desire to take part in their investigation.

On the adoption of the Report, a brief discussion occurred, as to the propriety of publishing the above list of subjects, in anticipation of the accomplishment of results. It being understood, however, that the object in view was to invite and encourage joint labor, which, without some publicity, would be impossible, authority was given for printing one hundred copies of the Report for the use of the members.

Nov. 1st. Dr. J. J. Woodward read a paper entitled "Remarks on a remarkable form of the basic Phosphate of Ammonia and Magnesia occurring in the urine of a patient suffering under cancer of the bladder." The committee on Organic Chemistry, to which this paper was referred, reported in favor of its publication in a medical journal to be selected by the author.

Dr. Hammond read the following paper:

On the Action of certain Vegetable Diuretics.

BY WILLIAM A. HAMMOND, M. D.

Assistant Surgeon U. S. Army.

The ensuing investigations consist mainly of repetitions of those performed some years since by Krahmer, and subsequently by Bird. They have reference to the appreciation of the influence of squill, juniper, digitalis and colchicum, over the quantity of the urine, its specific gravity and the amount of its solid organic and inorganic constituents. They were all performed upon healthy adult males.

The quantity of urine was determined in cubic centimetres, and the weight of the solids in grammes.

The method employed for the determinatlon of the whole amount of solid matter was as follows :

Ten cubic centimetres of the urine were evaporated to as complete dryness as possible *in vacuo* over sulphuric acid, and the residue accurately weighed. By simple proportion the amount of solids in the whole quantity of urine was easily ascertained.

Although it is impossible to get rid of all the water by this process, the quantity remaining is extremely small, and the results obtained are far more accurate than those yielded by evaporating to dryness in the water bath as generally practised. No matter how carefully this latter method is conducted, the loss of urea by decomposition is always an importent item, and involves far more serious errors than the imperfect desiccation by the former process.

For the determination of the amounts of organic and inorganic constituents separately, the solid residue obtained as above was mixed with ten or fifteen drops of moderately strong nitric acid, and gently heated till the mass was well dried. The heat was then gradually raised till all the carbon was consumed, and the mass in consequence became white. It was then cooled *in vacuo* over sulphuric acid and weighed. The inorganic matter wns thus determined and the loss showed the proportion of organic substance.

Digitalis.—The subject of the experiments with this substance, was about twenty-five years of age and in good health. For the three days immediately preceding the commencement of the investigations the average quantity of urine daily excreted by him was 1474.5 cubic centimetres, the specific gravity was 1024.30, and the average total amount of solid matter was 75.31 grammes of which 30.17 grammes were inorganic, and 45.14 organic constituents. The digitalis was given in the form of the officinal tincture in doses of 20 minims three times in 24 hours, and was continued for three consecutive days. During this period the manner of living (food, drink, exercise, &c.,) was as nearly as possible the same as during the preliminary investigations.

1st day. The urine passed on this day was of a pale straw color and feeble acid reaction ; quantity 1950 cubic centimetres ; specific gravity 1013.25 ; total solids 69.98 grammes, of which amount 31.27 were inorganic and 38.71 organic matter. The action of the digitalis was not manifested otherwise than by its effect upon the urine.

2nd day. The urine passed on this day was of similar physical character to that above mentioned. The quantity was 1873.6 centimetres, the specific gravity 1014.32, and the total solids 63.74 grammes. The inorganic solids amounted to 30.15 grammes, and the organic to 33.49.

The pulse on this day was somewhat slower and fuller than on the previous day.

3rd day. The quantity of urine evacuated on this day was 1624.9 cubic centimetres, and of specific gravity 1020.04. The total amount of solid matter was 67.29 grammes, of which 33.19 were inorganic and 34.10 organic.

The color, reaction and odor of the urine were similar to those of the two previous days.

The characteristic effects of the digitalis upon the action of the heart were well marked during this day.

The effect of the digitalis in increasing the amount of urine is seen to have been greatest on the first day. On the second day it had fallen somewhat, and on the third was but 150 cubic centimetres greater than when no digitalis was taken. The solids, it is seen, were less than the normal standard from the commencement, were still further reduced on the second day, and on the third were slightly increased. This diminution is perceived to have been owing to the lessened amount of organic matter excreted. The inorganic substances were somewhat increased in amount over the ordinary proportion.

Juniper.—The experiments with this substance were conducted on a healthy man thirty-five years of age. The average condition of his urine for the three days immediately preceding the investigations was as follows : quantity 1237.5 cubic centimetres, specific gravity 1022.50; total solids 61.23 grammes, of which 23.12 were inorganic and 38.11 organic matter. It was of ordinary color and odor, and of strong acid reaction.

Sixteen ounces of the officinal infusion of the berries of the *Juniperus communis* were taken during the twenty-four hours, and the manner of living kept as nearly as possible to correspond with that of the preliminary experiments.

1st day. For this day the quantity of urine amounted to 1732 cubic centimetres, the specific gravity of which was 1016.38; the total solids were 62.75 grammes ; of this amount 25.43 grammes were inorganic, and 37.32 organic constituents.

The urine was of a pale straw color and gave off the characteristic odor produced by juniper. The reaction was feebly acid.

2d day. The quantity of urine passed on this day was 1885.2 cubic centimetres. The specific gravity was 1014.15, and the total solids 58.49 grammes, 22.17 of which were inorganic, and 36.22 organic matter. The physical characteristics were similar to those of the day before. The reaction was barely acid.

3d day. On this day the quantity of urine was 1672.5 cubic centimetres, with a specific gravity of 1018.41. The total solids amounted to 63.27 grammes, of which 27.50 were inorganic and 35.73 organic matter. The physical characteristics and reaction were the same as on the previous day.

From these experiments it is seen that whilst the quantity of urine was materially increased by the juniper, the amount of solid matter, as a whole, was but slightly affected, the loss in organic matter being about compensated for by the increase in the inorganic.

Squill.—The experiments with this substance were instituted upon myself, and were conducted upon the same general principles as the foregoing series. The average daily quantity of urine, for the three days preceding the investigations, was 1358 cubic centimetres. The specific gravity was 1023.51, and the total solids 69.35 grammes ; of this amount 27.22 were inorganic and 42.13 organic matter.

I took two grains of the dried bulb of the *Scilla maritima* three times in the twenty-four hours. The other conditions remaining the same as in the preliminary examination of the urine.

1st day. The quantity of urine passed on this day was 1572 cubic centimetres of 1020.34 specific gravity. The total solid matter was 60.67 grammes, 31.07 of this amount being inorganic and 29.60 organic constituents. The urine was of feeble acid reaction.

2d day. Quantity of urine 1493.5 cubic centimetres, specific gravity 1020.90, total solids 58.22 grammes, inorganic matter 30.15, organic 28.07 grammes. The reaction, &c., were the same as on the preceding day.

3d day. On this day the quantity of urine amounted to 1535 cubic centimetres, and was of 1019.37 specific gravity. The total amount of solid matter was 61.58 grammes, of which 30.58 were inorganic and 31.00 organic constituents. The reaction, color, &c., were unchanged.

From the above experiments it is perceived that the action of the squill was similar to that of the digitalis and juniper, *i.e.* causing an increase in the water of the urine and inorganic solids, but a reduction of the amount of organic matter. The loss of organic matter was considerably greater than with either of the other substances.

Colchicum.—The investigations into the action of this substance were performed upon a healthy man 28 years of age. The urine for the three days immediately preceding the commencement of the experiments, was of the following daily average character. Quantity 1230 cubic centimetres, specific gravity 1025.08; total solids 63.12 grammes, inorganic matter 29.83 and organic 33.29. The reaction was very strongly acid.

One and a half drachms of the officinal tincture of the seeds of the *Colchicum autumnale* were given three times in twenty-four hours, and continued for three days. During this period the food, exercise, &c., were as nearly as possible the same as during the preliminary series.

1st day. The quantity of urine passed on this day was 1595.7 cubic centimetres, with a specific gravity of 1024.37. The total solids amounted to 77.29 grammes, the inorganic matter of which was 36.50 grammes, and the organic 20.79 grammes. The reaction was stongly acid.

2d day. Quantity of urine 1484.1 cubic centimetres, specific gravity 1024.31; total solids 75.22 grammes. The amount of inorganic matter was 35.01 grammes, and of organic 40.21. The reaction was very strongly acid.

3d day. On this day the quantity of urine amounted to 1620 cubic centimetres and was of 1022.06 specific gravity. The total amount of solid matter was 79.33 grammes, of which 34.20 were inorganic and 45.13 organic constituents. Reaction strongly acid.

It is thus perceived that the action of the colchicum, as compared with that of the other substances experimented with, was very remarkable, it being the only one with which there was an increase in the amount of solid matter eliminated, both organic and inorganic.

From the foregoing experiments the following table embracing the averages of each series of investigations is constructed.

	Quantity of Urine.	Specific Gravity.	Total Solids.	Inorganic Solids.	Organic Solids.
Normal Standard.	1474.5	1024.30	75.31	30.17	45.14
Digitalis.	1822.8	1015.87	67.00	31.54	35.43
Normal Standard.	1237.5	1022.50	61.23	23.12	38.11
Juniper.	1763.2	1016.28	61.50	25.03	36.42
Normal Standard.	1358	1023.51	69.35	27.22	42.13
Squill.	1533.5	1020.20	60.15	30.60	29.55
Normal Standard.	1280	1025.08	63.12	29.83	33.29
Colchicnm.	1556.6	1023.58	77.28	35.23	42.04

From the foregoing investigations, I think it is deducible that neither digitalis, juniper or squill, increases the total amount of solid matter eliminated by the kidneys, and that the organic matter is considerably reduced through their influence. Although they do increase the amount of inorganic matter removed through the urine, yet as it is the organic matter which is generally considered as contaminating the blood in disease, it is evident they exert no effect whatever in depurating this fluid, but on the contrary are positively injurious.

The results obtained, in so far as the experiments with digitalis, squill or juniper, are concerned, are similar to those obtained by Krahmer, but are materially different as regards the colchicum. For, although Krahmer found that under the influence of this medicine there was an increase in the amount of organic matter excreted, this was so small as to lead to the supposition that it may have been accidental, and besides there was a reduction in the quantity of inorganic substance removed. It is desirable, therefore, that we should have further observations with this article.

The alterations in the Constitution, proposed by Dr. Hammond, were read for the third time and adopted.

Article 1st of the Constitution, as so altered, will read as follows:

I. Every *resident* member shall pay an initiation fee of two dollars.

Article 2d, will read as follows:

II. No person shall be entitled to the privileges of *resident* membership, until he shall have paid the fee of initiation, &c.

Drs. Addinell Hewson and Charles A. McCall were duly elected members of the Department.

The Recorder having stated the necessity of his absence for several months, the Department appointed Dr. Atlee recorder *pro tempore*.

Nov. 15*th*. Dr. Mitchell read the following paper:

On the Inhalation of Cinchonia, and its salts.

BY S. W. MITCHELL, M. D.

There can be very little doubt that at some future time we shall possess the means of giving to patients many potent remedies in the form of inhalation, rather than in the usual way. This is at least among the hopes of the therapeutist of the present day. Absorption of medicinal substances by the intestinal mucous surface is but too often uncertain, while the passage to the blood through the lungs seems to be always an open track when the agent inhaled is in a state of vapor. *How* desirable it would be to possess the means of inhaling quinine in the congestive fevers of our malarious districts, we can very well conceive. Guided by these ideas, I have sought industriously for some means of attaining this result, and although I have failed, as I shall here show, in evolving any very marked practical benefit from these researches, I have met with certain facts of such interest that I desire to put them on record as indicating a novel direction for medical thought and action.

At one time, the analogy in chemical composition, between certain of the newly formed ethers and quinia itself, seemed to point out these as fit subjects for therapeutic use and trial. The difficulty of procuring them, obliged me, however, to relinquish effort in this direction, and I turned from them to examine anew the alkaloids derived from cinchona bark. While thus engaged, one of my friends, now Dr. Bill, of the army, pointed out to me in Fresenius's Chemistry, his account of cinchonia, which he describes as volatile at high temperatures.

Struck with this, I searched carefully for any accounts of its inhalation, but as yet have been unable to find in the books on Cinchona any description of inhalation, as a mode of using the alkaloid in question. The last complete work on quinia, by M. Briquet, enumerates many methods of employing the alkaloids and bark, but neither among the means in use, or out of use, is this one alluded to. Occasionally, in disease of the lungs or throat, inhalation of pulverized cinchona bark has been resorted to, and M. Briquet relates,—"Traité Thérapeutique du Quinquina et de ses preparations," p. 118,—that those who work in the storehouses of cinchona bark are sometimes thus cured of malarious fevers. This could only occur through accidental ingestion, and inhalation of the floating particles of bark.

Cinchonia and its salts are the only alkaloids which appear to be volatile by heat. After many experiments, I have finally resorted to the following very simple method of inhaling them:—About forty grains of pure cinchonia, being mixed up with sand, are placed in a capsule, and heated by a spirit-lamp. The sand is useful in diffusing the heat, and preventing too rapid a destruction of the alkaloid. A heat of about 300° melts the particles of cinchonia into a brown fluid, and from this, if the evaporation be carefully managed, the volatilized alkaloid escapes in the form of a gray vapor.

When a microscope glass is held over the capsule, and the heat is *too* elevated, the cinchonia decomposes, and a dark red gummy-matter, with the odor of burned benzoin, adheres to the glass. A rather lower temperature drives off the cinchonia in a gray vapor, which may be made to redeposit the pure alkaloid upon the interior of a funnel held over it, or upon a microscope slide. The alkaloid thus obtained is in branching needles.

On a number of occasions, I inhaled the vapors of cinchonia, often breathing them for ten or twenty minutes, without much inconvenience, when care was taken to regulate the supply of heat. The brown or reddish volatile substance which is given off when the heat used is too great, so irritates the throat as to cause nausea, and oblige the patient to cease inhaling.

When carefully inhaled, a part of the alkaloid is deposited on the throat and in the mouth, where its sub-bitter taste is soon perceived. To guard against error, which might arise from swallowing these portions of the alkaloid, I refrained from swallowing whilst inhaling, and frequently rinsed the throat with water.

Upon four occasions, I noted the symptoms caused by the cinchonia thus employed, taking care to allow the excitement of the system produced by the inhalation to pass away before I counted the pulse. In three instances the pulse *fell*, losing from 6 to 10 beats per minute. In the fourth, the pulse remained a few beats above the normal number. The person on whom these experiments were made is liable to still greater depression of cardiac energy, when under the influence of quinia. At first, it was difficult to separate the ordinary signs of cinchonism, from the feelings of cerebral confusion, caused by breathing too rapidly. These sensations, however, were evanescent. At the end of a quarter of an hour, or even less, the head was clear, and within half an hour afterwards the patient felt a quickly increasing headache, with giddiness, and sometimes a feeling as though the brain was swelling into monstrous bulk. These sensations passed away within four or five hours, unless the inhalation was renewed.

Still uncertain as to whether or not the alkaloid entered the blood, I caused a healthy adult, æt. twenty-nine years, to inhale the fumes from forty grains of the heated cinchonia four times in one day. Symptoms of cinchonism were felt only after the first inhalation, which was made at 10 A. M.; at 12 M. the second inhalation took place, and at the same time four ounces of clear urine, s. g. 1023, were passed. The other inhalations occurred in the afternoon and evening, but none other of the urine passed was saved, until 7 A. M. next day.

The first specimen was examined by Bouchardat's test, the iodated iodide of potassium. This reagent gave a faint but decisive brown precipitate of iodide of cinchonia, when employed in the usual way; when, however, I placed in a test tube a portion of the test solution, and slowly poured upon it the lighter wine, a profuse deposit of the iodide announced the presence of cinchonia in the urine. In the usual mode of making this test,—although the precipitate is perceptible enough,—it almost immediately redissolves in the urine, which appears to possess a remarkable power of dissolving the iodides of cinchonia and quinia, since when these precipitates are thrown down from an aqueous solution of a salt of either alkaloid, they are found to be very insoluble. The second specimen of urine contained only traces of cinchonia, and twenty-four hours after the last inhalation no evidence of the presence of the alkaloid in the urine could in any way be obtained.

It will be readily seen from what I have said, that I do not anticipate any remarkably valuable practical results from the new mode of administering cinchonia, in vapor. The want of therapeutic power in this alkaloid, when compared with quinia,—dose for dose,—the difficulty of regulating the heat so as to volatilize, and yet not decompose it, as well as the unpleasantness of the process of inhalation, combine to deprive these experiments of any great practical utility. In a single case of tertian intermittent fever, I employed the inhalation of cinchonia vapor. The patient had no new attack for one month, although no other ulterior measures were employed. The case was a very irregular and uncertain one, and I therefore attach but little faith to this single therapeutic test. I should add that my patient complained a good deal of the effect of the alkaloid upon his glottis and larynx. For a time it altered the tones of his voice very considerably.

In two cases of chronic bronchitis, of long standing, I also used the fumes of cinchonia; one of these dated his first improvement from the use of these inhalations, in which he persisted every other day, for more than two weeks; no other treatment was used until he had been much aided by the means above described. He learned after a time to employ the cinchonia without my aid. The other patient submitted to one inhalation, but declined any further proceedings of a similar character, declaring, that the remedy was worse than the disease, only shorter. When we are successful in volatilizing the alkaloid without decomposition, the process of inhalation is not very disagreeable; but when the heat is too high, and the cinchonia becomes altered, it is extremely difficult to continue to breathe it.

The salts of cinchonia are also volatile by heat, but they offer no advantages which do not equally belong to pure cinchonia. The sulphate is quite inadmissible for inhalation use, since sulphuretted gases are given off in small amounts when the heat is too elevated, and decomposition takes place.

Dr. Woodward read a paper entitled "Remarks on the Anatomical Marks of Cancer." The Standing Committee on Pathology, to which this paper was referred, reported in favor of its publication in a medical journal to be selected by the author.*

Dr. Mitchell submitted a short preliminary report on the subject of the changes undergone by the white race in America. The object of this report was, principally, to suggest the proper manner of proceeding in this research. A form of letters to be addressed to different eligible persons, for the purpose of receiving their assistance in making this report, was communicated, with a copy of the table they are desired to fill.

The Committee appointed at a former meeting to prepare a series of tables for the Registration of Diseases, &c., to be used by members of the Department and others, reported that they had performed their duty by adopting the tables submitted to the State Medical Society by Dr. H. Hartshorne, and approved by that Association. Owing to want of funds these tables never were published. Mr. Price, of this city, is willing to issue these tables in book form at his own expense, and to supply members and others at a slight cost. They will be bound with his visiting list for physicians, and also issued separately. The Committee asked leave to print the approval of the Department, with these tables, and in its name to recommend them to the profession. This report was accepted, and the permission asked was granted.

Dr. Woodward submitted the following resolutions, which were adopted:

1. *Resolved*, That every author of a paper hereafter read before the Department, not designed for publication in the Proceedings, shall at the time of reading furnish a full abstract of the same to the Recorder, in order that it may be laid before the Academy with the monthly report.

2. *Resolved*, That Committees having referred to them papers read before the Department, accompanied with illustrations, shall be required to report to the Department whether such illustrations are indispensably necessary for the thorough elucidation of the subject considered; and when in their opinion such a necessity exists, the entire cost of such cuts, engravings or lithographs shall be borne by the Department, on a vote of the majority of the members present at any stated meeting. Provided, that the author shall present at the time an estimate of the cost of such illustrations.

Dec. 6th.—Dr. Walter F. Atlee read the following communication upon "*Relaxation of the Abdominal Walls, as a cause of Hæmorrhoids.*"

A cause of hæmorrhoids, at least what we believe may be one, which has been neglected by all writers with whom we are acquainted, is weakness or relaxation of the muscles of the anterior wall of the abdomen.

* See American Journal of Medical Sciences for January, 1859.

In order to understand this it is necessary to reflect a little while upon the peculiarities of the venous circulation in the portal system. From the resistance the blood in the general circulation encounters in traversing the capillaries, much of its moving force is lost, and to move regularly in the veins it requires some assistance, that is obtained chiefly from muscular movements and the aspiratory action of the movements of inspiration; by neither of these is the flow in the portal veins affected. Besides, the portal veins possess no valves, and the blood contained therein is between two systems of capillaries, for these veins act as arteries in the liver, and the blood passes through a capillary network in that organ before it empties into the inferior vena cava. If in passing through the general capillary system, the blood loses nearly the whole of its moving force, it is evident that the capillary system in the liver must act in the same way, and with so much the more power, as that the tension of the blood in the portal vein is already itself less than that in the arteries. In fact, well-known experiments, as for instance those made when the blood of the liver and that of the portal veins are collected for chemical examination, show that the circulation in the vena portarum is an entirely passive one, its current is directed towards the liver only on the one condition that there is a force to push it there, and this force comes from the abdominal walls, which, by pressing the mass of the intestines, propel the blood contained therein. Causes that may locally modify the circulation must, of course, act here with great efficacy, and it is far from being a matter of surprise that the hæmorrhoidal veins, those most exposed, are often enlarged and diseased. Nature, as usual, has made provision for their protection, and were it not for the relief afforded them by the communications existing in the walls of the rectum between the inferior mesenteric vein, and the middle and hemorrhoidal branchesof the hypogastric, they would be still more often affected.

It is very hard to say how far the rapidity of the current of the blood in the portal vein may be diminished, but one experiment is sufficient to show the influence, in this respect, of causes constantly occurring. The ferro-cyanuret of potassium shows itself in the urine as soon as it reaches the general circulation; this salt, when given 24 minutes after a meal appeared in the urine at the expiration of 16 minutes; and when given 240 minutes after a meal, in 2 minutes. In fact when the fatal consequences of the sudden injection into the general venous system of large quantities of even the most innocuous fluids is considered, the necessity of the prevention of the sudden passage into the inferior vena cava of the materials carried into the vena portarum, is at once apparent. Most important chemical changes undoubtedly occur in the liver, but it might be shown, we think, by reasons taken from numbers of facts in normal and pathological anatomy, both human and comparative, as also in physiology, that its action as a mechanical agent is most important. If a few ounces of water suddenly thrown into the general circulation of a dog can produce death, what would be the effect if, in man, the liver did not intervene between the inferior vena cava, and a barrel of lager beer?

Now it being undoubtedly a fact that the pressure exerted by the abdominal muscles upon the mass of intestines is the cause of the onward movement of the blood in the portal veins towards the liver, any cause diminishing the pressure, whether position of the body, or feebleness of the muscles themselves, must lead to more or less stagnation of the blood, and consequently to hemorrhoidal affections. Tailors, shoemakers, dress-makers, and persons engaged in writing, which forces them to lean forward over a desk, are particularly subject to hæmorrhoids; and we would explain the well-known influence of sedentary occupations generally upon this affection more by their producing relaxation of the anterior abdominal walls, than by the deficiency of exercise and the constipation attending them, though these must play their part also. An undoubted cause of an attack of hæmorrhoids, and one not unfrequently witnessed, is parturition. It is not very uncommon for the patient to suffer most severely after the birth of the child, from the strangulation of a mass of hæmorrhoidal veins, that have been forced out with the first passages from the bowels, and the cause of this phenomena we believe to be the relaxation of the abdominal walls at that time existing. Many facts corroborative of this opinion could readily be cited.

Dr. Leidy called the attention of the members to the stomach of a mink (*Mustela vison*), containing a large number of worms. The latter had caused much thickening of the walls of the stomach, in which the anterior extremity of their body deeply penetrated. The worm is a species, heretofore unnoticed, of the genus *Cheiracanthus*. Its name and characters were given as follows:

Cheiracanthus socialis, Leidy. Body cylindrical, posteriorly obtuse; anus subterminal. Integument transparent, with distinct circular muscles. Head discrete, discoidal, furnished with transverse rows of recurved hooks. Mouth bilabiate; œsophagus clavate, red; intestine dusky brown. Ovaries and oviducts, or testes and vasa deferentia, very tortuous and white. Anterior portion of the body thickly covered with alternating transverse rows of minute plates, of which those most anterior are tridentate, the succeeding ones bidentate, and the last ones are simple and gradually become obsolete. Posterior extremity of the male attenuated, spirally contorted, and ending in a horse-shoe-like border with four red papillæ on each side.

Length of female fifteen lines; breadth three-fourths of a line; length of male twelve lines, breadth half a line.

Dr. Woodward stated that a portion of the stomach of the mink was submitted to him for investigation by Dr. Leidy. The piece presented on the surface of the mucous membrane several orifices about $\frac{1}{6}$th of an inch in diameter, which were surrounded by well-marked indurations of the size of a chestnut. On making sections of these indurations it was observed that the orifices were the openings of canals penetrating from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch into the tissue, winding in various directions; one orifice sometimes leading to several canals.

The canals were lined by a reddish pultaceous matter in which blood corpuscles in various stages of disintegration and numerous pus-corpuscles were clearly made out. One or two bodies supposed to be ova were also perceived.

The induration was essentially a new formation of connective tissue in which development had proceeded to the stage of nucleated caudate cells with extremities much prolonged. It involved the sub-mucous tissue and the superficial portion of the muscular coat.

It is presumed that the new formation is the result of the organization of an inflammatory exudation, poured out as the consequence of the disturbance produced by the penetration of the worm into the tissue.

Dr. Mitchell exhibited an ingenious injecting pump, invented by Mr. Franklin Peale, of this city. Its valves were in imitation of those in the veins of the animal organism. He also exhibited a craniometer, graduated to 1-50th of an inch, and a spirometer, for measuring lung capacity, much superior to the one ordinarily used.

While engaged recently, in preparing various instruments to be used in physical examinations of the height, weight, and pulmonary capacity of the men of the police force of Philadelphia, Dr. M. was struck with the clumsiness, and, in some instances, with the inefficiency of the ordinary spirometer. Its great size and cumbrous form, the necessity of using many buckets of water to fill it, and the expense of its construction, alike unfit it for common or ready use.

With the aid of his friend, Mr. B. Phillips, and of Mr. Gratz, he has succeeded in arranging the ordinary "dry gas metre" so as to adapt it perfectly to spirometric use. This beautiful metre is made in vast numbers by Messrs. Code, Hopper & Co., of Philadelphia. It is unnecessary to explain the interior arrangements, which, although complicated, are capable of accurately measuring the cubic amount of the gases which pass through, and it is so little apt to become deranged that it will often run for years without serious error. As the works of the dry metre are made by machinery, and the number manufactured is enormous, the price is of necessity moderate, being from eight to ten dollars, or less than one half of the cost of the worst spirometer, made upon the ordinary plan, and many times less than that of the best of them. This new form of spirometer runs with so little friction that a pressure of 1-8th of an inch of water will move it readily. One source of error is thus avoided, since if the instrument was difficult to move, the air blown into it would be more or less condensed, and so occupy less space than it ought to do.

The number of cubic inches passed through this instrument is marked by hands upon a dial placed on top of the metre. After very careful testing, it was found to give extremely accurate indications. The size of the new spirometer is as follows:—Height 14 inches, width 11 inches. The inlet and outlet pipes form convenient handles.

As the air from the lungs naturally deposits a certain amount of moisture in the metre, its escape is provided for by an aperture at the bottom, usually closed by a button.

The committee to which was referred the Preliminary Report of Dr. S. Wier Mitchell, relative to the plan by which he purposes obtaining the statistics of height, weight, &c., of the native born white race in North America, reported that upon full and attentive consideration it was the opinion of the committee that the plan proposed by Dr. Mitchell, is such, that if followed out as indicated by him, it cannot fail to lead to results of the highest importance, not only in regard to the development and hygiene of the race in America, but to the solution of certain questions relative to mankind at large, of equal if not of greater consequence. The committee therefore suggested to the Department as a whole, and also to the individual members, the importance of affording to Dr. Mitchell, and to those gentlemen whom he may associate with him in his inquiries, such assistance as may be in their power.

This committee had also referred to it resolutions giving authority to Dr. M. to use the name of the Department in his efforts to obtain the information he desires, and appropriating a sum not exceeding sixty dollars for the necessary expenses of his investigations.

The first and second resolutions are so manifestly proper, that the committee deemed it unnecessary to urge them further.

In relation to the third resolution, the committee desired to offer a few reasons why it should be favorably considered and acted upon by the Department.

In the first place the subject to which Dr. M.'s inquiries relate, is one assigned to him in the report of the General Committee, and therefore not selected by him for voluntary investigation. There is accordingly an obvious propriety, aside from any other reason, in the Department defraying such necessary and moderate expenses as may be incurred.

2d. In order to do full justice to the subject it is essential that numerous circulars, blanks, &c., should be printed and distributed, and that occasionally small sums of money should be given to persons who may have rendered valuable assistance. These are expenses probably not incidental to any other subject proposed by the General Committee, and it would be just as proper that the Recorder should be at the expense of the blanks, circulars, &c., used by him for the Department as that Dr. M. should furnish those required for the performance of the duty assigned to him.

Such necessary apparatus as may be required should also be furnished by the Department. This will of course remain the property of the Department, and may be used in future researches.

3d. In conclusion, the committee was of the opinion that in general no better use can be made of the funds of the Department, than by employing them in furtherance of such scientific investigations as come within its range of action. It is desirable that this should from the first be made the settled principle of the Department, and the committee believed that means will not be wanting to carry it out.

The committee therefore recommended the adoption of the third resolution, leaving it to the Department to decide whether the amount shall be raised by subscription or appropriated directly from the treasury.

On motion of Dr. HAMMOND, the Department made the following resolutions :—

Resolved, That Dr. M. be appointed a committee of one on the subject of the physical development of the native born white American race, with power to add to the committee such persons as he may think proper.

Resolved, That said committee be authorized to make use of the name of the Department in its inquiries.

Resolved, That said committee be authorized to draw upon the Treasurer for such funds as may be required, not exceeding sixty dollars.

On motion of DR. HAMMOND, it was resolved that a Committee be appointed to solicit subscriptions, to be paid over to the Treasurer in aid of the investigation, in regard to the statistics of the human race in America.

Mr. FOULKE, a Member of the Committee on Dr. Hartshorne's paper on the relations of Physiology to Palæontology, stated that before the action of the committee, the author was compelled to go to Europe for his health, and he preferred to withdraw his paper. Mr. Foulke, therefore, at his request, asked leave for the withdrawal of the paper, which was granted by the Department.

Dr. E. HARTSHORNE presented a resolution, asking for the appointment of a committtee, consisting of five persons, to devise and report upon a plan for securing a wide circulation of the memoirs of the Department among medical readers. The resolution was adopted, and a committee, consisting of Messrs. E. Hartshorne, Hammond, Leidy, Mitchell and Atlee was appointed.

The following persons were chosen as the officers and members of the Standing Committees for the ensuing year:

Director.—Dr. LEIDY.
Vice-Director.—Dr. HAMMOND.
Recorder.—Dr. HARTSHORNE.
Conservator.—Dr. MORRIS.
Treasurer.—Mr. QUEEN.
Auditors.—Mr. SLACK, Mr. SERGEANT and Dr. WURTZ.
Anatomy and Histology.—Drs. LEIDY, SCHMIDT and ATLEE.
Physiology.—Drs. HAMMOND, MITCHELL and MORRIS.
Pathology and Pathological Anatomy.—Drs. WOODWARD, MOOREHOUSE and BAKER.
Organic Chemistry.—Drs. RAND, MORRIS and WILCOCKS.
Micrology.—Drs. BOKER, WOODWARD and MITCHELL.
Embryology.—Drs. ATLEE, CORSE and H. HARTSHORNE.
Etiology and Hygiene.—E. HARSTHORNE, H. HARTSHORNE and S. POWELL.

The Treasurer's Report was read, showing a balance on hand of $70 36.

December 20th. Dr. S. W. MITCHELL read a paper upon *the effects of certain substances upon the exposed hearts of animals,* which was ordered to be published in a medical journal. The following is an abstract of this paper:

Dr. Mitchell's experiments seem to him to justify the following conclusions :—

1st. That the hearts of the frog and turtle beat much less rapidly in vacuo, and sometimes cease to act until the air is readmitted. That the vacuum most probably retards the heart's action by the mechanical effects it induces, as well as by depriving it of oxygen, since the beat in vacuo is long and labored, and the accelerating influence of the readmitted atmosphere is almost instantaneous.

2d. That mere isolation from the air, as by placing the heart in oil, does not alter the rate of the heart's movements for some time, but lessens their ultimate duration.

3d. That water, at ærial temperatures, stimulates the heart, and very soon causes it to cease to pulsate. That water at higher temperatures, as 100° F.,—113° F., produces much more rapidly the same results.

4th. That glycerine, at ærial temperatures, affects the heart but little, except as shortening the time during which it continues to pulsate. That glycerine at 32° F., depresses the heart's action, lessening the number of pulses per minute at least one half, and soon checking its movements altogether. That olive oil at 32° F., affected the heart very little at first, as to the number of beats per minute, but soon rendered them feeble, and finally stopped them; though at the close of a longer interval than was required by glycerine at the same temperature.*

5th. That when the heart has ceased to respond to one stimulus, however violent, it will usually remain sensitive to others, apparently far less powerful.

Dr. Leidy exhibited specimens of true bone, found in the kidney of a mink. It was situated in the fibrous tissue of the organ, the glandular substance of which was wasted away, its place being occupied by an enormous parasite, the Strongylus gigas.

Dr. Woodward stated that he had found tubercular deposits upon the pleura of an opossum, which had been kept in confinement in the Academy for some time.

Dr. Hartshorne, from the Committee appointed to devise and report upon a plan for securing a wide circulation of the Memoirs of the Department among medical readers, reported certain resolutions, which were read for the first time.

This Report was adopted.

A resolution was offered by Dr. Hartshorne, providing for the appointment of a Committee on Statistics, which was adopted.

The following persons were duly elected members of the Biological Department:—W. M. Uhler, M. D., Prof. J. H. B. McClellan, M. D., Prof. Joseph Carson, M. D., Prof. J. Jones, M. D., Mr. Wm. S. Vaux, T. B. Wilson, M. D., Prof. H. F. Campbell, M. D., and William Hunt, M. D.

* The glycerine was thinner than the English Glycerine, (Price's), now in use, and altogether was a much less reliable article. For this reason I do not entirely trust the results observed when using glycerine.

THE

MOSAIC ACCOUNT

OF

THE CREATION.

BY

JAMES C. FISHER, M.D.,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES.

PHILADELPHIA:

MERRIHEW & THOMPSON, PRINTERS,

Lodge street, North side of Pennsylvania Bank.

1858.

THE

MOSAIC ACCOUNT OF THE CREATION.

The substance of the following paper was originally given as a verbal communication, at the meeting of the Academy of Natural Sciences, on the 9th of May, 1854, in reply to the strictures of W. Parker Foulke, Esq., on the lecture of the late Hugh Miller, "The two Records—the Mosaic and the Geologic." It was the design of the Author to show, that Mr. Miller, so far from using the classification by geologists, of the rocks on the earth's surface into three great groups, the "*palæozoic, secondary*, and *tertiary*," to illustrate the striking coincidence between the two records, in an unauthorized manner, was perfectly justified in showing that this classification, *made without any reference to the Scriptures whatever*, yet, did, in a most wonderful manner, agree with them. He endeavored to show that by taking the most prominent fact in each of these periods, Mr. Miller had only followed the course which Moses had taken with each of the other, so-called, days. He had not stated, and did not intend to state, that these *were the only facts*, but that in each of them they were the most prominent and characteristic. Circumstances at the time prevented the author from writing out his remarks, for publication with those of Mr. Foulke, and no good opportunity occurred until the present summer, when they were published in the form now given, in the Presbyterian Quarterly Review. It has been a source of regret to the author, that they were not published at the time, as they would probably have saved the lamented Miller from the feeling expressed in the notes to his last work, "The Testimony of the Rocks," in regard to the remarks made by Mr. Foulke, which were certainly made in no unkind spirit towards Mr. M., for any such feeling was at the time most explicitly disclaimed.

The various methods by which theologians and geologists have sought to reconcile "the testimony of the rocks," and our version of the first chapter of Genesis, may all be reduced to two, or perhaps, three general schemes. The first one supposes, that between the first verse and the second there was an undefined and enormous interval of time, in which the various geological changes, such as we now find upon the earth, took place; that the earth was then brought into the chaotic state described in the second verse, and then it was, in six days of twenty-four hours each, prepared for the habitation of man, who was at that time placed upon it. This was the plan of reconciliation of Dr. Chalmers, and, with a single exception, that of Dr. John Pye Smith, who thought that the chaos described in the second verse, and the work of creation, in the rest of the chapter, extended over but a small part of the earth's surface, and that outside of that area, the rest of the earth continued to enjoy the light of the sun, and plants and animals lived, and grew, and have continued by an unbroken series of generations to our own times. The progress of geological discovery has caused the scheme of Dr. Chalmers to be laid aside, for it does not meet the wants of the case, and that of Dr. Smith is opposed to the record of Moses, in making no provision for the creation of the heavens.

The second method supposes, that the days were periods of great and indefinite extent, each embracing vast ages, in which the various geological changes occurred. With some few modifications, this is now adopted by the great majority of modern geologists. There is little, if any, doubt that so far at least as the length of the days is concerned, this scheme is strictly in consonance with the meaning of the Scriptures. Almost all geologists and theologians, however, commit the mistake of confining this description of the creation to the earth alone, although the sacred narrative as plainly asserts that "in the beginning God created the *heavens* and the earth," and at its close declares, "thus the *heavens* and the earth were finished, and all the host of them."

Prof. Barrows, in commenting upon this verse says, that "Tuch remarks, that this is the only passage in which the word *hosts* includes earthly objects along with the heavenly host. It denotes the orderly marshalling and arranging of all created things in heaven and earth." We have a right then to require that any system of interpretation which shall be presented to us for adoption, shall account for the heavenly bodies, as well as the earth, and it will not do, as we shall soon see, to confine the sole description of their creation to the work of the fourth day. Such an interpretation must not only accord with geology, but likewise with astronomy. It must, in short, be so read as to give us an account of the creation of the heavens, as well as of the earth.

Before proceeding to examine and determine the meaning of the Mosaic record, we may premise, that that interpretation which, fairly made, according to those rules by which we interpret all language, shall best harmonize with all the facts, is most likely to be the true one, even though it may be very different from the one which we have been accustomed to regard as correct. If it best agrees with all the phenomena, we ought not to reject it on account of novelty, and assume that it cannot be true, because so many learned and wise scholars, on whose opinions we have been accustomed to rely, have given a different reading. It may be, that they have never examined it from the right point of view, to attain the knowledge of its meaning.

We will now proceed with our undertaking. Verse 1st. "In the beginning God created the heavens and the earth." Prof. Lewis has employed a large part of the sixth chapter of his Six Days of Creation, in proving that the word translated *create*, does not mean to bring into existence from nothing, but rather to arrange matter previously existing. It seems, however, more reasonable to think that it was the design of Moses, to teach, in opposition to those who believed in and taught the eternity of matter, that it was created by the power of God. In fact, the absolutely literal translation of the verse conveys exactly this idea.

In our version, the particle את which means *the substance of*, is not translated; were it rendered, the verse would read thus: "In the beginning God created the substance of the heavens and the earth." The authorities for this reading are many and important. Dr. Wilson, in his Easy Introduction to the Knowledge of Hebrew without the Points, in a note on this word says, "This particle following an active verb, and going before a noun which has the servile ה prefixed, admits of no translation unless we render it 'the substance of.' Here the sense will allow it, which is rarely the case." So Harris, in his Pre-Adamite Earth, in a note on this first verse, says, "according to the Rabbins, the verse should be rendered, 'God in the beginning created the substance of the heavens and the substance of the earth.' They understand את here to mean the substance or material. The Syriac translation gives the same sense. Compare Gesenius on this word; Aben Ezra; Kimchi in his Book of Roots, and Buxtorf's Talmudic Lexicon."

The adoption of this reading throws light upon the subsequent verse, and assists us to understand more clearly its meaning.

Verse 2d. "And the earth was without form and void, and darkness was upon the face of the deep, and the Spirit of God moved upon the face of the waters."

"It has been held that the particle translated *and* in this verse, does not necessarily imply a direct connection between this verse and the first, and that an immense period of time may have elapsed between them. Barrows and others, have, however, shown conclusively that this is erroneous, and that it has here its proper power as a direct copulative. This is also evident from the verse itself. What is the object of this verse? Is it not to describe the condition or state of the substance of the heavens and the earth, the creation of which has just been affirmed? Prof. Lewis says, "'without form and void' are expressions, the one referring to utter irregularity of dimensions, and outward extent, the other to the deficiency of gravity; denoting, not so much an absolute as a relative want of weight, in other words, a fluid or rarified condition, with an absence of all cohesion or solidity, or it may be a huge nebulosity," &c.; and again, "the תְּהוֹם or *deep* is evidently the תֹּהוּ, *without form*, mentioned before. It is etymologically different, and yet the word as here used, can be only another name for the chaos, though afterwards employed to denote other objects which the imagination might regard as presenting some resemblance to the primeval waste." The word *waters*, in this verse, is also used to designate the same as the deep. We would here also remark that the word מְרַחֶפֶת, rendered *moved upon*, is in the Hiphil conjugation, and is therefore causative, and would be more properly rendered *caused motion in*. The phrase *the face of*, is idiomatical and answers to our word *throughout*. We can now understand the meaning of the verse. Moses is describing, in his masterly manner, by a few bold expressions, the appearance of the matter of whose creation he had just spoken. It was formless and void, or filling all space and without any cohesion or solidity; it was all dark; and a motion caused by the Spirit of God pervaded it. The Creator now proceeds to form this formless and void matter into those bodies which he had from eternity designed. The first act was the endowing a part of this dark matter with luminous properties. Verse 3d. "And God said, let there be light, and there was light." The language used does not imply a new creation of matter, but simply giving to matter already created luminous power.

Verse 4th. "And God saw the light that it was good, and God divided between the light and the darkness." The expression, God saw that it was good, does not imply moral goodness, but that it was fitted for the designed end, the purpose for which he formed it. This remark applies also to each place in the chapter in which the expression occurs. The word here rendered *divided*, expresses a gradual act, such as the separation of two dissimilar substances would be; how this separation was finally effected we shall presently see.

Verse 5th. "And God called the light day, and the darkness he called night; and the evening and the morning were the first day," or literally, "evening was, morning was, one day." The name *day* is here used evidently in a different sense, in the first part of the verse, from what it is in the last. In the first part, it undoubtedly is a name given to the light to designate its special character. Gesenius and others derive it from a root, which signifies to be warm, hot, to glow with heat, and therefore its signification as a name will be, that which produces heat, or the warmth-producer; a name which fairly expresses its principal character, and is in this respect like our word *caloric*, with which it seems to be identical in meaning; so also the term *night* is here used, not to designate a portion of time, but as the name of the dark, or non-luminous matter from which the luminous had been, in this work of the first day, separated. It is, says Wilson, derived from the root לוּל, signifying to turn to, or towards, to move around, and as a name would be, the moving around matter.

In the latter part of the verse, the term *day* means a period of time. The true meaning of this word here, has been one of the chief difficulties in the way of the interpretation of this chapter. Many have contended that it means in this place, a period of twenty-four hours, or what we call a natural day, and their main argument has been the reference to the work of creation in the fourth commandment. They contend that God, in the reason which is there given for hallowing the seventh day, settles this point, that the days of creation were natural days. Now, there is no fact more evident than that the word day is used in the Scriptures in a variety of senses, one of which we have in the first part of this verse, where it certainly has no reference whatever to time or duration. When it does mean duration or time, it is by no means restricted to the meaning contended for; on the contrary it has so many different ones, that we can only determine it from the context. The instances of these are numerous. In the next chapter we are told in the fourth verse, "these are the generations of the heavens and the earth,—in the day that the Lord God made the earth and the heavens." Here the term day includes the whole six days of the creation. So, when Job says, "turn from him that he may accomplish, as an hireling, his day," he uses it to express the lifetime of a man. When our Saviour said to the Jews, "Abraham rejoiced to see my day," he used it to designate the period of his appearance upon earth. We have also the prophetic use of the word for a year, and many other uses of the same character, so that we can only determine the meaning of the word from the context. Prof. Lewis says, "the Hebrews use the word יום *day*, for any period of time, presenting a complete course or unity of events, irrespective of precise duration. There can be no doubt at all of such usage." We would reply to the argument for the limitation of time in the fourth commandment. that we are told in the next chapter, that God rested from his work on the seventh day, and blessed the seventh day and sanctified it. Now we wish those who contend for this limitation of the *six* days, to tell us when the seventh day ended, and when God ceased to rest from his work. The term Sabbath is also used to signify a rest of more than a natural day. It is so used in the Levitical law to designate the Sabbath of the land, or every seventh year, and in other places. The meaning of the word *day* is unquestionably limited by the context, and in each subsequent passage to the series of completed events with which it is connected. Here the context limits it to the period from the creation of matter to the separation of light matter from the dark matter; and as no sun was yet in existence, it could not have been a day measured by it.

Verses 6th, 7th, and 8th. "And God said let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament, from the waters which were above the firmament, and it was so. And God called the firmament, heaven: and the evening and the morning were the second day." There is no part of the account of the creation that has more puzzled commentators.

Perhaps it is not possible to find any exposition of this work of the second day, that has yet been given, that when fairly examined does not involve a downright absurdity. We will mention two examples of these; one given by Cruden, the author of the Concordance, as the understanding of divines in regard to it in the year 1737, and the other by Prof. Barrows, of Andover, in the year 1856. "The word used," says Cruden, "is רָקִיעַ, which is translated expansion, something expanded, or firmament, something firm and solid. By this word, the Hebrews understood the heavens, which, like a solid and immense arch (though it be soft and liquid) served as a bank and barrier between the upper and the lower waters; and that the stars were set in this arch like so many precious stones in gold and silver, when firmament is taken for the starry heaven; then by upper waters, is meant that sea or collection of waters placed by God above all the visible heavens, and there reserved for ends known to himself. If by firmament we understand the air called the expansion because it is extended far and wide, and the firmament, because it is fixed in its proper place, from whence it cannot be moved unless by force; then by superior waters are to be understood the waters in the clouds; and these may be said to be above the firmament of air, because they are above a considerable part of it."

Prof. Barrows, of Andover, says: "In this azure vault (the sky) God has placed the heavenly bodies; the fowls fly above the earth on its face; that is, along under it, as if skimming its surface, and it constitutes a permanent division between the waters above and below itself. The waters under the firmament are those on the earth's surface. The waters above the firmament are not directly the clouds, but rather that invisible store-house of waters whence the clouds are, from age to age, supplied. Such seems to be the representation of the sacred writer. And now, what is there in this at which modern science can justly take offence? Is it that he describes the firmament as an outspread vault, in which are placed the sun, moon, and stars? Is it that he places an inexhaustible reservoir of water above our heads? That God has such a reservoir there, is certain; for he has been pouring down rain from it for six thousand years, and it is not yet spent!" Certainly, this is almost equal to the child's idea of the sky; "A great blue curtain drawn overhead, with holes in it to let the glory of heaven through." A very beautiful idea for a child. We answer the professor's question seriously, in the words of Hugh Miller—"that philology cannot be sound which would commit the Scriptures to a science that cannot be true."

The difficulty arises here from an entire mistake as to the meaning of רָקִיעַ, and the waters here mentioned. The word is derived from a root which means to expand, to spread abroad, and, as a noun, it may be rendered expansion. Now, what is the meaning here of expansion? Is it not a division of the formless and space-filling mass into different parts, and by an interval or expansion that can be measured from one to another? In other words, the matter of the universe was now divided into all those parts which, by their consolidation on the succeeding day, were to form not only our earth, but all the heavenly bodies. This gives us an intelligent idea of what the work of the second day was. It was the division of the matter formed in the beginning, and on the first day divided into two great classes, the light and the dark, into those innumerable parts which were to form the heavens and the heaven of heavens.

Verses 9th, 10th, 11th, 12th, and 13th. "And God said, Let the waters under the heaven be gathered together into one place, and let the dry appear, and it was so; and God called the dry, earth; and the gathering together of the waters called he seas; and God saw that it was good. And God said Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself upon the earth; and it was so. And the earth brought forth grass, and the herb yielding seed after his kind, and the tree yielding fruit, whose seed is in itself, after his kind; and God saw that it was good. And the evening and the morning were the third day." The work of the third day was, first; the consolidation of the matter of the universe here designated as "the waters under the heavens." Throughout all the regions of space this work of consolidation went on simultaneously. Previous to this third day of creation, no geological changes could have taken place, for the earth had no separate existence. Now, however, they commence, and, as the earth becomes fitted for the existence of life upon it, it is supplied. The second part of the work of this day was the clothing the earth with verdure by the creation of plants in rich abundance; the operations of this day and the fifth are consecutive, for the work of the fourth day extended over a part of each of these days. The third, fifth, and sixth days are the only ones with which geology has anything to do, and, for the manner in which the two records agree, we must refer to the late work of the lamented Miller, The Testimony of the Rocks, especially to the lecture—the two Records, Mosaic and Geological.

Verses 14th, 15th, 16th, 17th, 18th, and 19th. "And God said, Let there be lights in the firmament of the heaven, to divide the day from the night; and let them be for signs and for seasons, and for days and for years. And let them be for lights in the firmament of the heaven to give light upon the earth; and it was so. And God made two great lights; the greater light to rule the day, andthe lesser light to rule the night; he made the stars also. And God set them in the firmament of the heaven to give light upon the earth, and to rule over the day and over the night, and to divide the light from the darkness; and God saw that it was good. And the evening and the morning were the fourth day."

It has puzzled many to know why the sun, moon, and stars were not said to be made before the fourth day. If the reader has followed carefully the course of interpretation, he can now see why they are not mentioned before.

The word here rendered made, is not the one which is rendered create, but one which most frequently means constituted, appointed, or set in order. The work, then, of the fourth day was the ordering and arrangement of the motions of the heavenly bodies; and their functions, so far as our earth is concerned, are clearly stated. The undoubted object of this was to guard men against making them objects of divine worship; they were created things, the work of the Deity; and, so far as man was concerned, they were designed to serve his convenience and promote his welfare. Let us now recapitulate the work of the several days, and see how they agree with the teachings of the works of God.

In the beginning, God created the substance of the heavens and the earth, and this substance was without form and void, or, diffused throughout space, it was dark, and the Spirit of God caused a motion to commence in it. God endued a part of it with luminous properties, and a part he left dark; he then caused the light to separate from the dark matter, and named the light matter day, or the warmth-producing matter; and the dark he called night, or the moving-around matter. This constituted the first day. On the second day, he caused the matter of the heavens and the earth, or of the universe, to separate and divide into distinct masses; and to the space, which contained these masses, together with the masses themselves, he gave the name of heaven. This was the work of the second day. On the third day, he caused the masses of matter to become consolidated, and gave to the one which we inhabit, the specific name of earth, and to its collections of waters, seas. He then clothed the earth abundantly with verdure of all kinds, and commenced its preparation for the residence of man upon it; this was the work of the third day. On the fourth day, he arranged the motions of the heavenly bodies, both with reference to the earth and to each other. On the fifth and sixth days, the preparation of the earth for the residence of man was completed, and man was placed upon it. We have thus a clear, definite, and intelligible narrative, which agrees throughout with the teachings of the most perfect science. We have not space now to review the various phenomena of nature which bear us out in the assertion; but those who have studied the subject will understand the full force of the declaration that, if one should seek to give a sketch in the fewest words of the Celestial Mechanism of Laplace, the Cosmos of Humboldt, and the geology of the latest and best authorities, he would do it in the very language of Moses. Here, then, we have presented to us the wonderful spectacle of all the grandest conclusions of science, epitomized, arranged, and accounted for ages ago, at a time when we are accustomed to look upon the world as in its infancy, and when all nations, except the one to which this wonderful writer belonged, were plunged in the darkest and most degrading idolatry. Where did Moses get this knowledge so absolutely perfect? Was it not from God? and is not this chapter, over which such a premature shout of triumph has been sent up, the most convincing proof of the inspiration of the Scriptures? And so it will ever be, no matter what assaults may be made upon it, whether it be in regard to the unity of the race, or some other which shall yet be brought forward, all will prove in the end vain and futile, and the Scriptures will come out of the contest like the three Jews from Nebuchadnezzar's fiery furnace, without even the smell of fire having passed upon them.

Hints to Craniographers.

BY J. AITKEN MEIGS, M. D.

Everywhere Ethnology, the youngest and most ambitious of the sciences, is at length beginning to receive that earnest attention which the grandeur, importance and acknowledged complexity of its problems demand. Treated at first as an eminently speculative and metaphysical study, it has come at length to be considered as amenable chiefly, if not entirely, to the purely scientific methods of research employed by the naturalist. Long ago, the Ethnology of the so-called philosophical school was simply a meagre Anthropology, made up almost wholly of certain national, psychologic phenomena of uncertain value and unknown relations. In the metaphysical systems of this school physical characters and the working formulæ of the naturalist found no place. But the attempt to separate the phenomena of mind from the physical conditions with which they are constantly associated in nature, proved as barren in results, as it was irrational in conception.

Anterior to the time of Linnæus the *philosophy* of man was everything, the *science* nothing. Of the latter, the great Swedish naturalist was himself the founder and first exponent. After Linnæus, came Buffon, Daubenton, Camper, Sœmmering, Blumenbach, Zimmerman, and others, who, by regarding, and therefore treating man, as falling legitimately within the scope of the zoological method, attracted serious attention to the study of Anthropology as one of the natural sciences. The labors of these savants formed the foundation of this study, and gave it an impetus which is felt even at the present day. It must be confessed, however, that since the days of Blumenbach, in whose hands it received its more exact and scientific form, the progress of the study has been both slow and irregular; and the facts collected neither so extensive, nor for the most part so thoroughly and satisfactorily established as could be desired. Buffon, Cuvier, Lawrence, Péron, Kombst, Davis, Wilson and others, have all, at different times, taken occasion to deplore and comment upon this evident neglect of an important investigation.

Closely examined, the cause of this manifest neglect, and consequent slow progress of the Ethnological branch of Anthropology, will be found to be two-fold. In the first place and for a long time, the study of man was by many entirely separated from that of the rest of creation. Barbançois, Marcel de Serres, Ray, Brisson, Pennant, Vicq d'Azyr, and other naturalists following Aristotle, the illustrious founder of philosophical natural history, have all in succession ignored the physical character of man, by excluding him in their classifications from the animal kingdom. Thus effectually isolated, he has been treated from a mental point of view only, and his zoological affinities and analogies completely overlooked. Another class of observers, however, having a more comprehensive conception of nature, and the unity of design which pervades it, have at length recognised the animality of man, and placed him accordingly among, and at the head, of the Mammalia.

In the second place, the study has thus far been one of divided effort, undertaken by individuals who, at different times and in different places, widely separated from each other, have worked at and attempted to solve with varying success, each his own favorite problem, with little or no aid from, or correspondence with others interested in, and studying the same specialty. In a word, there has been little or no combination, or regularly systemized effort among the students of Ethnology.

Attempts, it is true, have not been wanting to establish such combinations, and appeals have been made to the scientific and general public, from time to time, by enthusiastic archæologists and ethnologists, in behalf of some of the objects of their respective sciences. As early as 1817, Dr. Hodgkin, in an Essay on the Promotion of Civilization, pointed out the importance of preserving from annihilation the uncivilized races of men, that their physical characters, traditions, &c., might be carefully studied. In 1837, an *Aborigines Protection Society* was formed in England, for the purpose of collecting information "concerning the character, habits and wants of the uncivilized tribes." But the benevolent objects of the Society finally engrossed the attention of its members to the exclusion of the ethnological. Two years later, Dr. Prichard, in the unwearied pursuit of his favorite study, called the attention of the British Association, then in session at Birmingham, to the rapid manner in which certain varieties of the human race were hastening on to extinction. He suggested to the Association the importance of making some effort to rescue from utter oblivion, the many historical, physiological and philological details, constituting, so to speak, the biography of these decaying races. His interesting paper, read before the Natural Historical Section of the Association, was, in fact, an appeal in behalf of Ethnology. This appeal met with a lively response in the appointment of a Committee to prepare a set of queries to be addressed to travellers and others whose opportunities were such as to enable them to give satisfactory answers to these queries. About the same time the Ethnographical Society of Paris, published a similar set of questions for travellers. In 1842, Dr. King, of London, urged upon the scientific public, the wants and interests of Ethnology, in a prospectus issued July 20th, for the formation of an Ethnological Society. In 1844, after many of the barbarous races had disappeared forever from the face of the earth, Drs. King and Hodgkin endeavored in conjunction, "to excite sufficient interest to command the necessary means for preserving a record of the living, and of that which remains of the dead." (*Anniversary Address to the Ethnological Society of London*, 25th May, 1844.) In 1841 we find the late Mr. Geo. R. Gliddon appealing to the Antiquaries of Europe in behalf of the monuments of Egypt, which at that time, to use his own language, "were disappearing with frightful rapidity from the banks of the Nile." (*Otia Ægyptiaca*, p. 7). In 1852, in a highly interesting pamphlet, entitled "*Questions Relatives à l' Ethnologie Ancienne de la France*," read before the Society of Antiquaries of that country, M. Alfred Maury pressed upon the attention of the correspondents of the Society, the necessity of investigating, ere it was too late, the physiognomical and national characters of the dissimilar races inhabiting the different cantons of France; their costumes, usages, linguistic and cognominal peculiarities, &c. Prichard long ago hoped that specimens of the craniology of Britain would not be suffered to fall into decay. In 1855 Mr. A. H. Rhind, actuated by the same feeling, sent forth a "vigorous appeal for the preservation of the 'monuments of primeval Britain,'" which appeal has found a truly scientific and valuable response in the *Crania Britannica* of Messrs. Davis and Thurnam, who are successfully attempting "to rescue and perpetuate the faithful lineaments of a sufficient number of the skulls of the ancient races of Britain, to preserve authentic data for the future." Davis strenuously urges the importance of studying the diversified races of the British Islands "with constant reference to their origin and history, and taking their cranial and other physical properties as a basis."

The human skull is so positively distinctive of race, that it claims at the hands of the student of Anthropology the most minute examination. The receptacle of the brain, of the organs of the senses and the masticatory apparatus, it exhibits race-characters more striking and distinguishing than those presented by any other part of the bony system. The pelvis, perhaps, comes next to it in ethnographic importance. The configuration of the skull influences to a considerable extent the characters of the countenance and shape of the features. "Hence, our zoological study of man," says Lawrence, writing in 1819, "will be greatly assisted by carefully examining genuine specimens of the skulls of different nations, which are easily prepared and preserved, may be conveniently handled and surveyed, considered in various points of view and compared to each other." Just twenty-one years afterwards, Wilde of Dublin wrote: "It is now universally admitted by the first authorities in this science, that to the form and character of the head can we alone refer in order to determine the varieties of man, either existing or extinct." (*Narrative of a Voyage to Madeira, Teneriffe, and along the shores of the Mediterranean.* By R. W. Wilde, Dublin, 1840, vol. 2.)

Craniography is in truth destined to constitute one, perhaps the most important of the corner stones upon which the great edifice of the Natural History of Man is to be hereafter erected. To become a sure and solid foundation it must be composed of numerous and well-established facts upon which the student may unhesitatingly build up, until he can overlook and successfully grapple with the higher problems of the science. Like its elder sisters Astronomy, Geology and Palæontology in former times, Ethnology is at present passing through what Comte calls the metaphysical or speculative phase of its career. Obscure writers and lecturers, impatient of that careful and laborious research which leads to correct results, and unacquainted even with what has already been done by Blumenbach, Retzius, Morton, Huschke, Davis, Virchow and others, are daily bringing disrepute upon the whole study, by unwisely discussing questions for the solution of which the data have not yet been developed. That these controversialists of an hour may be silenced, and the science positively advanced, every effort should be made to multiply and classify facts. But the multiplication and classification of facts must in great measure keep pace with and be dependent upon the establishment of cranial collections, which constitute, so to speak, the store-houses of the raw material ready to be elaborated into a science.

These collections and the important studies which they facilitate, are daily attracting more and more the attention of scientific men both in Europe and America; and the conviction is constantly gathering strength, that the zealous cultivation of Craniography is capable of yielding facts of the highest importance, not only in a purely scientific, but also in a political point of view.

In the "summer of 1830, Dr. S. G. Morton delivered a lecture, introductory to a course of anatomy, on the 'different forms of the skull, as exhibited in the five races of men.' Strange to say, he could neither buy nor borrow a cranium of each of these races; and he finished his discourse without showing either the Mongolian or Malay. Forcibly impressed with this great deficiency in a most important branch of science, he at once resolved to make a collection for himself; and after a lapse of sixteen years, deposited in the Academy of Natural Sciences of Philadelphia a series embracing upwards of 700 human crania, and an equal number of inferior animals." This collection, now in the possession of the Academy, contains at the present time about 1100 crania, representing more than 170 different races and tribes of the human family.

The establishment of this large and varied collection, and the important investigations to which it has given rise, have served to stimulate sensibly the advance of Craniography in Europe. Some years ago, "the Emperor of Russia was induced to found at St. Petersburgh a national museum, exclusively dedicated to craniolgy, to contain the skulls of all the ancient and modern races of his vast dominions," (See Squiers' *American Ethnology*, p. 3). All over Europe, Craniography is now being cultivated with considerable activity, and with highly valuable results, by such men as Retzius, Nilsson and Eschricht of Scandinavia, Gosse of Geneva, Dumoutier, Blanchard and Serres of France; Engel, Zeune, Carus, Virchow, Huschke, Lucæ, Fitzinger and others of Germany; and by Davis, Thurnam, Williamson, Minchin and others in Great Britain.

Many cranial collections are to be found in Europe and America, differing in the number and ethnic variety of their specimens. Precise information, however, as to their location, extent, variety and proprietorship is not easily obtained. From the writings of the craniographers above mentioned, and from my correspondents—especially Dr. J. Barnard Davis, of Shelton, England—I have become acquainted with a few of these collections. The largest and most diversified, as far as I know, is that contained in the Museum of the Army Medical Department, at Fort Pitt, Chatham, England. Of the existence of this collection I was not aware, until a descriptive catalogue of it appeared in the *Dublin Quarterly Journal of Medical Science*, for May and August, 1857. Through the kindness of Dr. George Williamson, the author, I have since received a copy of this catalogue, containing valuable photographs of many of the skulls.

The skulls embraced in the Chatham collection number about 600, and are arranged in 4 classes; 1st, oval-shaped skulls, including Europeans, Egyptians, Afghans, Hindoos, Singalese, New Zealanders, Otaheitans, &c.; 2d, skulls with projecting alveolar processes, or with the nasal bones in the same plane, comprising West African Negroes, Kaffirs, Hottentots, Bushmen, inhabitants of Mozambique and Madagascar, and the black natives of Mauritius, New South Wales and Van Diemen's-land; 3d, skulls with very prominent superciliary ridges, containing Sandwich Islanders, and 4th, skulls with broad and flat face, including Burmese, Malays, Chinese, Eskimos and North American Indians The collection appears to be quite diversified. It contains specimens of about 70 different tribes and nations. Among these are many not represented in the Academy's collection: such as Albanians, Maltese, Spanish, Baluchi, Pariahs and Singalese among the oval-headed; and Mandingos, Joloffs, Timmanni, Sossoos, Kassos, Hausas, Hanti, Attans or Oppas, Pappas or Mahais, Barconkas, Ashantis and others of the prognathous African form.

Dr. Williamson's Catalogue is a very acceptable addition, not only to the literature of Craniography, but also to the means by which this science might be advanced. It contains short but important descriptions of 547 crania, and 7 skeletons of different races of men, with extensive measurements of the same. The appendix embraces a number of anatomical measurements, estimates of the internal capacity, and a valuable table showing the relative frequency with which the ossa triquetra or Wormian bones appear in the occipital suture in the different varieties of men; the number of instances in which the sphenoid is cut off from the parietal bone by a process of the temporal; the number of instances in which the lachrymal groove is formed entirely on the nasal process of the superior maxillary bone; the frequency of a suture in the centre of the frontal bone; and the size of the occipital foramen in the various races. The author also calls attention to the difference in the form of the anterior nasal openings in different classes of skulls, and illustrates his remarks with a number of outline engravings.

Of the present location and condition of the collections made by the earlier craniologists—those industrious pioneers of the science—I know nothing. Soemmering, writing in 1785, speaks of having examined the collections of Camper at Klein-hankum; of Hovius at Amsterdam; of Walter at Berlin; and of Blumenbach at Göttingen, (*Ueber die Körperliche Verschiedenheit des Negers vom Europäer.*) In the course of my reading, I have often found allusion to the cranial cabinets of Rau, (mentioned in Sandifort's *Museum Anatomicam,*) Albinus, Gualtherus van Doeveren, Munro, Kokilansky of Vienna and many others. Derwent Conway, in a work on Switzerland, published in 1830, says that "at the site of the cemetery of Zug is a Golgotha, where are thousands of skulls piled upon one another." Of Gall's famous collection, a catalogue, translated from the French of Dr. Dauncey, his pupil and friend, appeared some years ago, in the 6th Vol. of the *Edinburgh Phrenological Journal and Miscellany.* In 1824 or 5 Mad. Becker, the niece of Gall's first wife, presented a portion of this collection to Dr. Roulett of Baden, near Vienna. Vimont's collection, in 1828, amounted to more than 1200 skulls and casts of man and animals. The celebrated Deville collection, at the Strand, in London, numbered in 1830, more than 1800 casts and skulls. The Hunterian Museum, according to Prof. Owen's Catalogue published in 1853, contains a number of human crania. Judging from the numerous donations recorded, from time to time, in the different volumes of the Edinburgh Phrenological Journal, the Museum of the Society of that name must contain quite a large cranial collection. The collection of the Society of Antiquaries of Scotland was catalogued by Prof. D. Wilson, while acting as Secretary of that Society. Twenty-five years ago, when Phrenology was exciting so much attention, numerous Phrenological Societies were founded in various parts of Great Britain. Busts, casts and skulls of men and animals were industriously collected and deposited in the Museums of these Societies. But many of the latter having ceased to exist, after a few years of activity, it is not now easy, though very desirable, to obtain any information concerning the disposal made of their collections.

Cranial collections are also contained in the Cabinets and Museums of many scientific associations, colleges, universities, &c., throughout Europe, such as the Royal College of Surgeons, in London and Dublin, Guy's Hospital, the Yorkshire Philosophical Society, the Bristol Infirmary, the Senckenberg Natural History Society, the Josepheum in Vienna, the University of Dorpat, the Fremley Museum at Utrecht, Rijks Museum and the Anatomical Cabinet at Leyden, &c. &c.

In a letter dated Shelton, 25th Dec. 1857, my friend Mr. J. Barnard Davis informs me that his private collection, at present, "exceeds 450 specimens." In the Museum of Thos. Bateman, Esq., at Lomberdale House, Derbyshire, England, are numerous "skeletons, skulls, and separate bones, exhumed from tumuli chiefly of the Celtic period in Derbyshire, Staffordshire and Yorkshire," amounting at the time of the publication of his excellent antiquarian catalogue (1855) to 224 specimens. Among other private collections may be mentioned those of Retzius, Nilsson, Eschricht, Van der Hoeven, Thurnam, &c.

The Mortonian collection, in this Academy, is by far the largest and most diversified in the United States, and, as far as I can learn, in the world. The Smithsonian Institution is in possession of several hundred crania, chiefly of American Indians. I have examined a few, also, in the Patent Office in Washington. Most of the cranial collections in this country are small and are principally contained in the Museums of Scientific Associations, Medical Colleges, Phrenological Societies, &c. In this city (Philadelphia) the Museum of the University of Pennsylvania contains 169 skulls; that of the Jefferson College 72; that of the Pennsylvania College 125; and that of the Philadelphia College of Medicine 80.

In the *Canadian Journal of Industry, Science and Art* for October, 1855, "special directions were given with a view to the formation of a collection of Ancient Crania, illustrative of Canadian Ethnology." In the same Journal for November, 1856, the Editor Prof. D. Wilson, re-produces some of these directions, in the hope of securing a more careful attention to the preservation of the human remains and relics of art found in the ancient sepulchral deposits in Canada. He appeals to the "members of the Canadian Institute, who are scattered over nearly every district of the Province," to contribute their share to the elucidation of Ethnological Science, by rescuing from destruction the remains of the ancient and more recently displaced aborigines, and the specimens of their rude arts, brought to light in the course of the agricultural, railway, and other operations, which are extending into new districts, breaking up virgin soil, and leading to extensive excavations in regions hitherto untouched by the spade or plough.

From a later number of this Journal (November, 1857) it appears that in Canada there are several small collections of human crania contained in the Museums of the Canadian Institute, the Toronto University, Trinity and Knox's Colleges, and in the private cabinets of Prof. Wilson, and Drs. Hodder and Bovell, of Toronto, and the Rev. Jno. Gray, of Orillia.

Now, from the foregoing remarks, the members of the Academy will perceive that, to the student of craniology, catalogues of all such collections, whether large or small—especially if they be descriptive—are of very considerable value. They make known to him the existence of other collections besides his own, and inform him what races and tribes of men are represented therein, or in other words, precisely how much and what available material has been collected for the furtherance of his scientific specialty. He may be desirous of studying the cranial characters of a particular race, of which the specimens in the only collection to which he has access are few in number or of doubtful origin. Having exact catalogues of the various cranial collections which have been made, from time to time, and deposited in different parts of the world, he turns to these and at once learns how many specimens of this race, besides his own, have been collected and where they are located. He at once opens a correspondence with the proprietors of these collections, and is soon put in possession of any information which he may desire.

Moreover, these catalogues would form an admirable basis for the interchange of duplicate crania, for the owners of them would know exactly where to apply to make up their deficiencies. The correspondence, also, to which the interchange of catalogues and duplicate crania would give rise, would of itself greatly facilitate the progress of Craniography, by making the students of this science acquainted with each other, and enabling them by a private interchange of opinions to verify their conclusions or examine them in different points of view before publication. There can hardly be a doubt that the different collections would be respectively increased by the extensive distribution of such catalogues in the hands of army, navy, and other government officials, officers of merchantmen, travellers, naturalists connected with exploring expeditions, and others whose opportunities might be favorable to making such collections, and who would cheerfully do so were their attention once explicitly directed to this matter.

Again, it appears to me that the progress of craniography might be very much and very readily facilitated by some such plan or system of co-operation as the following. Let all those actually engaged or interested in the study, in any particular country, notify the secretary, or appropriate officer, of the most prominent and best known scientific institution in that country, of the existence and precise location of any collection of crania with which they may be acquainted, no matter how small or imperfect such a collection may be, stating carefully the name and address of the Society or individual owning the collection, the number of skulls contained, and the different races of men represented therein. Let the secretary or other officer receiving such communications cause them to be published from time to time in the printed journal, transactions or proceedings of the Society. These being sent in exchange or otherwise, to scientific associations and individuals in other countries, would thus become the vehicle for the transmission of this information to the craniographers of the latter places.

The editors of scientific, medical and literary magazines, journals, reviews, &c., have it in their power greatly to promote craniographic science by inserting in their pages from time to time, and thus disseminating the information obtained in the manner indicated above. This statement particularly applies to medical Journals, inasmuch as most of those cultivating Craniography are physicians, not a few of whom are in the active public or private practice of their profession.

These crude suggestions are offered to the Academy in the hope that, being distributed with its Proceedings, they may attract the attention and active support of those who are interested in, and who are able and willing to advance so important a branch of the *Science of Man.*

January 5*th.* From Mr. Mayland Cuthbert, dated January 5th, 1858, acknowledging his election as a member.

12*th.* From Hon. Jas. L. Orr, Speaker of the House of Representatives, dated Washington, January 8th, 1858, acknowleding the receipt of a copy of the resolutions of the Academy, which were adopted November 24th, last.

From U. S. War Department, Jan. 9th, 1858, transmitting Vols. 3 and 4 of a report on Explorations and Surveys for a rail road route from the Mississippi to the Pacific Ocean.

19*th.* From the Society of Arts, Commerce, and Manufactures of London, dated Nov. 19th, 1857, acknowledging the receipt of publications of the Academy.

February 2*d.* From the Minister of Agriculture, Commerce, and Public Works of France, dated Paris, October 24th, 1857, accompanying the donation of the Annales des Mines.

From the Natural History Society of Northumberland, Durham and New Castle-upon-Tyne, dated December 21st, 1857, acknowledging the receipt of publications of the Academy.

From the Geological Society of London, dated December 3d, 1857, acknowledging the receipt of publications of the Academy.

From the Boston Society of Natural History, dated January 7th, 1858, acknowledging the receipt of publications of the Academy.

From the Museum of Natural History of the Jardin des Plants, dated January 5th, 1858, acknowledging the receipt of a collection of fossils, and transmitting in exchange specimens of Dinotherium, Mastodon, Palæotherium, Anchitherium, Cainotherium, Lophiodon, Entelodon, Rhinoceros, Anoplotherium, Equus, Dicrocerus, Dorcatherium, and Antilope.

16*th.* Letters were read from the Lyceum of National History of New York, (not dated,) acknowledging the receipt of publications of the Academy.

From Nathaniel H. Mason, dated London, January 22d, 1858, announcing his proposed expedition to the Cape de Verd Islands, and offering to supply collections therefrom.

March 2*d.* From Thomas Bland, Esq., dated New York, 27th February, acknowledging his election as Correspondent.

From Mr. J. C. Beraud, dated 9th January, transmitting donation, and desiring exchange.

From the Académie Royale des Sciences of Liége, dated 2d April, 1856, and 5th June, 1857, acknowledging receipt of publications of the Academy, and transmitting donation.

From the Royal Society of London, dated 6th August, 1857, acknowledging receipt of publications of the Academy.

9*th.* From Kirtley Ryland, M. D., U. S. A., dated St. Louis, 15th February, acknowledging his election as member.

16*th.* From Major Henry C. Wayne, U. S. A., dated Washington, 12th March, acknowledging election as member.

From the American Antiquarian Society, dated Worcester, Mass. 5th March ;

The American Philosophical Society, dated Philadelphia, 5th March ;

The Society of Arts, Manufactures and Commerce, dated London, 19th November, 1857;

And the Horticultural Society of London, dated 2d February, severally acknowledging receipt of publications of the Academy.

From Dr. G. S. Williams, dated Moorefield, Va., March 10th, offering to transmit collection of palaeozoic fossils from that vicinity.

From the Young Amateurs' School of Natural Science, of Baltimore, dated 4th March, desiring a donation of duplicates.

23*d.* From the Lyceum of Natural History, dated New York, 16th March, acknowledging receipt of publications of the Academy.

From Mr. Wm. Wood, President of the Portland Natural History Society, dated 8th March, giving an account of the present condition of the Society.

From Dr. B. F. Shumard, dated St. Louis, March 16, announcing the Permian age of fossils collected by Dr. G. C. Shumard, in the white limestone of the Guadalupe Mountains, New Mexico.

April 6th. From Joseph Johnson Brown, Esq., dated Philadelphia, 5th April, acknowledging his election as member,

13*th.* From Philip R. Uhler, Esq., dated Baltimore, 10th April, acknowledging his election as member.

From Henry Hartshorne, M. D., Recorder of the Biological Department, announcing its organization, and time of meeting.

From W. H. Barris, dated Iowa City, 7th April, desiring certain papers on Palæontology published by the Academy.

20*th.* From the Imp. Regio Istituto Lombardo, dated Milan, 13th October, 1857;

The Kongelige Danske Videnskabernes Selskab, dated Copenhagen, 30th June, 1857;

The Acad. des Sciences, Arts et Belles Lettres of Dijon, dated 18th January, 1857;

The Königl. Sächsische Gesellschaft der Wissenschaften, dated Leipzic, 1st October, 1857;

The Bureau of the Annales des Mines, dated Paris, 8th March, severally transmitting donations, and acknowledging receipt of publication of the Academy.

May 4th. From Col. J. D. Graham, U. S. A., dated Chicago, Illinois, 14th April;

The Acad. Royale des Sciences of Amsterdam, dated 15th August, 1857;

The Société d' histoire naturelle du Departement de la Moselle, dated Metz, 4th January;

The U. S. War Department, dated Washington, 28th April, severally transmitting donations;

From the Naturforschende Gesellschaft in Dantzic, dated 1st July, 1857;

The Acad. Roy. des Sciences of Amsterdam, dated 17th July, 1857;

The Royal Society of Sciences of Upsal, dated 11th October, 1857;

The Zoological Society of London, dated 1st April, 1858, severally acknowledging receipt of publications of the Academy.

11*th.* From David L. Huntingdon, M. D., dated Philadelphia, 10th May, acknowledging his election as member.

From the Soc. Imp. d'Agriculture, d'Histoire naturelle et des Arts utiles of Lyons, dated 21st July, 1854;

The Acad. Imp. des Sciences, Belles-lettes et Arts, of Lyons, dated 21st July, 1854, each transmitting donations.

From the Verein zur Beförderung des Gartenbaues, dated Berlin, 28th September, 1857, transmitting donation, acknowledging receipt of publications of the Academy, and desiring missing numbers.

From the Königl. Norwegische Universität of Christiania, dated 6th November, 1857, transmitting a copy of the medal struck on the occasion of the 50th anniversary of the appointment of Dr. Christopher Hansteen as Professor.

From the Naturforschende Gesellschaft in Emden, dated 32d November, 1857;

The Société Linnéenne de Normandie, dated Caen, 24th October, 1857;

The American Antiquarian Society, dated Worcester, 19th April;

The Boston Society of Natural History, dated 1st May;

The Free Public Library, Museum, and Gallery of Art of Liverpool, dated September, 1857;

The Leeds Philosophical and Literary Society, dated 8th December, 1857, severally acknowledging the receipt of publications of the Academy.

From I. I. Hayes, M. D. proposing further Arctic Exploration.

18*th*. From W. Stimpson, dated Washington, D. C., 10th May, acknowledging his election as member.

From N. B. Benedict, M. D., Recording Secretary of the New Orleans Academy of Sciences, giving some account of the present condition of that Society.

June 1*st*. From John Hare Powel, dated Philadelphia, 1st June;

Dr. Samuel Kneeland, dated Boston, 29th May;

Dr. Edward K. Covey, U. S. A., dated Camp on Smith's Fork, 24th March, severally acknowledging their election as members.

From the Sec. of the American Baptist Missionary Union, dated Philadelphia, 20th May, returning thanks for invitation to visit the Museum.

From the Geological Society of London, dated 15th and 29th April; and

The Librarian of the British Museum, acknowledging receipt of publications of the Academy.

8*th*. From the Verein für vaterl. Naturkunde in Württemberg, dated Stuttgart, 6th Sept., 1857, transmitting donation, and acknowledging receipt of publications of the Academy.

From the K. Akad. der Wissenschaften, dated Vienna, 10th April, 1857, acknowledging receipt of publications of the Academy.

June 15*th*. From the Linnean Society of London, dated Jan. 8th, 1858,

Senkenbergische Naturf. Gesellschaft, dated Frankfort und Main, Dec. 24th, 1857.

Bata. Genootsch. der Proefond. Uijsbegeerte te Rotterdam, dated Jan. 14th, 1858,

K. K. Geolog. Reichsanstalt, dated Vienna, Jan. 22d, 1857,

Entomol. Verein in Stettin, dated Dec. 23d, 1857, and from the

Soc. Impériale des Naturalistes de Moscou, dated July 1–13, 1858, acknowledging receipt of publications of the Academy.

From the Utrecht Society of Arts and Sciences, dated Dec. 7th, 1857,

W. Haidinger, dated Vienna, June 24th, 1857,

Naturforschende Gesellschaft in Basel, dated Dec. 10th, 1857,

K. K. Geolog. Reichsanstalt, dated Vienna, May 30th, 1857, transmitting publications.

Verein für Vaterlandische Naturkunde in Württemberg, dated Stuttgart, Dec. 28th, 1857,

K. Preuss. Akad. der Wissenschaften, dated Berlin, Nov. 28th 1857,

Societas Natura Artis Magistra, dated Amsterdam, Nov., 1857, transmitting publications, and acknowledging receipt of those of the Academy.

22*d*. From F. A. Sauvalle, dated Havana, June 8th, 1858, transmitting a donation of shells.

July 6*th*. From K. Bayerisch. Acad. der Wissenschaften, dated München, 10th Dec., 1857, transmitting donation, and acknowledging receipt of publications of the Academy.

13*th*. From Rev. W. P. Breed, dated Philadelphia, July 8th, and from Chas. Izard McEuen, dated Philadelphia, July 10th, acknowledging their election as members.

Société Vaudoise des Sc. Naturelles, dated Lausanne, 6th May, 1858, transmitting donation and acknowledging receipt of publications of the Academy.

20*th*. From Myron Tompkins, M. D., Houghton, Michigan, acknowledging his election as member.

August 3*d*. From the British Museum, dated London, July 2d, 1858, and the Horticultural Society of London, dated July 7th, 1858, acknowledging receipt of publications of the Academy.

10*th*. From A. Snowden Piggott, M. D., dated Baltimore, July 26th, 1858, acknowledging his election as member.

17*th*. From the Deutsche Geolog. Gesellschaft, dated Berlin, Febr. 5th, 1858, transmitting donation, acknowledging receipt of publications of the Academy, and noting deficiencies.

24*th*. From Alfred Malherbe, dated Metz, August 4th, 1858, transmitting prospectus of his Monographie des Picidés.

September 7th. From the Public Library, Museum and Gallery of Art, Liverpool, dated August 2d, 1858, acknowledging receipt of publications of the Academy, and noting deficiencies.

14th. From H. C. Sorby, dated Bromfield, Sheffield, July 6th, 1858, and August le Jolis, dated Cherburg, August 6th, 1858, acknowledging their election as correspondents.

Ernest Turati, dated Milan, August 11th, 1858, proposing exchanges.

21st. From George Davidson, dated Philadelphia, Sept. 15th, 1858, acknowledging his election as member.

October 5th. From the British Museum, dated London, Jan. 7th, 1858;

The Geological Society of London, dated June 10th, 1858;

The Literary and Philosophical Society of Manchester;

Sociétê du Museum d'Histoire Naturelle de Strasburg, dated March 1st, 1858, severally acknowledging receipt of publications of the Academy.

Lewis Troost, dated Hot Springs, Va., Sept. 22d, 1858, offering for sale the collection of minerals and fossils of the late Gerard Troost.

12th. From the Zoolog. Botan. Gesellschaft of Vienna, dated June 10th, 1857, transmitting donation.

J. J. Up de Graff, dated Indianapolis, Oct. 6th, 1858, asking information, and proposing exchanges.

J. M. Kennedy, dated Washington, Oct. 7th, 1858, offering for sale a collection of reptiles.

19th. From Arthur M. Edwards, dated New York, Oct. 12th, 1858, and John H. Janeway, dated Princeton, N. J., Oct. 18th, 1858, acknowledging their election as members.

Nov. 2d. From Daniel Egbert, M. D., U. S. N., dated Philadelphia, Oct. 28th, acknowledging his election as member.

Baron R. von Osten Sacken, dated Washington, Oct. 30, 1858, and A. Guyot, dated Princeton, N. J., Nov. 1st, 1858, acknowledging their election as Correspondents.

W. P. Tatham, dated Philadelphia, Oct. 30th, 1858, transmitting donation.

9th. From Benjamin Peirce, dated Harvard University, Cambridge, Mass., Nov. 6th, 1858, acknowledging his election as Correspondent.

16th. From the Naturf. Gesellschaft in Freiburg, Oct. 15th, 1858, transmitting donation.

23d. From Société des Sciences physiques et Naturelles, Zurich, dated June 22d, 1858, transmitting donation, and acknowledging receipt of publications of the Academy.

Wm. Spillman, M. D., dated Columbus, Miss., in relation to a collection of fossils from the Ripley group to be transmitted to the Academy.

Samuel Ashmead, dated Philadelphia, Nov. 23d, 1858, resigning his office as Curator, on account of removal from the city.

O. M. Mitchel, dated Cincinnati, Ohio, Nov. 17th, 1858, acknowledging his election as correspondent.

Dec. 7th. From John M. Dow, dated Panama, Nov. 10th, 1858, acknowledging his election as member.

Société Royale des Sciences de Liége, dated June 15th, 1858, and

Société Impériale d'Agriculture, d'Histoire Naturelle et des Arts utiles de Lyon, dated August 2d, 1858, transmitting donations and acknowledging receipt of publications of the Academy.

Royal Society of London, dated June 20th, 1858;

Royal Society of Sciences of Upsal, dated Jan. 8th, 1858;

Société Imperiale des Naturalistes de Moscou, March 3—12, 1858;

Naturforschenden Verein zu Riga, Jan. 31st, 1858;

K. L. C. Ak. der Wissenschaften, Breslau, Nov. 20th, 1857 and June 20th, 1858;

Naturhist. Verein der Preuss. Rheinl. und Westphaliens, Bonn, Jan. 11, 1858;

Naturforsch. Gesellschaft in Dantzic, April 8th, 1858;

Verein für Vaterl. Naturkunde in Württemburg, May 31st, 1858 ;
K. Sächs. Gesellschaft der Wissenschaften, Leipsic, June 6th, 1858 ;
University of Göttingen, Jan. 11th, 1858 ;
Acad. Royale des Sciences de Turin, May 15th, 1858, acknowledging receipt of publications of the Academy.

Gesellschaft für Beförderung der Naturwissenschaften zu Freiburg in Bresgau, June 25th, 1858, transmitting donation, and acknowledging receipt of publications of the Academy.

Oberhessische Gesellschaft für Natur und Heilkunde, Giessen, April 6th, 1858, acknowledging receipt of publications of the Academy, and transmitting donation from Dr. Phœbus, the Secretary of the Society.

Royal Society of London, Nov. 12th, 1858, accepting offer of exchange of publications made by the Academy.

Wm. Spillman, M. D., Columbus, Miss., Nov. 29th, 1858, transmitting donation of fossils.

George N. Lawrence, New York, Dec. 4th, 1858, sending account against the Academy.

Royal Society of London, dated June 20th, 1858,
Royal Society of Sciences of Upsal, dated June 20th, 1858,
Soc. Imperiale des Naturalistes de Moscou, dated March 3–12, 1858.

14th. From his Excellency W. F. Packer, addressed to Francis Peters, Esq., accompanying the donation of a white deer received this evening.

21st. From Joseph Jones, M. D., dated Augusta, Georgia, Dec. 13th, 1858, acknowledging his election as member.

Mrs. Christiana W. Watson, dated Philadelphia, Dec. 20th, 1858, acknowledging receipt of the resolution adopted Nov. 30th, 1858.

Mrs. Lucy W. Say, dated Newburgh, New York, Dec. 17th, 1858, acknowledging receipt of the resolution adopted Nov. 30th, 1858.

George Ord, President of the Academy, dated Philadelphia, Dec. 20th, 1858, desiring, on account of increasing age and infirmity, to decline a re-election to the office held by him.

Geological Society of London, dated Nov. 20th, 1858, acknowledging receipt of publieations of the Academy.

Donations to Museum.—1858.

Jan. 12*th.* Molar tooth of fossil Hippopotamus, from Sicily. Presented by Dr. Carson.

Three fossil shells, cretaceous, from Alabama. Presented by Dr. S. W. Clanton.

Paradoxides Harlani, from Massachusetts. Presented by Dr. Isaac Lea.

Mercenaria tridacnoides, miocene. Presented by A. C. Michener.

Eight specimens, 4 species miocene fossils, from North Carolina. Presented by J. M. Hines.

19*th.* Fossil Helix, from Wayne Co., Missouri. Presented by Dr. Uhler.

A bronze image and a face in stone, from Siam. Presented by John Henry Smith, through Aubrey Smith.

Feb. 2*d.* An unusually fine specimen of a branching Coral, from Oahu, Sandwich Islands. Deposited by James W. Morse, Esq.

A large Polyporus, from Samoan Islands. Presented by Dr. Ruschenberger.

Fragments of fossil wood, from Tivoli, and a specimen of Rock Salt, from Salzburg, Tyrol. Presented by J. H. Slack.

A large and very choice collection of marine, freshwater and terrestrial shells, containing about 1,000 species, from all parts of the world, presented by Mrs. R. Pierpont. The genera are as follows: Aspergillum, Auricula, Achatina, Argonauta, Avicula, Anomia, Anatina, Achatinella, Ampullaria, Arca, Bulla, Buccinum, Bulimus, Cardium, Cymba, Cypræa, Conus, Cerithium, Cassis, Corbis, Cassidaria, Crassatella, Chama, Chiton, Crepidula, Cucullæa, Dentalium, Dolium, Donax, Delphinula, Eburna, Fusus, Fasciolaria, Fissurella, Helix, Harpa, Haliotis, Isocardia, Lutraria, Lima, Mactra, Mya, Murex, Malleus, Meleagrina, Marginella, Mitra, Modiola, Natica, Nerita, Nautilus, Ostræa, Ovula, Oliva, Orbicula, Oniscia, Planaxis, Purpura, Pecten, Phasianella, Pinna, Perna, Pyrula, Placuna, Psammobia, Pholas, Petricola, Paludina, Patella, Pteroceras, Pectunculus, Phorus, Ranella, Rotella, Strombus, Siliquaria, Spirula, Solen, Spondylus, Struthiolaria, Scalaria, Solarium, Tellina, Terebellum, Tornatella, Triton, Terebra, Turbo, Turritella, Trochus, Turbinola, Tridacna, Unio, Umbrella, Venus, Voluta.

Feb. 9*th.* 2 fossils, from Alabama. Presented by Mr. Kirkland.

One Panopeus, 1 Ocypode, 1 Palæmon, 1 Labrax, 1 Pomotis, 1 Umbrina, 1 Lesbias, 1 Temnodon, 1 Lueciscus, 1 Lamna, 1 Leiostomus. From Chesapeake Bay. Presented by Mr. Taylor.

Pseudocarcinus, Lupa, Pagurus, from Central America. Panopeus, Xantho, Chlorodius, Eriphia, Goniograpsus, Pagurus, Porcellana, 3 species. Asterias, Ophiura, Scutella, from Panama. Presented by Dr. LeConte.

Feb. 16*th.* Amblyopsis spelæus and Astacus pellucidus. Presented by Ward B. Hazeltine, Esq.

March 2*d.* A Polyporus, and a large, heavy, compact species of sponge (Halichondria,) from Arica, Peru. Presented by Dr. W. S. W. Ruschenberger.

One coal plant, from Luzerne Co., Pa. Presented by R. Bingham.

One hundred and forty-three specimens fossils of the genera Deinotherium, Mastodon, Palæotherium, Anchitherium, Lophiodon, Entelodon, Rhinoceros, Equus, Cainotherium, Dicrocerus, Dorcatherium, Antelope. In exchange from the Jardin des Plantes, Paris.

9*th.* Two fine specimens Sphenopteris crenata, from Broad Top Mountain. Presented by W. B.

Native Copper, from Lake Superior. Presented by A. J. Dougherty.

Five Orthoptera, from Panama. Presented by Dr. LeConte.

Two species Orthoptera, 3; 2 Hemiptera, 5; 15 Coleoptera, 20; 1 Scorpio, 2; 1 Arachnide, from Honduras. Presented by Dr. LeConte and J. S. Hawkins.

Male and female Eider Duck, from Long Island. Presented by J. Hare Powel.

One Pipe fish, from the Atlantic. Presented by H. St. G. Hopkins, M. D.

Two Taxidea americana, 3 Spermophilus tridecemlineatus, 2 S. Townsendii, 1 S. ——?, 7 Cynomys Gunnisonii, 3 Cynomys ludovicianus, 11 Tamias quadrivittatus, 3 Lepus callotis, 2 Antilocapra americana, 2 Canis occidentalis, 1 Sciurus Richardsonii, 1 Mephitis mephitica, 1 Bos americanus, 1 Vespertilio, 2 Indian skulls, 1 skull Canis occidentalis. Of Birds: 1 Recurvirostra, 2 Sturnella neglecta, 1 Picus torquatus, 2 Sialia macroptera, 1 Numenius longirostris, 3 Tetrao urophasianus, 2 T. obscurus, 1 Pica hudsonia, 1 Colaptes Ayressii, 1 Hirundo ?, 2 bird's nests and 14 eggs. From Kansas. Presented by Dr. Wm. A. Hammond, U. S. A.

16*th.* Plumbago and calcareous spar, from Lake George. Presented by Mr. Huddy.

23*d.* Pagurus striatis, from Florida. Presented by I. Lea.

Tooth of Mastodon, from Virginia. Presented by J. D. Sergeant.

April 6*th.* Slab of black slate, with numerous unknown markings; bone of a large saurian in red sandstone; 5 specimens red sandstone, with imbedded batrachian bones; from Gwyned, on the N. Penna. R. R., Pa. Presented by Messrs. Sergeant, Slack and Dr. Leidy.

One Belemnite and 2 shells, from Mullica Hill, N. J.; 1 fossil coral, from near Louisville, Ky.; 1 fossil plant, from Pottsville, Pa. Presented by Rev. W. G. E. Agnew.

One Scolopendra, from St. Jago, Cape Verd Islands; 1 Julus, from Cape Palmas, W. Africa; 1 Scorpion, remarkable for having one of its ordinary legs developed into a large chela. Presented by Dr. J. M. Sommerville.

13*th.* Six fossil shells, 3 fossil fishes (tertiary), from Astoria, Oregon. Presented by Geo. Gibbs, through Dr. Suckley.

Twenty species rare land shells, from Ceylon, Burmah and Africa. Presented by Rev. E. R. Beadle, Hartford.

Several species of rare exotic Unios, principally from Siam, and several land shells, from South America. Presented by W. A. Haines, Esq., of New York.

A perfect specimen of a most rare variety of Voluta aulica; a large specimen of Leptoconchus striatus; 1 Helix acute-dentata; 1 H. Loisa; 3 H. ——?

Fifty species European land and fresh water shells; 20 do. American Cyclas and Pisidium; 35 species West Indian land shells. Presented by W. G. Binney.

Thirteen species American fluviatile shells. Presented by J. G. Anthony.

Six species of Texan land shells. Presented by the Smithsonian Institute.

Three hundred specimens of shells, from the Sandwich Islands. Presented by Mr. Pease.

Eight species of California shells. Presented by J. H. Thompson, of New Bedford.

20*th* Four specimens fossils, from Sharon, New York. Presented by Mary E. Powel.

One gold fish. Presented by Dr. Hammond.

Vial of liquid from the Fountain of Blood, near Virtud, Honduras. Presented by Dr. LeConte.

May 4*th.* Skull of the Black Bear. Presented by Joseph M. Nagle.

Forty-five lizards from St. Thomas, W. I. Presented by Robert Swift, Esq.

Numerous fragments of red shale, containing reptilian remains, from near Gwyned, on the N. Pennsylvania R. R. Presented by Messrs. Sergeant, Powel, Camac, and Leidy.

Seventy-four marine, freshwater and terrestrial shells, 517 specimens. From St. Simon's Island, Georgia Presented by James Postell.

11*th.* Skeleton of the Porcupine. Presented by S. Ashmead.

Two Flying-fishes, from Chili, S. A. Presented by Chas. S. Rand.

Ten specimens fossils, from Texas. Presented by Francis Moore.

18*th.* Fine specimen of Sula bassana. Presented by John Hare Powel.

Twelve varieties of common opal; 2 fragments Mastodon tusk; fragment of lignite; from Honduras. Presented by Dr. J. LeConte.

June 1*st*. A collection of 2129 specimens, 709 species Coleoptera, and 280 specimens, 75 species Lepidoptera. From Italy, Hungary and Greece. Presented by F. Schafhirt.

Four very large specimens Haliotis. Presented by J. J. Allen, Esq.

Four Pleuronectes maculatus, 1 Fistularia tabacaria, 2 serpents, 2 salamanders, 1 Pagurus pollicaris, 2 Loligo Pealii. Atlantic City. Presented by Paul B. Goddard.

Skeleton of a monkey. Presented by S. W. Mitchell.

Forty specimens vertebrate fossils of the genera Palæotherium, Anoplotherium, Dicrocerus, Mastodon, Acerotherium, Chalicotherium, Hiparion, Listriodon, Paloplotherium, Cricetodon, Myoxus, Titanomys, Hemicyon, and Machaiarodus. France. In exchange.

A small collection of Unios, from Texas. Presented by F. Moore.

June 8*th*. Sixty-six Orthoptera 21 species ; 1 Hemiptera ; 18 Hymenoptera 10 species ; 10 Diptera 5 species. From Nebraska. Presented by Dr. F. V. Hayden.

Very large scorpion. Monrovia, Liberia. E. T. Cresson.

Lepidodendron Sternbergii. Broad Top, Pa. J. H Powel.

June 15*th*. Chinese skull from Shanghai ; Feejee skull from Bau ; 3 Peruvian skulls from the ruins of old Callao ; Hispano-Peruvian skull ; 2 skulls from Oregon and Washington Territories ; Digger Indian skull from Mare Island ; 2 Araucania skulls. Deposited by Drs. T. J. Turner, U. S. N., and J. A. Meigs.

Seventy-nine specimens 62 species Lepidoptera, from Honduras. Presented by J. S. Hawkins, Esq.

A scorpion from Panama, N. G. Presented by J. L. Le Conte.

A large boa, from Honduras. J. S. Hawkins, Esq.

June 22*d*. Mummied bird, from a guano bed. Presented by W. Camac.

Two Salmo Gloveri. Shoodiac Lakes, Maine. Presented by Ed. Harris.

One Antomys monax. Long Branch, N. J. Presented by Saml. Powel.

Two hundred specimens Diptera, Lepidoptera, Hymenoptera, Hemiptera, and Neuroptera. Presented by Messrs. Powel, Tilghman and Leidy.

Large specimen Astrangia astræformis. Long Branch, N. J. Fossil flustra, from green sand, ditto. Presented by Mr. Powel.

Agatized wood. Comayagua, Honduras. Dr. Le Conte.

Several hundred specimens of minerals, rocks, and fossils, from various parts of the world. Presented by Dr. S. Weir Mitchell.

Fifty-two specimens terrestrial and fluviatile shells, from Cuba. Presented by F. A. Sauvalle, of Havana.

A large and diseased gold fish. Schuylkill River. Presented by Dr. Uhler.

July 6*th*. One Mastodon tooth. Mouth of Columbia River. Presented by P. B. Goddard.

Four specimens pedal tracks from red shale beneath the coal measures at Tamaqua, Pa. Deposited by Wm. M. Gabb.

Three Pelamis, 5 Hydrophis, 1 Platax. Gulf of Siam. 1 Julus and a collection of Coleoptera from Hakodadi, Japan. Presented by Dr. A. A. Henderson.

Five Platuris ; 1 Crocodilus. Manilla, P. O. Mr. Wood.

Three teeth Carcharodon. Monmouth Co., N. J. Presented by James Hulick.

Two teeth Otodus, and two of Lamna. N. Jersey. Presented by S. Powel.

Cryolite and aluminium. Presented by Wm. Frishmuth.

A large alligator gar fish. Mississippi River. Presented by Dr. T. S. Richardson.

July 13*th*. Three fragments Baculites ; 1 Ammonite. Nebraska. Presented by J. B. Fisher, Esq.

A small collection of Diptera and Hymenoptera, from Blair Co., Pa. Presented by Dr. Le Conte and Mr. Sergeant.

Two large specimens Astrangia. Long Branch, N. J. Presented by Mr. Powel.

Osseous carapace of the box turtle. Presented by Miss M. E. Powel.

Aug. 24*th*. White head variety Anser canadensis. Rhode Island. Presented by Prescott Hall, Esq., of Newport.

Remora. Long Beach, New Jersey. Presented by Thad. Norris.

One Cistuda ; 2 Emys ; 8 serpents 4 species ; 2 Salmo fontinalis ; 2 Perca fluviatilis ; 7 Leuciscus 3 species ; 4 Pomotis 2 species ; 5 Salamander 3 species ; eggs of Fringilla pusilla. Morris Co., New Jersey. Pyrohotine (nickeliferous), Apatite from Hurd's mine, Morris Co., N. J. Presented by Dr. J. C. Fisher.

Sixteen fossils from the carboniferous limestone of Quincy, Illinois. Presented by Harry and Rowland Cox.

One fossil from the Chemung group. Steuben Co., New York. Presented by S. B. Buckley.

Tinga Schinzii. Del. River, near Philadelphia. Presented by C. Kuhn.

Sept. 7*th*. Eleven specimens Magnesite, Brucite, Pyroxine, Marmolite, Talc, Asbestos, Fossil wood. From New York. Presented by J. E. Coleman, through J. H. Slack.

Forty-seven specimens 11 species Menopoma, Hyla, Scincus, Salamander, Triton, Tropidonotus, Crotalus, Coluber. From Warren Co., Pa. Presented by J. H. Slack.

One Spectrum, 1 Cyathophyllum, 7 Unio 4 species, two fragmentary human crania (Indian ?) 6 species of terrestrial and fluviatile shells. Presented by J. H. Slack.

Twenty-four specimens 9 species Esox, Centrarcus, Lucioperca, Catastomus, Leuciscus, Salmo, and Pomotis. From Warren Co., Pa. Presented by J. H. Slack.

Belone truncata. Delaware Bay. Presented by Dr. Uhler.

Twenty-two specimens Helix, Succinea, Neretina and Melania. From Hakodadi, Japan. Presented by Dr. A. A. Henderson.

Hapale———? Presented by Christopher C. Wood.

Four species Circus, Falco, Erismatura, Otis. Tunis, Africa. Presented by W. S. Vaux.

Fourteen Saurians, from St. Thomas, W. I. Presented by Robert Swift, Esq.

Sept. 14*th*. Twenty-five specimens 9 species Fossil shells, Fimbria, Turritella, Paludina, Natica, Cassis, Corbula, Voluta, Ancillaria and Plicatula, from Claiborne, Ala. Presented by T. P. Cleaveland, Augusta, Georgia.

Seventy-five specimens 8 species, marine shells, from Absecom, N. J. Presented by G. W. Farquhar, Philada.

One specimen of impression of fern and bark on slate, from the Sharp Mountain Mine, Schuylkill Co., Pa. Presented by W. G. Farquhar.

A collection of shells, from Florida. Presented by Gustavus Wurdeman, U. S. Coast Survey, through W. G. Binney.

Seven specimens of Ripple ? marked sand stone, from Second Mountain and west branch of Schuylkill River ; and 1 specimen of fossil carbonized bark, from Schuylkill Co., Pa. Presented by Chas. W. Cresson.

One reptile, from Caraccas. Presented by Alfred B. Durand.

Sept. 21*st*. A sponge from the shores of the Mediterranean near Smyrna. Presented by Rev. H. S. Osborn.

Seven specimens 5 species insects, from Hakodadi; 16 species of corals from Singapore. Presented by Dr. A. A. Henderson, U. S. N.

Four hundred and thirty-one specimens of 10 species Diptera, 14 Hymenoptera, 80 Lepidoptera, 13 Neuroptera, 14 Orthoptera, 10 Hemiptera, 22 Coleoptera. Schooley's Mt., N. J. Presented by Dr. J. C. Fisher.

Sixty-nine specimens of 13 species Coleoptera, 8 Hymenoptera, 3 Hemiptera, 2 Diptera, 1 Neuroptera. From Conway, New Hampshire. Presented by Dr. Le Conte.

Fifteen specimens of 2 species Diptera, 2 Hemiptera, 3 Hymenoptera, 3 Lepidoptera, 1 Coleoptera. From the neighborhood. J. D. Sergeant.

Six Diptera 5 species and 1 Coleoptera. From Massachusetts, New York and Philadelphia. Presented by James Ridings.

Thirteen insects, from Warren Co., Pa. Presented by J. H. Slack.

Holoderma horridum. Arizona Territory.

Branch and fruit of Sequoia gigantia. Presented by the California Acad. Nat. Sciences.

Oct. 5*th*. Neophron percnopterus, Milvus regalis, Rallus crex. From Tunis, Africa. Presented by W. S. Vaux.

One Puffin. Delaware Bay. Presented by Thos. Beesley.

One hundred and sixty-seven specimens American, and 207 British Lepidoptera ; 20 Arachnides ; 19 Myriapods ; 21 Neuroptera ; 5 Orthoptera ; 60 Hemiptera ; 17 Hymenoptera ; 44 Diptera. Presented by E. T. Cresson.

Oct. 12*th*. One Leucosia, n. s. Japan. Presented by Dr. A. A. Henderson, U. S. N.

Stercorite (microcosmic salt from guano). Presented by Dr. R. Bridges.

Geode of Calcedony enclosing a nodule of pyrites. From Comeagua, Honduras. S. W. Woodhouse, M. D.

Fossil human cranium. From near Santos, Brazil. Presented by Capt. W. F. Lynch, U. S. N.

Two beaver Skulls. Presented by J. G. Fisher, Esq.

Native Copper. Lake Superior. Presented by Jos. Jeanes, Esq.

Sulphuret of copper with silver from Sonora. Presented by Dr. J. C. Fisher.

Sulphuret of Cobalt. La Paz, Bolivia. Dr. Le Conte.

Three insects, from White Mts. Dr. Le Conte.

Nine specimens fossil fishes in bituminous shales. From Albert Co., New Brunswick. Presented by Jos. Jeanes, Esq.

Forty-three specimens 25 species Diptera, from the neighborhood. From James Ridings.

Eight Hymenoptera 6 species ; 4 Diptera 2 ; 3 Hemiptera 2 ; 1 Lepidoptera ; 1 Coleoptera. Presented by J. D. Sergeant.

Ninty-five Lepidoptera 72 species ; 8 Hymenoptera 7 ; 24 Neuroptera 12 ; 18 Hemiptera 17 ; 15 Diptera 14 ; 4 Coleoptera 4 ; 3 Orthoptera 3 ; 42 Arachnida 15. Trenton, N. J. Presented by Chas. C. Abbott.

Eighteen reptiles, serpents, saurians, and batrachians, 12 species ; 6 species fishes ; 1 Julus ; 2 Scolopendra. From Singapore. Presented by S. Drinker, Esq.

Euchroma gigantea. Panama. Dr. Ruschenberger.

Oct. 20*th*. Fourteen Lepidoptera 8 species. Newport. R. I. Mr. Remont.

One hundred and twenty Lepidoptera 31 species ; 85 Neuroptera 16 ; 27 Hymenoptera 11. Newport, R. I. Mr. Samuel Powel.

Sixty-eight Lepidoptera 23 species ; 11 Coleoptera 5 ; 11 Orthoptera 8. Newport, R. I. Dr. R. Bridges.

One hundred and ninety-two Lepidoptera 85 species ; 36 Coleoptera 26 ; 367 Diptera 80 ; 87 Hemiptera 29 ; 168 Hymenoptera 50. Newport, R. I. Dr. Jos. Leidy.

One Ophisaurus, from Tennessee. Presented by J. G. Anthony.

Four Ancillaria gibbosa, Ten., and 8 A. Kirtlandiana, Va. Presented by J. G. Anthony.

Three specimens Stizus. N. Carolina. Dr. H. G. Lugren.

Antler of reindeer. From four feet below the surface, near Vincentown, New Jersey. Presented by C. Moore, Esq.

Nov. 1*st.* Eight specimens ores of silver. Chihuahua, Mexico. Presented by Dr. B. C. Ludlow.

Elaps from Venezuela. Presented by Dr. C. D. Meigs.

Mummied child, from Thebes. Presented by J. A. Lehman.

Ten specimens fossil shells, from Utah. Presented by A. S. Johnston.

Triquetra contorta, Lea. Shanghai, China. Presented by H. Cuming.

Young Muskrat (mounted.) Presented by Dr. Corse.

Ten species Orthoptera 15; 7 Hemiptera 40. From Fort Laramie. C. Drexler.

An Armadillo. From W. P. Tatham.

Four species Orthoptera. China. Dr. A. A. Henderson.

A large writing slate, 5 feet by 3 feet. Presented by J. H. Slack.

Apophyllite. Bergen Hill, New Jersey. W. S. Vaux.

Green oxide of Chromium. From Chromate of Potash Works, Baltimore. Presented by Dr. A. S. Piggot.

Nov. 9*th.* Two fine specimens of Opal, from near San Antonio, Honduras. Presented by J. C. Trautwine.

A collection of birds, consisting of 57 species, from Japan, Philippines, and China. From Dr. A. A. Henderson, U. S. N.

Nov. 16*th.* Female opossum, living. Presented by Dr. J. H. Janeway.

Twenty specimens Orthis insculpta. Oxford, Ohio. Presented by Prof. David Christy.

A large bee, from Concepion, Chili. Dr. Ruschenberger.

Nov. 23*d.* Pectolite with Calc-spar. Bergen Hill, N. J. Presented by W. S. Vaux.

One Arvicola, 1 Tamias, mounted specimens. Presented by Dr. Corse.

Two Hesperiphona vespertina, m. and f. Rock Island Co., Illinois. Pre sented by J. D. Sergeant.

Dec. 7*th.* Fish and Cray-fish, from Mammoth Cave, Ky. Presented by Walter Brown.

Three minerals from Honduras. Presented by J. C. Trautwine.

Living Muskrat. Presented by Dr. Corse.

A mink (Mustela vison). Presented by George Wanger.

A Siamese cranium, taken from a Necropolis near a temple in Siam. Presented by J. E. Semple, M. D., U. S. N.

Fasc. V. VI. Lichenes Amer. Septent. Curante E. Tuckerman. Presented by E. Tuckerman.

Two coal plants. Tioga Co., Pa. Presented by A. E. Dougherty.

Dec. 14*th.* Skin of an Albino Deer, (male.) Lycoming Co., Pa. Presented by his excellency W. F. Packer, Governor of Pennsylvania, through F. Peters, Esq.

Bones of Hadrosaurus Foulkii, consisting of nine teeth, 28 vertebræ, 1 humerus, 1 radius, 1 ulna, 1 ilium, 1 os pubis, 1 femur, 1 tibia, 1 fibula, 2 metatarsal bones, 1 phalanx, and a number of small fragments. From the Greensand formation of J. E. Hopkins' farm, near Haddonfield, N. J. Presented by W. Parker Foulke, Esq.

Fifteen Diptera 9 species; 10 Hemiptera 8; 5 Neuroptera; 4 Orthoptera 3; 13 Hymenoptera 13; 13 Lepidoptera 8; 2 Coleoptera 1. Near Philadelphia. Dr. Jos. Leidy.

Thirteen Diptera 1 species. Newport, R. I. S. Powel.

Forty Hemiptera 14 species. Altoona, Pa. Dr. Le Conte.

One Mantis, 2 Libellula. Dr. J. L. Burtt.

One Belostoma. H. B. Dewey. 1 scorpio, 1 Scolopendra, W. Africa. Dr. Ford. 11 ants, W. Africa. Dr. Savage.

Seven microscopic specimens. Presented by Dr. J. C. Morris, through the Biological Department.

Dec. 21st. Twenty-one species 70 specimens, cretaceous mollusca, from Tippah Co., Mississippi. Presented by Dr. Wm. Spillman.

Vertebra of Balæna palæatlantica. Miocene, N. Carolina. Presented by Dr. W. A. Norcom.

Eight specimens vertebræ and ribs of two species of extinct Cetaceans, from miocene marl of Pitt Co., N. C. Presented by Dr. James M. Hines.

Numerous fragments of cetacean bones, from miocene deposits, near Old Point Comfort, Va. Presented by Dr. Eppes.

Two fragments of fossil wood, from the drift, near Haddonfield, N. J. Presented by Miss A. Cooper.

Fine skull of the Wild Boar, from Tunis, Africa. Presented by W. S. Vaux.

Iron ore, from Iron Mt., Missouri. Presented by Dr. Uhler.

Horns of the Cape Ox. Cape of Good Hope. Presented by Dr. R. E. Rogers.

Twenty-one microscopic specimens. From the Biological Department.

Forty-three microscopic specimens. Deposited by Mr. J. H. Slack, through the B. D.

One Emys. Mississippi. Presented by Dr. W. Spillman.

A Chinese cranium, and model of a compressed foot of a Chinese lady. Presented by J. E. Semple, M. D., U. S. N.

Ninety-three Lepidoptera 40 species; 84 Diptera 50; 100 Hymenoptera 45; 43 Hemiptera 22; 30 Orthoptera 19; 25 Neuroptera 15; 40 Coleoptera 24. Newport, R. I. Presented by S. Powel, Jr.

One hundred and twenty-four Hymenoptera 59 species; 34 Hemiptera 23; 13 Coleoptera 12; 13 Diptera 8; 4 Orthoptera 4; 58 Lepidoptera 40; 26 Neuroptera 12. Rhode Island. Presented by Joseph Leidy.

A small collection of oriental shells. Presented by Dr. B. H. Coates.

Donations to Llbrary—1858.

January 5th, 1858. The following were presented by Dr. T. B. Wilson on the usual conditions:

Journal of the Franklin Institute, Dec., 1857.

Fossils of South Carolina. By Tuomey and Holmes. Nos. 13, 14 and 15.

London, Edinburgh and Dublin Philosophical Magazine. Dec., 1857, and Supplement.

Annals and Magazine of Natural History. Dec., 1857.

Malakozoologisches Blätter. Bd 4. Bogen 9—11.

London Athenæum. Nov., 1857.

Mittheilungen aus Justus Perthes' Geographischer Anstalt. Von Dr. A. Petermann, 1857. 9—10.

L'Organisation du Règne Animal. 25 livr.

Beiträge zur Kenntniss der Landplanarien. Von Dr. Max Schultze. Halle, 1857.

Plantæ Indiæ Batavæ Orientalis quas exploravit C. G. C. Reinwardt. Fasc. 2.

Beiträge zur Osteologie der Nagethiere. Von C. G. Giebel. Berlin, 1857.

Suites a Buffon. Histoire des Coralliaires. T. 1 et 2. Planches 1—2 livraisons.

Bibliotheca Geographica. Herausg. von W. Engelmann. 2te Hälfte. Leipzig, 1858.

Fauna Austriaca. Die Käfer. Von L. Redtenbacher. 5 und 6 heft. Wien, 1858.

Reagentien-Tabelle. Von Dr. H. Klencke. Leipzig, 1858.

Die Foraminiferen der Miocän-Schichten bei Ortenburg in Nieder-Bayern. Von Dr. J. G. Egger. Stuttgart, 1857.

Der Jura. Von F. A. Quenstedt. 2te lief. Tübingen, 1856.

Synopsis des Echinides Fossiles. Par E. Desor. 5me. livr. Planches. 5me. livr.

L'Insecte. Par J. Michelet. Paris, 1858.

Omphalos: an attempt to untie the Geological Knot. By J. H. Gosse. London, 1857.

Rambles of a Naturalist on the Coasts of France, Spain and Sicily. By A. de Quatrefages. 2 vols. London, 1857.

Natural History of the Tineina. Vol. 2, containing Lithocolletis. Part 1. By H. T. Stainton. London, 1857.

12th. The following were presented by Dr. T. B. Wilson on the usual conditions:

Naturgeschichte aus den besten Schriftstellern mit Merianischen und neuen Kupfern. 1er Abschnitt der Sommer-Vögel. Heilbronn, 1778.

Museum Regium Christiani V. Descrip. ab Oligero Jacobæo. Hafniæ, 1696.

Histoire Physique de la Mer. Par Louis Ferdinand, Comte de Marsilli. Amsterdam, 1725.

Description Anatomique d'un Elêphant Mâle. Par P. Camper. Paris, 1802.

Zur Kenntniss der Wirbelthier-Skelettes. Von B. C. Brühl. Wien, 1845. 1 abth. 1 hälfte.

Mêmoires d' Anatomie et de Physiologie comparées. Par P. Flourens. Paris, 1844.

A Review of the works of the Royal Society of London. By Jno. Hill, M. D. London, 1751.

Orang Outang, sive Homo Sylvestris: or, the Anatomy of a Pygmie compared with that of a Monkey, an Ape and a man. By E. Tyson, M. D. London, 1699.

Naturgeschichte der Europäischen Schmetterlinge nach systematischer Ordnung. Von M. B. Borkhausen. 5 th. Frankfurt, 1788—1794.

Bath and Bristol Magazine. Bath, 1832—1834. 3 vols.

The Figures, Description and History of Exotic Animals, comprised under the classes Amphibia and Pisces of Linnæus. By Jno. Walcott, Esq. London, 1788.

Uccelliera overo discorso della natura, e Proprieta di diversi Uccelli. Di G. P. Olina. Roma, 1622.

Transactions of the Philosophical and Literary Society of Leeds. Vol. 1, pt. 1. London, 1837.

Von Würmern des Süssen und Salzigen Wassers. Von O. F. Müller. Kopenhagen, 1771.

G. H. Kramer Elenchus Vegetabilium et Animalium per Austriam Inferiorem Observatorum sistens ea in Classes et Ordines Genera et Species redacta. Viennæ. 1756.

Wanderings in New South Wales, Batavia, Pedir Coast, Singapore and China. By Geo. Bennett. London, 1834. 2 vols.

Two Expeditions into the Interior of Southern Australia during 1828—31. By Capt. Chas. Sturt. London, 1834. 2 vols.

Wanderings and Adventures in the Interior of Southern Africa. By Andrew Steedman. London, 1835. 2 vols.

Ornithological Dictionary; or, Alphabetical Synopsis of British Birds. By George Montagu. London, 1802. 2 vols.

Sarawak; its Inhabitants and Productions. By Hugh Low. London, 1848.

Histoire Naturelle du Jorab et de ses Environs. Par C. De Razoumowsky. Lausanne, 1789. Tomes 1 et 2.

Geschichte und Beurtheilung aller Systeme in der Zoologie nach ihrer Entwiklungsfolge von Aristoteles bis auf die gegenwärtige Zeit. Von Johannes Spix. Nürnberg, 1811.

Naturgeschichte im Auszuge des Linneischen Systems. Von E. J. C. Esper. Nürnberg.

Fauna Austriæ. Von K. Duftschmid. Linz und Leipzig, 1805—1825. Theil 1, 2, 3.

Chapters on Fossil Botany. By S. R. Pattison. London, 1849.

The Natural History of the Order Cetacea, and the Oceanic Inhabitants of the Arctic Regions. By H. W. Dewhurst. London, 1834.

Transactions of the Liverpool Polytechnic Society. Liverpool, 1849.

Méthode analytique des Fossiles, fondée sur leurs caracteres extêrieurs. Par H. Struve. Paris, 1798.

Eine Anleitung die interessantesten mikroskopischen Objecte aus allen drey Reichen der Natur. Von J. F. W. Koch. 1er theil. Magdeburg, 1803.

Outlines of Geology. By W. T. Brande. London, 1817.

Plantæ Favershamienses. By E. Jacob. London, 1777.

Histoire Gêographique, politique et Naturelle de la Sardaigne. Par D. A. Azuni. Paris, 1802. 2 vols.

The Natural History of Animals. By T. Rymer Jones. Vol. 1. London, 1845.

A Popular Guide to the Observation of Nature. By R. Mudie. London, 1832.

A Conspectus of the Butterflies and Moths found in Britain. By Jas. Rennie. London, 1832.

Museum Meyerianum, sive Catalogus Rerum Naturalium, etc. Collegit C. P. Meyer.

Taxidermy: or, the art of collecting, preparing and mounting objects of Natural History. By Mrs. R. Lee. London, 1843.

Museum Tradescantium. By J. Tradescant. London, 1656.

A Rudimentary Treatise on Geology. By Lieuft-Col. Portlock. London. 1849.

Philosophia Entomologica. J. C. Fabricii. Hamburgi et Kilonii, 1778.

Natuurkundige Verlustigingen behelzende microscopise waarneemingen van inen uitlandse water- en land-dieren. Door M. Slabber. Haarlem, 1778.

Ostéographic de la Baleine. Par T. Dubar. Bruxelles, 1828.

Dissertatio de Sceleto Piscium. Auctore J. Van der Hoeven. Lugduni-Batavorum, 1822.

Neües Thier-Buch, oder; Merckwürdige Beschreibung der Thieren und Vögeln. Prag, 1718.

Bergniännisches Reise in Serbien in Auftrag der Fürstlich-Serbischen Regierung ausgefürht im Jahre, 1835. Von S. A. W. Freiherrn von Herder. Pesth, 1846.

Specimen Zoophytologiæ Diluvianæ. Auc. J. Michelotti.

Martini Lister Conchyliorum Bivalvium Exercitatio Anatomica, etc. Londini, 1696.

Erucarum ortus, alimentum et paradoxa metamorphosis, etc. Per M. S. Merian. Amstelædami.

Caroli Linnæi Animalium Specierum in Classes, ordines, genera, species methodica dispositio, etc. Lugduni Batavorum, 1759.

Caroli Linnæi Systema Naturæ. Lug. Batav. 1756.

26*th*. Charleston Medical Journal and Review. January, 1858. From the Editor.

American Journal of Science and Arts. January, 1858. From the Editors.

Transactions of the Illinois State Agricultural Society. Vol. 2. Springfield, 1857. From J. A. Lapham.

Reports of Explorations and Surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean. Washington, 1856. Vols. 3 and 4.

New Orleans Medical and Surgical Journal, for January, 1858. From the Editors.

An Enquiry into M. A. D'Abbadie's Journey to Kaffa, to discover the Source of the Nile. By Chas. T. Beke. London, 1851. Also a Letter to M. Daussy, by the same. From the Author.

Annales des Mines T. 11. 3 livr. de 1857.

The works of Ulysses Aldrovandus published at Bonn, from 1599 to 1668, in 13 vols. From J. H. Slack.

February 2d. On the Newer Pliocene and Post Pliocene Deposits of the vicinity of Montreal, with notices of fossils recently discovered in them. By J. W. Dawson. Montreal, 1858. From the Author.

Canadian Naturalist and Geologist. December. From the Editors.

Journal of the Indian Archipelago and Eastern Asia. Vol. 2, No. 2. New series. From the Editor.

London Natural History Review. Oct., 1857. From the Editors.

Catalogue or Alphabetical Index of the Astor Library. Part 1. A to L.

Lettres sur les Roches du Jura et leur Distribution Géographique dans les deux Hémispheres. Par J. Marcou. 1ère livr. Paris, 1857. From the Author.

Recueil des Actes de l'Academie Impériale des Sciences, Belles-Lettres et Arts de Bordeaux. 18 annèe, 1856. Bordeaux.

Exposition de opèrations faites en Lapponie pour la Dètermination d'un arc du Mèridien en 1801—3. Par Jöns Svanberg. Stockholm, 1805.

Separatdruck naturwissenschaftlicher Abhandlungen aus den Schriften des Zoologisch-botanischen Vereins in Wien. 1856. From the Union.

Verhandlungen des Zoologisch-botanischen Vereins in Wien. Bd. 6. Jahr., 1857. From the Union.

Württembergische naturwissenschaftliche Jahreshefte. 8 Jahr., 3 Heft.; 10 Jahr., 3 Heft.; 12 Jahr., 3 Heft.; 13 Jahr., 1 Heft.; 13 Jahr., 2 Heft. From the Edtors.

Archiv für Naturgeschichte. 22 Jahr., 4 and 5 Heft. From the Editor.

Kongliga Svenska Vetenskaps-Akademiens Handlingar. Ny Följd. Första Bandet. Första Häftel, 1855.

Kongl. Vetenskaps-Akademiens Handlingar, för är 1854.

Ofversigt af Kongl. Vetenskaps-Akademiens Förhandlingar. Trettonde Argängen, 1856.

Dr. T. B. Wilson presented the following on the usual conditions :

London Athenæum. December, 1857.
Kosmos. No. 10.
Die Natur. Nos. 41 and 42.
Revue et Magasin de Zoologie. Nos. 10 and 11.
Comptes Rendus. T. 42. Nos. 19, 20, 21, 25, 26.

9th. Untersuchungen über den innern Baueiniger Rheinischen Brachiopoden. Von Dr. Fr. Sandberger. From the Author.

Annual Report of the Geological Survey of the State of Wisconsin. From E. Daniels.

Geologische Ubersicht der Bergbane der Österreichischen Monarchie. Von F. R. von Hauer und F. Foetterle. From F. von Hauer.

16th. Missionary Travels and Researches in South Africa. By Dr. Livingstone. New York, 1858. From J. Jeanes, Esq.

Annual Report of the Council and Officers of the American Geographical and Statistical Society, for the year 1857. From the Society.

Catalogue of the Library of the American Geographical and Statistical Society. Compiled by E. R. Straznicky. From the Society.

Address at the Anniversary Meeting of the Royal Geographical Society. 25th May, 1857. By Sir R. I. Murchison. From the Author.

Proceedings of the Zoological Society of London, for 1857, pp. 1 to 192; and 1856, pp. 65 to 435, with title pages and list of plates. Also, Transactions of the same Society. Vol. 4, Part 4. From the Society.

March 2d. The following were presented by Dr. T. B. Wilson on the usual conditions:

Annals and Magazine of Natural History. January, 1858, and Supplement for December, 1857.

London, Edinburgh and Dublin Philosophical Magazine. Jan., 1858.

The Zoologist, from October, 1856, to January, 1858.

Annales des Sciences Naturelles. T. 7, Nos. 1—3.

Flora van Nederlandsch Indiê. Door F. A. W. Miguel. 2de deel.; Afl. 3.

Exotic Butterflies, being illustrations of New Species, &c. By W. C. Hewitson. Parts 5 to 25.

The Naturalist, from October, 1856, to January, 1858.

Neuroptera Austriaca. Von F. Brauer und F. Löw. Wien, 1857.

Käferbuch; Allgemeine und Specielle Naturgeschichte der Käfer Europa's. Von Dr. C. G. Calwer. Stuttgart, 1858.

Johann Andreas Naumann's Naturgeschichte der Vögel Deutschlands. Leipzig. 12 vols. complete; and 7 parts of Vol. 13th.

History of British Birds. By F. O. Morris. Parts 77 to 90.

Illustrations of British Mycology. Mrs. T. J. Hussey. Part 17.

Memoirs of the Royal Society of Sciences of Liège. Vols. 12 and 13. From the Society.

Natural History of Insects. Genera of Coleoptera, by T. Lacordaire. Vol. 4. From the Author.

Mémoires de la Societé Académique de Maine et Loire. 1er vol. Nos. 1 et 2. From the Society.

Etablissements Scientifiques et artistiques d'Angers. Par M. T. C. Bérand. From the Author.

Die Versteinerungen des Rheinischen Schichtensystens in Nassau. Von Dr. G. und F. Sandberger. Wiesbaden, 1850—1856. From the Authors.

Systematische Beschreibung und Abbildung der Versteinerungen, etc. Von Dr. G. und F. Sandberger. From the Authors.

Observations on the Genus Unio, together with descriptions of new species in the family Unionidæ. By I. Lea, LL.D., &c. Vol. 6, part 1. From the Author.

9th. How to work with the Microscope. By L. S. Beale. London, 1857. From Dr. T. B. Wilson.

Desc.iptions of new Organic Remains from North-eastern Kansas, indicating the existence of Permian Rocks in that Territory. By F. B. Meek and F. V. Hayden, M. D. From the Authors.

Peninsular Journal of Medicine. Feb., 1858. From the Editors.

Remains of Domestic animals discovered among Post-Pleiocene Fossils in South Carolina. By F. S. Holmes. From the Author.

The Canadian Journal of Industry, Science and Art. March, 1858. From the Editors.

Abstract of the Proceedings of the Geological Society of London. Nos. 1—3. From the Society.

Address delivered at the Anniversary Meeting of the Geological Society of London, on the 20th of February, 1857. By Col. J. E. Portlock. London, 1857. From the Author.

American Journal of Science and Arts. March, 1858. From the Editors.

Essai Monographique sur les Pisidies Francaises. Par A. Baudon. Paris, 1857. From Dr. T. B. Wilson.

Catalogue des Coquilles recueillies à la Guadeloupe et ses dépendances. Par M. Brau. Paris, 1853. From Dr. T. B. Wilson.

Revue et Magasin de Zoologie pure et Appliquée. 1857, No. 12. From Dr. T. B. Wilson.

Catalogue des Livres composant la Bibliothèque Scientifique de Fen. M. A. Brongniart. Paris, 1858. From Dr. Wilson.

Kosmos. 1857, No. 12. From Dr. Wilson.

Gazophylacium rerum Naturalium, etc. Leipzig, 1733. From Dr. Wilson.

16*th*. Quarterly Journal of the Geological Society of London. Nos. 31, 35, 41, 42, 43, 44, 45, 46, 48, 50, 52, and Index and Table of Contents. Vol. 10. From the Society.

Kritische Untersuchung der Arten des Molluskengeschlechts Venus bei Linné und Gmelin mit Berücksichtigung der Später beschriebenen Arten. Von Dr. E. Rönier. Cassel, 1858. From Dr. T. B. Wilson.

Naturgeschichte der Vögel Mecklenburgs. Von H. D. F. Zander. 6, 7, 8 lief. From Dr. Wilson.

Biographisch-Literarisches Handwörterbuch zur Geschichte der exacten Wissenschaften. Von J. C. Poggendorff. 1te lief. Leipzig, 1858. From Dr. Wilson.

Wiener Entomologische Monatschrift. January, 1858. From Dr. Wilson.

Revue et Magasin de Zoologie. 1857. No. 12. From Dr. Wilson.

Annales des Sciences Naturelles. Tome 7, No. 4. From Dr. Wilson.

Acta Societatis Scientiarum Indo-Neêrlandicæ. Vol. 2. Batavia, 1857. From Dr. Wilson.

Systematisches Conchylien Cabinet von Martini und Chemnitz. 3 Bd. Heft. 18. From Dr. Wilson.

Mittheilungen aus Justus Perthes' Geographischer Anstalt, &c. Von Dr. A. Petermann. 1857, No. 12. From Dr. Wilson.

Comptes Rendus. T. 46. Nos. 1, 2, 3, 4. From Dr. Wilson.

Rudolph Wagners Icones Physiologicæ. Erlänterungstafeln zur Physiologie und Entwickelungsgeschichte. Durchgehends neu Bearbeitet und herausgegeben. Von A. Ecker. 3 lieferung. Leipzig 1854.

New York Journal of Medicine. March, 1857. From the Editors.

New Orleans Medical and Surgical Journal. March, 1858. From the Editors.

Proceedings of the Boston Society of Natural History. Vol. 6, pp. 273 to 304. From the Society.

23*d*. Dr. T. B. Wilson presented the following on the usual conditions.

Annals and Magazine of Natural History. February, 1858.

London, Edinburgh and Dublin Philosophical Magazine. February, 1858.

The Zoologist. No. 187.

The Naturalist. No. 84.

London Athenæum. January, 1858.

Bulletin mensuel de la Société Impériale Zoologique d' Acclimatation. T. 5. No. 1.

Om de Jakttagelser öfver Vattenhöjdens och Vindarnes Förändringar, etc. Af A. Erdmann. From the Author.

Geologiska Karta öfver Fyris Ans Dalbäcken upprättad. Ar., 1856. Äf A. Erdmann. From the Author.

Critical Researches in Medical Terminology. By Bennet Dowler. From the Author.

April 6th. The following were presented by Dr. T. B. Wilson on the usual conditions :

United States Exploring Expedition, during the years 1838—1842. Botany, Phanerogamia. By Asa Gray, M. D. Vol. 1. New York, 1854. Atlas of the same. Vol. 1.

Systematische Untersuchungen über die Vegetation der Karaiben, insbesondere dar Insel Guadaloupe. Von A. Grisebach. Göttingen, 1857.

Geologische Fragen. Von B. Cotta. 1ste und 2te Hälfte. Foriberg, 1857-8.

Geschichte der Botanik. Studien. Von E. H. F. Meyer. 4ter Bd. Königsberg, 1857.

Die Süsswasserfische der Ostereichischen Monarchie. Von J. Heckel und Dr. R. Kner. Leipzig, 1858.

Kosmos. Entwurf einer physischen Weltbeschreibung. Von A. Von Humboldt. 4ter Bd. Stuttgart und Tübingen, 1858.

Der Jura. Von Fr. A. Quenstedt. 3te lief. Tübingen, 1858.

Entwickelungsgeschichte des Pflanzenkeims. Von Dr. Th. Hartig. Leipzig, 1858.

Naturgeschichte der Insecten Deutschlands. 1ste abth. Coleoptera. 2ter Bd. Bearbeitet von Dr. G. Kraatz. Berlin, 1858.

Monographia Hymenomycetum Sueciæ. Vol. 1. Sistens Agaricos, &c. Scrip. E. Fries. Ursaliæ, 1857.

Jahrbücher für wissenschaftliche Botanik. Heraus. Von Dr. N. Pringsheim. 1ter Bd., 2tes Heft. Berlin, 1857.

Hütten-Erzeugnisse und andere auf künstlichem Wege gebildete Mineralien als Stützpuncte geologischer Hypothesen. Von K. C. V. Leonhard. 1tes heft. Stuttgart, 1858.

Description des Animaux saus Vertèbres découverts dans le bassin de Paris. Par G. P. Deshayes. Livr. 11 et 12.

Expédition dans les parties centrales de L'Amerique du Sud, etc., exécutée sous la direction du Comte Fr. de Castelnau, 6me. partie. Botanique. 7e livr,

Mittheilungen aus Justus Perthes' Geographischer Anstalt, &c. Von Dr. A. Petermann. 1857. No. 11.

Wiener Entomologische Monatschrift. 1 Bd. No. 1—5.

Flora Saræpontana Fossilis. Von Fr. Goldenberg. 2tes heft. Saarbrücken. 1857.

Kosmos. No. 11.

Palæontologie Francaise. Par A. D'Orbigny. Livr. 255 et 256.

Malakozoologische Blätter. V. Bd. 1—2 Bog.

Revue et Magasin de Zoologie. 1858. No. 1.

Bulletin de la Société Imperialc Zoologique d' Acclimatation. T. 4. No. 12.

Journal de la Physiologie de l' Homme et des Animaux publie sous la direction du Dr. E. Brown-Sequard. T. 1. Janvier, 1858.

Comptes Rendus. Index to vol. 44. Nos. 22—24 for 1857, and Nos. 5 to 8 for 1858.

13*th.* Quarterly Journal of the London Geological Society. No. 53. From the Society.

Journal of the Geological Society of Dublin. Vols. 3, 4 5, and part 1 of vol. 6. From the London Geological Society.

Canadian Naturalist and Geologist. February, 1858. From the Editors.

Proceedings of the American Association for the advancement of Science. 11th meeting. Cambridge, 1858. From the Association.

Second and third Reports of the Geological Survey in Kentucky, made during the years 1856 and 1857. By David Dale Owen. Frankfort, Kentucky. 1857. 2 vols. From the Author.

Maps and Illustrations referred to in vols. 2 and 3 of the Report of the Geological Survey of Kentucky, 1857. From D. D. Owen.

Descriptions of New Fossils from the coal measures of Missouri and Kansas. By B. F. Shumard and G. C. Swallow. St. Louis, 1858. From the Authors.

The following were presented by H. C. Sorby:

On the Contorted Stratification of the Drift of the Coast of Yorkshire. By H. C. Sorby. Leeds, 1852.

On the Origin of Slaty-cleavage. By H. C. Sorby. 1853.

On the Physical Geography of the Tertiary Estuary of the Isle of Wight. By H. C. Sorby. Edinburgh, 1857.

On the Physical Geography of the Old Red Sandstone Sea of the Central District of Scotland. By H. C. Sorby. Edinburgh, 1856.

On Yedmandale, as illustrating the Excavation of some Valleys in the Eastern part of Yorkshire. By H. C. Sorby. 1854.

On Slaty-cleavage, as exhibited in the Devonian Limestones of Devonshire. By H. C. Sorby. 1856.

On the Theory of the Origin of Slaty-cleavage. By H. C. Sorby. 1856.

On the Terraces in the Valley of the Tay, north of Dunkeld. By H. C. Sorby. Edinburgh, 1856.

Geological Survey of the Environs of Philadelphia. By O. Troost, M. D. Philada., 1826. From Mr. S. Powel.

Introduction to a Course of Lectures on Natural History. By Chas. W. Peale. Philada., 1800. From S. Powel.

20*th.* Verhandlungen des Vereins zur Beförderung des Gartenbaues in den K. Preussischen Staaten. Bd. 3—20, (1826 to 1851) and lief. 42 to 44, (1853.) Neue Reihe, 4ter Jahr., 2, 3 lief. From the Union.

Denkschriften der K. Akad. der Wissenschaften. Mathemat.-Naturwissen. Classe. 13 Bd. From the Academy.

Sitzungsberichte de K. Akad. der Wissenschaften. Mathemat.-Naturwis. Classe. Bd. 23. 2 heft. ; Bd. 24. Heft. 1—2. From the Academy.

Zeitschrift für die Gesammten Naturwissenschaften. Bd. 7, 8, and heft. 1—6 of Bd. 9. From the Editors, Giebel and Hentz.

Berichte über die Verhandlungen der K. Sächs. Gesellschaft der Wissenschaften zu Leipzig. Mathemat.-Phys. Classe. 1857. 1 and 2. From the Society.

Abhandlungen des Naturwissenschaftlichen Vereins für Sachsen und Thüringen in Halle. 1 Bd. 1 heft. From the Editors, Giebel and Heintz.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie und Petrefakten-kunde. 1857. 4 heft. From H. G. Brown.

Archiv für Naturgeschichte. 22 Jahr., 6 heft. From the Editor.

Verslagen en Mededeelingen der Koninklijke Akademies van Wetensschappen. Afdeeling Letterkunde. 2 Deel. ; 2, 3, 4 Stuk. ; 6 Deel. ; 1, 2, 3 Stuk. From the Academy.

Württembergische Naturwissenschaftliche Jahreshefte. 8 Jahr., 3 heft. ; 11 Jahr., 3 heft., and Taf. 8—13. From the Wurtemberg Natural History Society.

Oversigt over det Kongelige danska Videnskabernes Selskabs Forhandlinger og dets Medlemmers Arbeider i Aaret. 1856. From the Society.

Beiträge zur Kenntniss der Gefässkryptogamen. Von W. Hofmeister, II. Leipzig, 1857. From the Royal Society of Sciences of Saxony.

Auseinandersetzung einer Zweckmässigen Methode zur Berechnung der Absoluten Störungen der Kleinen Planeten. Von P. A. Hansen. From the same.

Über die Thermoelektrischen Eigenschaften des Boracites. Von W. G. Hankel. From the same.

Über die Messung der Atmosphärischen Elektricität nach Absoluten Maasse. Von W. G. Hankel. From the same.

Mémoires de l'Académie Impériale des Sciences, Arts et Belles-Lettres de Dijon. 2ême Série. T. 1—5. From the Academy.

Annales des Mines. 5ème Série. T. 12. 4e livr. de 1857. From the Minister of Public Works of France.

Mémoires de la Société Impériale des Sciences Naturelles de Cherbourg. T. 4. From the Society.

Memorie della Reale Accademia della Scienze di Torino. Serie 2da. T. 16. From the Academy.

Description d'un nouveau Genre d'Edenté Fossile. Atlas. Par L. Nodot. From the Author.

Monographie des Guêpes Sociales. Par H. de Saussure. Cahier 9. From the Author.

Supplément aux Tables du Soleil de P. A. Hansen et C. F. R. Olufsen. Par P. A. Hansen. From the Author.

May 4th. The following were presented by Dr. T. B. Wilson on the usual conditions:

Aus der Natur. Bd. 9 u. 10.

Brekin's Monograph upon Parrots. Nos. 4—14.

Dubois' Birds of Belgium. Nos. 15—101.

Reinwardt's Plantæ Indiæ Batavæ Orientalis. Pt. 1.

Küster's Conchylien Cabinet. No. 160.

Petermann's Mittheilungen aus Justus Perthes Geographischer Anstalt. 1858. No. 1.

Nægeli and Cramer's Physiological Researches upon Plants. Pt. 4.

Hall's Observations on Zingiberaceæ.

Wiener Entomologische Monatschrift. 1858. Nos. 2 and 3.

London Athenæum. Feb., 1858.

Zoologist. March, 1858.

Naturalist. March, 1858.

Annals and Magazine of Natural History. March, 1858.

London, Edinburgh and Dublin Philosophical Magazine. March, 1858.

Sowerby's Thesaurus Conchyliorum. Pt. 17.

Dunker and Meyer's Palæontographica. Vol. 5, Pts. 3 and 4; vol. 6, Pts. 4 and 5.

Van der Hoeven's Zoology. Vol. 2.

D'Orbigny's Recent and Fossil Crinoids.

Die Natur. 1857, Nos. 43—52; 1858, Nos. 1—9.

Adams' Genera of Mollusca. Pts. 27—33.

Hooker's Journal of Botany and Kew Garden Miscellany. Vols. 5 to 9.

Journal of the Chemical Society. Vols. 1—10.

Botany of the Herald. Pts. 7—10.

Woodward's Mollusca. Pts. 2 and 3.

Quecketts Histology. Vol. 2.

Bonplandia. 1858. Nos. 1 and 2.

Bulletin de la Société d'Acclimatation. 1858. February and March.

May 11th. Description of two new species of North American Helicidæ. By Thos. Bland from the Author.

New Orleans Medical and Surgical Journal, May, 1858. From the Editors.

Memoirs of the Historical Society of Pennsylvania. Vol. 6. From the Society.

Mémoires de la Société des Science physique et Naturelles de Bordeaux. Tome 1. Cah. 1 et 2. From the Society.

Report of the Proceedings of the Geological and Polytechnic Society of the West Riding of Yorkshire. 1856–7. From the Society.

Thirty-seventh Report of the Leeds Philosophical and Literary Society. 1856–7. From the Society.

The Bakerian Lecture.—Experimental Relations of Gold (and other metals) to Light. By Michael Faraday. From the Author.

Official Report of the United States' Expedition to explore the Dead Sea and the river Jordan. By Lieut. W. F. Lynch, U. S. N. Baltimore, 1852. From Dr. S. Weir Mitchell.

Report of an Expedition down the Zuni and Colorado Rivers. By Capt. L. Sitgreaves. Washington, 1853. Dr. S. Weir Mitchell.

Reports of Explorations and Surveys from the Mississippi River to the Pacific Ocean. Vols. 5, 6, 7. From the War Department.

Fossil Plants of the Coal Measures of the United States, &c. By L. Lesquereux. Pottsville, 1858. From the Author.

American Journal of Science and Arts. May, 1858. From the Editors.

Charleston Medical Journal and Review. May, 1858. From the Editor.

Proceedings of the Boston Society of Natural History. Pp. 305—320.

Canadian Naturalist and Geologist. April, 1858. From the Editor.

Geological Survey of Canada. Toronto, 1857. From T. Sterry Hunt.

London Journal of the Society of Arts. Nos. 246—266. From the Society.

Manual of the Mineralogy of Great Britain and Ireland. By R. P. Greg, F. G. S., and W. G. Lettsom. London, 1858. From W. G. Lettsom.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Comptes Rendus des Sêances et Mêmoires de la Sociêtê de Biologie. 1ère Sêrie. T. 4, 5. 2ème. T. 1, 2, 3.

Annales Botanices Systematicæ. Acu. G. G. Walpers. T. 1, 2, 3, and Fasc. 1, 2, 3, 4 of T. 4.

Archiv für Anatomie, Physiologie und Wissenschaftliche Medicin. Von Dr. J. Müller, 1853, 1854, 1855, 1856, 1857, pts. 1—5, 1858, pts. 1, 2.

Anatomie Microscopique. Par Louis Mandl. Livr. 6—20.

Flora Indiæ Batavæ, vol. 3, fasc. 3; vol. alt.; fasc. 2, 4.

Traitê Elêmentaire de Conchyliologie. Par G. P. Deshayes. Livr. 15, 16, 17, 18.

Naumannia. 1854. 3, 4, Quartal.

Wiener Entomologische Monatschrift. 2 Bd. No. 4.

Zeitschrift für Wissenschaftliche Zoologie. 9 Bd., 2 Heft.

Annales des Sciences Naturelles. 4 Sêr. T. 7. No. 5.

Planches Coloriêes des Oiseaux de la Belgique et de leurs œufs. Par Ch. F. Dubois. Livr. 102, 103.

Histoire Naturelle des Mollusques Terrestres et d'eau douce qui vivent en France. Par l'Abbê D. Dupuy. Fasc. 6.

Revue et Magasin de Zoologie. 1858. No. 2.

Comptes Rendus. No. 9, 10, 11, 12.

Die Geographische Verbreitung der Schmetterlinge Deutschlands und der Schweiz. Von Dr. Adolf Speyer und August Speyer. 1er Theil. Leipzig, 1858.

Malakozoologische Blätter. 4 Bd. 12—15 Bog.

Mittheilungen aus Justus Perthes' Geographischer Anstalt. 1858, 2.

Hütten, Erzeugnisse und andere auf künstlichen Wege gebildete Mineralien Stutzpuncte geologischer Hypothesen. Von K. C. V. Leonhard. 2 heft. Stuttgart, 1858.

Fortpflanzungsgesschichte der gesammten Vögel. Von F. A. L. Thienemann. 10 heft. Leipzig, 1856.

Anatomische Untersuchungen eines Limulus. Von C. Gegenbaur. Halle, 1858.

Die Fortpflanzung und Entwicklung der Pupissaren. Von Dr. R. Leuckart. Halle, 1858.

Illustrations Conchyliologiques. Par J. C. Chenu. No. 85.

Die veredelte Hühnerzucht, Anleitung zur Behandlung, Ernährung und Vermehrung der neuerlich eingeführten seltneren und nützlicheren Hühnerarten. Von Dr. H. Lichtenstein und E. Winckler. Berlin, 1857. 8 heft. 1, 2.

Edinburgh New Philosophical Journal. Vol. 7, No. 2.

Recueil des Actes de l'Academie Imperiale des Sciences, Belles Lettres et Arts de Bordeaux. 18 annêe. 1856. 4e Trimestre. From the Academy.

Mêmoirs de l'Academie Impêriale des Sciences, Belles Lettres et Arts de

Lyon. Classe des Lettres, N. S., T. 2; Classe des Sciences, N. S., T. 2. From the Academy.

Annales des Sciences physiques et Naturelles d'Agriculture et d'Industrie de Lyon. 2 Sêr., T. 4 et 5. From the Academy of Lyons.

June 1st. The following were presented by Dr. T. B. Wilson, on the usual conditions:

Archives des Sciences Physiques et Naturelles. Genève, 1858. Nos. 1—4.

Generum Plantarum Supplementum quartum. Auc. S. Endlicher. Pars 2 et sup. quintum. Vindobonæ, 1847, 1850.

Naumannia, 1855, 1—4; 1856, 1857, 1—6.

Journal für Ornithologie. No. 24—29, 31.

Species Général des Lépidoptères. T. 8, 9, 10 and plates. Par M. A. Guenée. Paris, 1854—1857.

Expedition dans les Parties Centrales de l'Amérique du Sud. Par F. de Castelnau. Zoologie, Mammifères et Oiseaux; Botanique, 1—6. 8 livraisons. Paris, 1855.

Archives Entomologiques. 1857. 1—10 livr.

Monographie des Cincindélides. Par J. Thomson. 1857. 1, 2 livr.

Revue de Zoologie. 1858. No. 3.

Annales des Sciences Naturelles. 1857. T. 7. No. 6.

Comptes Rendus. T. 46, No. 13—16.

Wiener Entomologische Monatschrift. 1857. No. 16.

Die Natur. 1858. No. 10—14.

Bonplandia. 1858. No. 3—5.

Das System der Pilze. 2 ab. Von Dr. Th. Bail. Bonn, 1858.

De Crustaceis ex Ordinibus tribus; Cladocera, Ostracoda et Copepoda, in Scamia Occurrentibus. Af. W. Liljeborg. Lund, 1853.

Monographie des Chéloniens de la mollasse Suisse. Par F. J. Pictet et A. Humbert. Genéve, 1856.

Meletemata Entomologica. Auc. Dr. F. A. Kolenati. Fasc. 7. Mosquæ, 1857.

8th. Canadian Journal of Industry, Science and Art. May, 1858. From the Editors.

Proceedings of the American Antiquarian Society. April, 1858. From the Society.

Catalogue of the described Diptera of North America. By R. Osten Sacken. From the Author.

Journal of the Indian Archipelago and Eastern Asia. Vol. 2, No. 3. From J. R. Logan, the Editor.

Quarterly Journal of the Geological Society. May, 1858. From the Society.

Landmollusken. Von Prof. A. Mousson. From W. G. Binney.

Études Entomologiques rédigées. Par V. de Motschulsky. 6 année From the Author.

Annales des Mines. 5 Sér. T. 12. 5 livr. of 1857. From the Minister of Public Works.

Recueil des Actes de l'Académie Impériale des Sciences, Belles-Lettres et Arts de Bordeaux. 19 anneé. 1857. 1 e 2 trimestres. From the Academy.

The School Journal. Vol. 2. No. 2. From the Editors.

The following were presented by Dr. T. B. Wilson on the usual conditions:

Edinburgh New Philosophical Journal. New Series. Nos. 1—13.

Histoire des Progrès de la Geologie. Par A. D' Archiac. T. 7, 2d partie.

London, Edinburgh and Dublin Philosophical Magazine. May, 1858.

Annals and Magazine of Natural History. April and May, 1858.

Naturalist. Nos. 86, 87.

Zoologist. Nos. 189, 190.

A Monograph of the Birds forming the Tanagrine Genus Calliste. By P. L. Sclater. Parts 2, 3, 4.

London Athenæum. March and April, 1858.

Thesaurus Conchyliorum. By G. B. Sowerby. Part 18.

The Geology and Extinct Volcanoes of France. By. G. P. Scrope. 2d edition. London, 1858.

Memoirs of H. E. Strickland. By Sir W. Jardine. London, 1858.

June 15*th*. List of the Linnean Society of London, 1857—Journal of the Proceedings of the Linnean Society, Botany, Vol. 1, No. 4; Vol. 2, Nos. 5 and 6; Zoology, Vol. 1, No. 4; Vol. 2, Nos. 5 and 6.—Address of Thos. Bell, together with Obituary Notices read at the anniversary meeting of the Linnean Society, May 25, 1857. Transactions of the Linnean Society, vol. 22, part 2. From the Society.

Natural History Review, (London,) January, 1858. From the Editors.

London Journal of the Society of Arts, Vol. 6, Nos. 267–275. From the Society.

Bulletin de la Société Impériale des Naturalistes de Moscou, 1856, Nos. 2, 3, 4; 1857, No. 1. From the Society.

Archiv für Naturgeschichte, 23 Jahr., 2, 3 Heft. From the Editor.

Neues Jahrbuch für Mineralogie, Geognosie, Geologie, und Petrefakten-kunde, 1857. Heft. 5, 6, 7. From the Editor.

Entomologische Zeitung, 18 Jahr. From the Entomological Society of Stettin.

Verhandlungen der Naturforschenden Gesellschaft in Basel. 4 Heft. From the Society.

Württemberg. naturwissenschaftliche Jahreshefte, 14 Jahr., 1 Heft. From the Editors.

Sitzungs-Berichte für die Gesellschaftsjahren, 1856–7. From the Physico-Medical Society of Würzburg.

Abhandlungen der Mathemat.-Physical. Classe der K. Bayerischen Akademie der Wissenschaften, 8 Bd. 1 Abtheilung. Ueber der Physik der Molecularkräfte. Von Prof. Dr. Jolly. Ueber der Arbau und Ertrag des Bodens im Königreiche Bayern. 1 Abtheilung. Von Dr. F. B. W. Von Hermann. Annalen der K. Sternwarte bei München, 7, 8 Bd. Magnetische Ortsbestimmungen an verschiedenen Puncten des Königreichs Bayern und an einigen auswärtigen Stationen. 2 Theil. From the Royal Bavarian Academy of Sciences.

Novorum Actorum Academiæ Cæsareæ Leopoldino-Carolinæ Naturæ Curiosum, vol. 23. Supp. sistens Revisionem Potentillarum. Auc. C. Lehmann. From the Academy.

Mittheilungen über die feinere Structur des Gehirns und Rückenmarks von Dr. W. Jacubowitcsh. Breslau, 1857. From the Author.

Denkschriften der K. Akademie der Wissenschaften. Mathemat.-Naturwissenschaftliche Classe. 11 Bd. Sitzungsberichte der K. Akad. der Wissenschaften, Math. Nat. Classe. 20 Bd. 1 Heft. From the Academy.

Jahrbuch der K. K. Geologischen Reichsanstalt, 1856, No. 4; 1857, No. 1. From the Institute.

Gelehrte Anzeigen, 44 Bd. From the Bavarian Academy of Sciences.

Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetisimus. Von K. Kreil. 4 Bd. 1852. From the Royal Academy of Sciences of Vienna.

Physikalische Abhandlungen der K. Akademie der Wissenschaften zu Berlin, 1856.—Mathemat. Abhand. der K. Acad. der Wissenschaften, 1856. From the Academy.

Monatsberichte der K. Preuss. Akad. der Wissenschaften zu Berlin, 1857, January to August. From the Academy.

Bijdragen tot de Dierkunde. Uitgegeven door het K. Zoologisch Genootschap Natura Artis Magistra, te Amsterdam, 1854. Zesde Aflev., 1 Deel.—Jaarboekje van het Genootschap Nat. Art. Magis. voor 1852—7 inclusive. From the Society.

Descriptio Systematica Animalium Belgii Septentrionalis. Auc. R. T. Maitland. Lugduni—Batav., 1851. From the Author.

Cyclostomatis Elegantis Anatome. Auc. R. E. Claparede. Berolini, 1857. From the Author.

22d. Transactions of the Academy of Science of St. Louis. Vol. i. No. 2. From the Academy.

A Synopsis of North American Willows. By N. J. Andersson. Cambridge, 1858. From the Author.

July 6th. Canadian Naturalist and Geologist, June, 1858. From the Editors.

American Journal of Science and Arts. July, 1858. From the Editors.

Bulletin de la Société Vaudoise des Sciences Naturelles. T. 5. No. 42. From the Society.

Leçons sur les Phénomènes Physiques des Corps Vivants, Par. C. Matteucci. Paris, 1847. From A. J. Brasier, Esq.

The following were presented by Dr. T. B. Wilson, on the usual conditions:

Journal of the Franklin Institute. June, 1858.

Bulletin Mensuel de la Société Impériale Zoologique d'Acclimatation. T. 5. No. 4 et 5.

Revue et Magasin de Zoologie. 1858, No. 4.

Comptes Rendus. T. 46. Nos. 17–20.

Annales des Sciences Naturelles. Botanique, T. 5 and 6; Zoologie, T. 5 and 6, and No. 1, of T. 8.

Archives des Sciences Physiques et Naturelles. Genève 1858. No. 5.

Journal de la Physiologie. T. 1. No. 2.

Études sur les Échinides Fossiles du Département de Lyonne. T. 1. Livr. 13–24.

Annales Botanices Systematicæ. T. 4. Fasc. 5. Auc. Dr. C. Mueller. Lipsiæ, 1858.

Wiener entomologische Monatschrift, 1858, No. 5.

Naumannia. 1858, 1 Heft.

Aus der Natur. 8.

Mittheilungen aus Justus Perthe's geographischer Anstalt. Von Dr. A. Petermann. 1858, Nos. 3 and 4.

Synopsis Avium, Auc. L. Reichenbach. Trochilidæ. Plates 774–803.

Bonplandia, 1858. No. 6. u. 7.

Die Natur, 1858. No. 15–20.

Verhandlungen des Naturkundige Vereeniging in Nederlandsch Indië. Deel 1. 1856.

Zoologischer Hand-Atlas. Von Dr. H. Burmeister. 1 Lief.

Darstellung und Beschreibung sämmtlicher in der Pharmacopœa Borussica aufgeführten offizinellen Gewächse. Von Dr. O. C. Berg und C. F. Schmidt. 1 Bd. Leipzig, 1858.

Bryologia Javanica. Fasc. 11.

Trésor des Livres rares et Precieux. Par I. G. T. Graesse. 1 Livr. Dresde, 1858.

Memorias Sobre la Historia Natural de la Isla de Cuba. Par F. Poey. T. 1. Habana, 1851.

Tagebuch einer Reise von Mississippi nach den Küsten der Südsee von B. Möllhausen. Leipzig, 1858.

13th. Proceedings of the Academy of Natural Sciences of Philadelphia, for June, 1858. From the Committee on Proceedings.

20th. Charleston Medical Journal and Review. July, 1858. From the Editor.

New York Journal of Medicine, July, 1858. From the Editor.

New Orleans Medical and Surgical Journal, July, 1858. From the Editor.

The Gulf Stream and its Causes. By Capt. Fleming (?). Philadelphia, 1858. From the Author.

Grape Culture in Missouri. By G. C. Swallow. St. Louis, 1852. From the Author.

School Journal. July, 1858. From the Editor.

Journal of the Franklin Institute, July, 1858. From T. B. Wilson, on the usual condition.

Bulletin de la Société Philomathique de Bordeaux. 2d Sér. 1856. Nos. 1, 2; 1857, Nos. 1, 2, 3, 4. From the Society.

August 3d. The following were presented by Dr. T. B. Wilson, on the usual conditions.

Das System der Pilze. Von Dr. Nees von Esenbeck und A. Henry. 1 Abtheil. Bonn, 1837.

Pflanzenphysiologische Untersuchungen von Nägeli und Cramer. 2 Heft. Von Carl Nägeli. Die Stärkekörner. Zurich, 1858.

Kosmos, 1858, Nos. 1–5.

Chemie und Physiologie der Pflanzen. Bearbeitet von Dr. Rochleder. Heidelberg, 1858.

Zoochemie, von Dr. C. G. Lehmann. Heidelberg, 1858.

Morphologische Studien über die Gestaltungs-gesetze der Naturkörper überhaupt und der organischen insbesondere. Von Dr. H. G. Bronn. Leipzig und Heidelberg, 1858.

Canstatt's Jahresbericht über die Leistungen in den Physiologischen Wissenschaften in allen Länden in Jahre 1857. Würzburg, 1858.

Wiener Entomologische Monatschrift. 2 Bd. No. 6.

Naturgeschichte der Insecten Deutschlands. 1 Abtheil., 4 Bd., 2 Lief., Bogen 12–24, und 1 Bd., 3 Lief., Bogen 23–35.

Fauna Austriaca. Die Käfer. 7 und 8 Heft.

Flora Indiæ Bataviæ. Vol. 3, Fasc. 2, et vol. Alt., Fasc. 5.

Voegel aus Asien, Africa, America und Neuholland. Von Dr. C. W. Hahn. 20 Lief. Nürnberg, 1820.

Malakozoologische Blätter. Bd. 5., Bog. 3–4.

Journal für Ornithologie. Von Dr. J. Cabanis. 3, Heft. 6 ; 4, Heft. 1, 2, 3 und 5 : 6, Heft. 2.

Jahrbücher für Wissenschaftliche Botanik. 1 Bd., 3 Heft.

Archiv für Anatomie, Physiologie und Wissenschaftliche Medicin. 1858, No. 3.

Revue et Magasin de Zoologie. 1858, No. 5.

Archives Entomologiques. 11 Livraison.

Comptes Rendus. T. 46, Nos. 21–24. Tables des Comptes Rendus. T. 45.

Séries Conchyliologiques comprenant l'enumeration des Mollusques, etc. Par A. Morelet. 1 Livr.

Planches Coloriées des Oiseaux de la Belgique, etc. Par. Ch. F. Dubois, 104 et 105 Livr.

Bulletin de la Société Imperiale Zoologique d'Acclimatation. T. 5. No. 6.

Systematisches Conchylien—Cabinet von Martin und Chemnitz. 7 Bd. Heft. 6.

Cataloguas Conchyliorum Regni Neapolitani quæ usque adhuc reperit A. Scacchi. 1857.

Quarterly Journal of Microscopical Science, July, 1858.

August 17th. The U. S. Naval Astronomical Expedition to the Southern Hemisphere during the years 1849–'50–'51–'52. Vol. 3. Observations to determine the Solar Parallax. By Lieut. J. M. Gilliss, LL. D. From the author.

General Report upon the Zoology of the several Pacific Railroad Routes. Part 1. Mammals. By Spencer F. Baird. Washington, 1857. From the War Department.

Report of the Survey of South Carolina. By Oscar M. Lieber. Columbia, S. C. 1857. From Prof. F. C. Holmes.

Some experiments on Sonorous Flames. By Prof. W. B. Rogers. New Haven, 1858. From the Author.

Proceedings at the Dedication of the Building for the Public Library of the City of Boston. Boston, 1858. City of Boston.

Tenth Annual Report of the Board of Managers and Treasurer of the Maryland Institute. From the Institute.

Canadian Journal of Industry, Science, and Art. July, 1858. From the Editors.

London Natural History Review. April, 1858. From the Editors.

Archiv für Naturgeschichte, 23 Jahr. 4 Heft. Berlin, 1857. From the Editor.

London Journal of the Society of Arts. Vol. 6, Nos. 276–279.

Württembergische naturwissenschaftliche Jahreshefte, 13 Jahr., 3 Heft. From the Editors.

Zeitschrift der Deutschen geologischen Gesellschaft. Bd. 1–8, and Heft. 1, 2, 3 of Bd. 9. From the Society.

August 24th. The following were presented by Dr. T. B. Wilson on the usual conditions.

Edinburgh New Philosophical Journal. July, 1858.

London, Edinburgh, and Dublin Philosophical Magazine. June and July, 1858, and Supplement for July 1858.

Annals and Magazine of Natural History. June and July, 1858.

Zoologist, No. 191.

Naturalist, Nos. 88, 89.

London Athenæum. May, 1858.

Exotic Butterflies, being illustrations of new species, &c. By W. C. Hewitson. Parts 26 and 27, 1858.

Bonplandia. 6 Jahr. No. 8 u. 9.

Die Natur, 1828. No. 21–26.

Berliner Entomologische Zeitschrift. Herausg. von dem Entomolog. Vereine in Berlin. 1858, 1 und 2 Vierteljahrsheft.

Expéditione dans les Parties Centrales de l'Amerique du Sud, etc. sous la direction de F. de Castelneau. Histoire du Voyage. T. 1–6. Planches, Vues et Scènes, Livr. 1–6; Antiquitiés, Livr. 1–6; Itinéraires, Livr. 1–13; Geographie. Liv. 1–6.

Historia fisica y politica de Chile. Por Claudio Gay. Text, Zoology, T. 6, parts 3 et 4, et T. 7, 8; Botany, T. 5, 6, 7 pt. 4, and 8; Documents, T. 2, History, T. 6; Plates Livr. 36–50.

September 7th. American Journal of Science and Arts. Sept., 1858. From the Editors.

Proceedings of the American Academy of Arts and Sciences. Vol. 4, pp. 1–88. From the Academy.

Canadian Naturalist and Geologist. August, 1858. Vol. 3, No. 4.

Charleston Medical Journal and Review. Sept. 1858. From the Editor.

Notes pour servir a une description géologique des Montagnes Rocheuses. Par J. Marcou. Genève, 1858. From the Author.

Bericht über die Leistungen in der Naturgeschichte der Crustaceen, Arachniden und Myriapoden während des Jahres 1852 und 1853. Von Dr. A. Gerstaecker. From the Author.

Ueber eine neue und weniger gekannte Siphonostomen-gattung. Von Dr. A. Gerstaecker. From the Author.

Ueber eine neue Myriapoden-und Isopoden-Gattung. Von Dr. A. Gerstaecker. From the Author.

Beschreibung zweier neuer Siphonostomen-Gattungen. Von Dr. A. Gerstaecker. From the Author.

Rhipiphoridum coleopterorum Familiæ dispositio systematica. Auc. A. Gerstaecker. Dr. Berolini, 1858. From the Author.

American Journal of Pharmacy. Vol. 30, Nos. 1–4. From the Editor.

A General Topography of North America and the West Indies. Being a collection of all the maps, charts, plans, and particular surveys, that have been published of that part of the world, either in Europe or America. Engraved by Thos. Jefferys. London, 1768. From W. P. Trumbull.

The following were presented by Dr. T. B. Wilson on the usual conditions.

Journal of the Franklin Institute, August, 1858.

London Athenæum, July, 1858.

Quarterly Journal of Microscopical Science, Nos. 22 and 23.

Annals and Magazine of Natural History, August, 1858.
London, Edinburgh, and Dublin Philosophical Magazine, August, 1858.
Zoologist. No. 193.
Naturalist. No. 90.
Cyclopædia of Anatomy and Physiology. Parts 49 and 50.
The Story of a Boulder, or Gleanings from the note-book of a field Geologist. By A. Geikie. Edinburgh, 1858.
The Aquarian Naturalist. By Thos. Rymer Jones. London, 1858.
Bulletin de la Société Impériale Zoologique d' Acclimatation. T. 5., No. 7.
Annales des Sciences Naturelle, T. 8, Zoologie, Nos. 4, 5. Botanique, No. 2.
Archives des Sciences Physiques et Naturelle, T. 2. No. 6. Genève, 1858.
Revue et Magasin de Zoologie. 1858, No. 6.
Comptes Rendus, T. 46 ; No. 25, 26 ; T. 47, Nos. 1, 2.
Planches colorieés des Oiseaux de la Belgique et de leurs œufs. Par. Ch. F. Dubois. 107 Livraison.
Description des Animaux sans Vertèbres decouverts dans le Bassin de Paris, etc. Par G. P. Deshayes. 13 et 14 Livr. Pages 481 à 552. Planches 59 à 68.
Monographia Pneumonopomorum viventium, Supplementum primum. Auc. L. Pfeiffer, Dr. Cassellis, 1858.
Physiologische Bemerkungen über der Gehörorgan der Cetaceen und das Labyrinth der Säugethiere, von Dr. Claudius. Kiel, 1858.
Beiträge zur neuern Mikroskopie. Von F. Reinicke. Dresden, 1858.
Untersuchungen über das Phänomen der Erdbeben in der Schweiz. Von Dr. G. H. Otto Volger. 1, 2 und 3 Thiel. Gotha, 1857–58.
Krystallographisch-Optische Untersuchungen. Von Prof. Dr. J. Grailich. Wien u. Olmüz, 1858.
Wiener Entomologische Monatschrift. Juli, 1858.
Beiträge zur Kenntniss der Phyllomorphose. 2es Heft. Von Dr. J. Rossmann. Giessen, 1858.
Mittheilungen aus J. Perthes Geograph. Anstalt über wichtige neue Erforschungen. Von. Dr. A. Petermann. 1858, No. 5.
Die Natur. No. 27–31.
Neue Untersuchungen über den Bau des Rückenmarks, von Dr. B. Stilling. 4 Lief. Bogen 88–128 Text. Cassel, 1858.
Analysen zu den natürlichen Ordnungen der Gewächse und deren sämmtlichen Familien in Europa. 1. Phanerogamen. Von Dr. A. Schnizlein. Erlangen, 1858.
Trêsor des Livres Rares et Précieux, etc. Par J. G. T. Graesse. Livr. Dresden, 1858.

September 14*th*. The following were presented by Dr. T. B. Wilson on the usual conditions.
A Treatise on the External, Chemical and Physical characters of Minerals. By R. Jameson. Edinburgh, 1817.
A Synopsis of the Mollusca of Great Britain, &c. By W. E. Leach, M. D. London, 1852.
Manual of Mineralogy. By R. Jameson. Edinburgh, 1821.
Skandinavisk Fauna, af J. Wilson, Foglarna. Lund, 1835. 2 vols.
En Handbok för Jägare och Zoologer; Af Sv. Nilsson, 2 Delen, Foglarna. Lund, 1828.
Jahrbücher des Vereins für Naturkunde im Herzogthum Nassau. Von Dr. C. Thomä. 1 Heft. Wiesbaden, 1842.
Geschichte des Vereins für Naturkunde im Herzogthum Nassau. Von Dr. C. Thomä. Weisbaden, 1842.
Nachträge zu Bechsteins Naturgeschichte Deutschlands. Von Dr. J. P. A. Leisler. 1 und 2 Heft. Hanau, 1812, 1813.
A Geological Sketch of the Tertiary Formation in the Provinces of Grenada and Murcia, Spain. By Chas. Silvertop. London, 1836.

Lehrbuch der Zoologie. Von Dr. F. A. L. Thienemann. Berlin, 1828.

Lehrbuch der Mineralogie. Von L. A. Emnerling. Giessen, 1796. 2, 3. Theil.

Explication Mechanique et Physique des Fonctions de l'Ame Sensitive. Par G. Lamy. Paris, 1677.

The Philosophy of Geology. By A. C. G. Jobert. London and Paris, 1847. 2d Edition, and duplicate 2d part, in French and English.

Göttingisches Magazin der Wissenschaften und Litteratur. Von Lichtenberg und Forster. Bd. 4, 5, 6, 7.

Ausführliche Naturgeschichte des Thier-Pflanzen—u. Mineral-Reichs. Von S. Schilling. Bd. 3, 4. Breslau, 1843.

September 21*st*. The following were presented by Dr. T. B. Wilson, on the usual conditions.

Voyage au Pole Sud dans l'Astrolabe et la Zélée, sous le commandement de M. J. Dumont-D'Urville. Text: Zoologie, t. 4, 5; Botanique, 1, 2; Anthropologie; Gêologie, Minèralogie et Gêographie Physique: 2ème partie; Hydrographie, Livr. 13; Mineralogie, Livr. 1, 2, 3.

Comptes Rendus, t. 47, Nos. 3, 4, 5, 6.

Journal de Conchyliologie. 1856, No. 1, 2; 1857. Nos. 1, 2, 3, 4; 1856–57, No. 4.

Archives des Sciences Physiques et Naturelles. 1858, No. 7.

Revue et Magasin de Zoologie. 1856, No. 7.

Fauna Austriaca, Die Käfer. Heft. 9.

Monographia Pneumonopomorum Viventium. Supplementum primum.

Systematisches Conchylien-Cabinet, Martini und Chemnitz. 3 Bd. Heft. 20.

Insecta Caffrariæ annis 1838–1845, a J. A. Wahlberg collecta, etc. Pars. 2 cum tab. 1. Coleoptera.

Zur Kenntniss des Generationswechsels und der Parthenogenesis bei den Inseckten. Von Dr. B. Leuckart. Frankfurt am Maine, 1858.

Monographie de la Famille des Résêdacées. Par Mr. J. Mueller. Zurich, 1857.

Journal of the Franklin Institute, September, 1858.

The Dudley Observatory and the Scientific Council. Statement of the Trustees. Albany, 1858. From the Trustees.

Proceedings of the American Philosophical Society. Vol. 6, No. 49. From the Society.

Proceedings of the Boston Society of Natural History. Vol. 6, pp. 369–384. From the Society.

The New York Journal of Medicine. Sept., 1858. From the Editor.

The New Orleans Medical and Surgical Journal, Sept. 1858. From the Editor.

The Presbyterian Quarterly Review. No. 25. From Dr. J. C. Fisher.

Pictures of Nature in the Silurian Region around the Malvern Hills and Vale of Severn. By E. Lees. Malvern, 1856. From Wm. Sharswood.

Annales des Mines. 5ème Série. T. 12, 6e Livr.; T. 13, 1re livr. Minister of Public Works of France.

Die Natur. 1858. No. 32, 33. From Dr. T. B. Wilson on the usual conditions.

Kosmos, 1858, No. 6, 7. From Dr. T. B. Wilson.

Fauna del Regno di Napoli. Fascicolo 75–79. From Dr. T. B. Wilson.

The Natural History of Carolina, Florida, and the Bahama Islands. By Mark Catesby. London, 1771, 2 vols. From Dr. T. B. Wilson.

October 5*th*. The following were presented by Dr. T. B. Wilson on the usual conditions.

Dr. J. S. Semlers Versuch eines Diarium über die Oeconomie mancher Insecten im Winter. Halle, 1782.

The Deep Sea and Coast Fisheries of Ireland. By W. Brabazon, Dublin, 1848.

Naturhistorische Reise nach der westindischen Insel Hayti. Von K. Ritter. Stuttgart, 1836.

Synopsis of the Galbulidæ. By P. L. Sclater.

De Mumiis Avium in Labyrintho apud sacaram repertis. Auc. C. A. Langguthio. Vitebergæ.

Diss. de Museum Naturalium Academiæ Upsaliensis. Pt. iii. and iv. Upsaliæ, 1787.

Prodromus Hymenopterologiæ Scandin avicæ. Lundæ, 1836.

Entwickelungsgeschichte der Schmetterlinge, anatomisch und physiologisch bearbeitet, von Dr. Herold. Cassel und Marburg, 1815.

Essais ou Recueil de Mémoires sur plusieurs points de Minèralogie. Par M. Macquart. Paris, 1789.

Description du Volcan de Parion. Par H. Lecoq. 1833.

Observations on Mineral Veins. By R. W. Fox, Falmouth, 1837.

The Mosaical and Mineral Geologies, illustrated and compared. By W. M. Higgins. London, 1832.

Geologie oder Betrachtung der Erde. Von F. W. Sack. Breslau, 1785.

Memoria en que se trata de Algunos Puntos relativos al Sistema del Mundo y Formacion del Globo Terrestre que Habitamos. Don J. M. Vallejo. Madrid, 1839.

Werden und Seyn des Vulkanischen Gebirges. Von W. H. C. R. A. von Ungern-Sternberg. Carlsruhe, 1825.

J. J. Beccherld. Physica Subterranea. Lipsiæ, 1703.

Essai sur la Lithologie des Environs de St. Etienne-en-Forez, etc. Par M. de Bournon 1785.

S. J. Brugmans Lithologia Groningana, etc. Groningæ, 1781.

J. A. Scopoli Crystallographia Hungarica. Pars 1.

Description Géognostique des Environs du Puy en Velay. Par J. M. Bertrand-Koux. Paris, 1823.

Memoires sur la Structure Interieure de la Terre. Par. M. E. Bertrand. Zurich, 1752.

Scriptural Geology. By Revd. G. Young. London, 1840.

Memorie di Orittognosia Etnea a de' Vulcani estinti della Sicilia. Del Dott, C. Maravigna. Paragi, 1838.

Syllabus of a Course of Lectures on Mineralogy. By J. S. Henslow. Cambridge, 1823.

Grundriss der Mineralogie. Von Dr. E. Glocker. Breslau, 1821.

Dictionnaire Minèralogique François-Allemand. Par J. H. L. Pansner. Jène et Leipsig, 1802.

Voyages Minèralogiques dans le Gouvernement d' Aigle, et une partie du Vallais. Par M. le Conte G. de Razoumowsky. Lausanne, 1784.

Kosmos. No. 8, 1858.

Handbuch der Mineralogie. Von J. F. S. Hausmann. 1er Bd. Göttingen, 1813.

Quarterly Journal of the Geological Society. Vol. 14, No. 55. From the Society.

Catalogue of the Lepidopterous Insects in the Museum of the Hon. East India Company. By Thos. Horsfield and F. Moore. Vol. 1. London, 1857. From the Directors of the East India Company.

Catalogue of the Birds in the Museum of the Hon. East India Company. By Thos. Hörsfield and F. Moore. Vol. 2. London, 1856-8. From the Directors of the East India Company.

Catalogue of the Shell-bearing species of Mollusca, inhabiting the vicinity of Columbus, Ohio, with some remarks thereon. By Frank Higgins. From the Author.

Six Discourses delivered before the Royal Society. By Sir H. Davy, London, 1827. From the Society.

Report on the Adjudication of the Copley, Rumford, and Royal Medals, &c. London, 1834. From the Royal Society.

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Opuscules Physiques et Chimiques. Par M. Lavoisier. Paris, 1774. Vol. 1. From John Cassin.

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Eastern Origin of the Celtic Nations. By J. C. Prichard, edited by R. G. Latham. London, 1857.

Proceedings of the Zoological Society of London. Part 21. 1853.

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The Complete Writings of Thomas Say on the Conchology of the United States. Edited by W. G. Binney. New York, 1848.

Description des Animaux sans Vertèbres, etc. Par G. P. Deshayes, 15 et 16 Livr. Pages 553 à 624. Planches 69 à 78.

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Kurze Erklärung der Zoologischen Weltcharte. Leipzig, 1783.

The Birds of Scotland. By Jas. Grahame. Edinburgh, 1806.

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Lezione Accademica intorne l'origine delle Fontane, etc. Di A. Vallisneri. Venezia, 1726.

Diss. Theolog.-Histor.-Philolog.-Literaria de Cultu Serpentum, etc., Auc. M. J. C. Koch. Lipsiæ, 1718.

Ipsa Linnæi Conchylia; or, the Actual Shells of Linnæus. By S. Hanley. London, 1849. Part 1.

Nouveau Système sur le Flux et le Reflux des Mers. Par P. Vastel. Paris 1836.

Letters to a Young Naturalist on the Study of Nature and Natural Theology. By J. S. Drummond, M. D. London, 1831.

Vier Verzeichnisse als Beiträge zur Kenntniss der Fauna und Flora des Harzes. 1842.

Gabinetto Vesuviane del Duca della Torre. Napoli, 1797.

Dissertationes Academicæ Upsaliæ Habitæ sub præsidio C. P. Thunberg. Vol. 3. Göttingæ, 1801,

Memoir on the Indian Species of Shrews. By E. Blyth, Esq. Calcutta.

Report on a Zoological Collection from the Somali Country. By E. Blyth.

Synopsis of the Contents of the British Museum. London, 1822.

Letters concerning the Northern Coast of the County of Antrim in Ireland By Revd. W. Hamilton. London, 1786.

Osservazioni sopra allo Svolgimento de Corpi Organici. Del Dottore G. Rivelli. Parte 1. Fano, 1836.

Abrégé Élementaire de Géographie Physique. Par M. le Conte O'Hier de Grandpré. Paris, 1825.

Magazin für Thiergeschichte, Thieranatomie und Thierarzneykunde. 1 Bd. 1 und 2 Stück. Göttingen, 1790–94.

Reports of the Curators of the Zoological Department of the Asiatic Society of Bengal; 1854, August and September; 1855, April and February.

Beiträge zur nähern Kenntniss des Flöz-Sandsteins. Von G. C. Sartorius. Eisenach, 1809.

Mêmoire sur les Fossiles du Bas Dauphiné. Avignon, 1781.

Mêmoire sur les Tremblemens de Terre. Par M. Isnard. Paris, 1758.

Tractatus Physicus de Cochinilla. Auc. C. F. Richtero. Lipsiæ, 1701.

Synopsis Faunæ Scandinaviæ a G. J. Billberg. T. 1. Pars 1. Mammalia. Holmiæ, 1828.

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Sambre and Meuse Railway. London, 1845.

Beiträge zur innern Naturgeschichte der Erde, von H. Steffens. Freyberg, 1801, 1 Thiel.

Ambræ Historian. J. F. Lobius. Wittenbergæ, 1666.

Observations et Expériences sur l' art d' empailler et de conserver les oiseaux. Par C. Hênon et Mouton-Fontenille. Lyon, 1801.

Gemälde der organischen Natur. Von Hilbrand und Ritgen. Giessen, 1821.

Die Okenschen Körper oder die Primordialnieren. Von L. Jacobson. Kopenhagen, 1830.

Pliny's Natural History in 37 Books. Vol. 1. 1847.

Ornis oder des Neueste und Wichtigste der Vögelkunde und Anziehendes aus der Thierkunde. Von C. L. Brehm. Jena, 1, 2, 3. Heft.

Statistique de Maine et Loire. 1 Partie. Statistique Naturelle, Par M. Desvaux. Angers, 1834.

Etude Pratique du Commerce d'Exportation de la Chine. Paris, 1848.

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Mungos animalculum et Radix descripta a M. F. Lochnero. Noribergæ, 1715.

Versuch einer mineralogischen Beschreibung von Landeck. Von L. von Buch. Breslau, Hirschberg und Lissa, 1797.

Dr. J. F. Blumenbachii Specimen Physiologiæ comparatæ inter animantia calide et Frigidi Sanguinis. Gottingæ, 1787.

Diss. inaug. med sistens Teutamina circa anatomiam Forficulæ auriculariæ Linn. Auc. C. F. Posselt. Jenæ.

G. Ploucqueti De Corporum organisatorum Generatione Disquisitio Philosophica, etc. Stutgardiæ, 1749.

Diss. Inaug. de Cancri astaci quibusdam Partibus. Auc. A. H. Georke. Gœttingæ, 1817.

Diss. inaug. Med.—Chirurg. sistens Experimenta circa resuscitationem animalium aqua suffocatorum. Auc. C. Roesler. Tubingæ, 1814.

Disquisitio de Phoca, Submit. M. F. Thormann. Regio Mucti, 1683.

Diss. inaug. sistens observationes Anatomicas de Tatu Novemcincto. Auc. F. A. Winter. Tubingæ, 1826.

Diss. Epist. del Fosforo Minerale. Scritta da L. F. Conte Marsiglii. Lipsia, 1698.

H. C. Koenig De Hominum inter Feras Educatorum statu naturali solitario. Hanoveræ, 1730.

Affinitatum Animalium Tabulam-Proponit G. C. Würtz. Argentatoti, 177

Diss. inaug. anatomica circa Partes Genitales Fœmineas avium. Submit. G. Spangenberg. Gottingæ, 1813.

Beschreibung einer neuen Grönländischen Thierpflanze. Von C. Weylius. London, 1753.

F. Martens von Hamburg, Spitzbergische oder Groenlandische Reise, Beschreibung gethan im Jahr 1671. Hamburg, 1675.

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G. C. Kirchmaieri Disp. Zoologicæ de Basilisco, etc. Jenæ, 1736.

Diss. de Coraliis Fossilibus D. Sigismundi Büttners. Lipsiæ, 1714.

De Gymnoto Electrico. Auc. F. L. Guisan. Tubingæ, 1819.

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The Botany of the Eastern Borders. By George Johnston, M. D. Edin. 8vo. London, 1853.

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Enterprise in Tropical Australia by G. Windsor Earl. 8vo. London, 1846.

Excursions in and about Newfoundland during the years 1839 and 1840, by J. B. Jukes, 2 vols. 8vo. London, 1842.

Das thierische Leben und seine Formen, ein Zoölogisches Handbuch, von Jonathan Carl Zenker 8vo Jena, 1828.

New Brunswick with notes for emigrants by Abraham Gesner 8vo. London, 1847.

Notes and Observations on the Ionian Islands and Malta, by John Davy, M. D., 2 vols. 8vo. London, 1842.

Observations relative chiefly to the Natural History, Picturesque Scenery, and Antiquities of the Western Counties of England in the years 1794 and 1796, by William George Maton, 2 vols. in one, 8vo. Salisbury, 1797.

Wanderings in New South Wales, Batavia, Pedû Coast, Singapore, and China, in the years 1832, '33, and '34, by George Bennett, 2 vols. 8vo. London, 1834.

The Field Naturalist, a Review of Animals, Plants, and Minerals, by James Rennie 8vo. London, 1833.

Die Familien der Blattwespen und Holzwespen, von Dr. Theodor Hartig 8vo. Berlin, 1837.

Zoologie specialis, quam expositis animalibus tum vivis, tum fossilibus potissimum Rossiacin universum, et Poloniæ in specie, edidit D. Edwardus Eichwold, vols. 3, 8vo. Wilnæ, 1829.

Histoire Naturelle des Coleopteres de France, par M. E. Mulsant, 8vo. Vesicants. Paris, 1857.

Zur Kentniss der electrischen Organe der Fische, von Max Schlutze, erste Abtheilung, Malopterus Gymnotus, 4to. Halle, 1858.

Paleontologie Lombardien, Description des fossiles de Lombardie, par L'Abbe Antoine Stoppani, 1st and 2nd Livriason. Milan, 1858.

Beiträge zur Paleontographie von Oestereich. Herausgegeben von Frans Ritter von Hauer 4to. 1 Band, 1 Heft. Wien und Olmüz, 1858.

Handbuch der systematischen Anatomie des Menschen von Dr. J. Henle. Erster Band, zweite und dritte Abtheilung. 8vo. Braunschweig. 1858.

Wiener Entomologische Monatschrift, 11 Band, No. 9. 1858.

Die Natur, Nos. 34, 35, and 36. Halle, 1858.

Naturwissenschaftliches Literaturblatt, Nos. 5 and 6. Halle, 1858.

Mittheilungen aus Justus Perthes Geographischen Anstalt über wichtige neue Erforschungen auf dem Gesammtgebiete der Geographie, von Dr. A. Peterman, No. 7. 1858, Gotha.

Berliner Entomologische Zeitschrift. Erstes Jahrgang 1857. Berlin.

Echinides du Départment de la Sarthe, par Cotteau et Friger. 1st and 2nd Livraison. Paris, 1857 and 1858.

Journal de la Physiologie de L'Homme et des Animaux. 1st vol. No. 3 3d, 1838.

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Revue et Magazin de Zoologie, No. 8. 1858. Paris.

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Comptes Rendus, Nos. 7 to 10. 1858, August, Sept.

Geological Survey of Canada, Sir W. E. Logan, Director, Decade 3. From the Survey.

Memoire della Real Accademi della Scienzi dal 1852 in avanti, vol. 1. Fascicola 11, per l'anno. 1853, from the same.

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November 2d. The following were presented by Dr. T. B. Wilson, on the usual conditions.

Les Hylophthires et leurs Ennemis. Par M. J. O. C. Ratzeburg. Trad. de l'Allemand par le Cte. de Corberon. Paris, 1842.

Hacquet's mineralogisch-botanische Lustreise. Wien, 1784.

Prodromus Faunæ Zeylanicæ; being Contributions to the Zoology of Ceylon. By E. F. Kelaart, M. D. Ceylon, 1852.

Narrative of a Tour through Hawii, or Owhyhee. By W. Ellis. London, 1827.

Karamania, or a Brief Description of the South Coast of Asia Minor and of the Remains of Antiquity, &c. By F. Beaufort, F. R. S. London, 1818.

Guide to the Highlands and Islands of Scotland, &c. By G. and P. Anderson. London, 1834.

A Narrative of Missionary Enterprises in the South Sea Islands, &c. By Jno. Williams. London, 1838.

Travels, comprising observations made during a residence in the Tarentaise, and various parts of the Grecian and Pennine Alps, &c. By R. Bakewell, Esq. London, 1823. 2 vols.

Reise nach der Insel Kreta im Jahre, 1817. Von F. W. Sieber. Leipzig und Sorau, 1823. 1 u. 2 Bd.

A History of the Island of Madagascar, &c. By S. Copeland. London, 1823.

The History of New South Wales, including Botany Bay, &c. By Geo. Barrington. London, 1802.

Travels in New England and New York. By T. Dwight. London, 1823. 4 vols.

Sketches of Tenby and its neighborhood. By F. P. Gwynne. London, 1852.

Beyträge zu einer Monographie der Molasse. Von B. Studer. Bern, 1825.

Geschichte und Beschreibung von Newfoundland und der Küste Labrador. Von C. A. Anspach. Weimar, 1822.

Moselfauna oder Handbuch der Zoologie. Von M. Schäfer. Trier, 1844, 1er Thiel.

Reise in die Barbarey. Von Heron Poiret. Strasburg, 1789. 1 and 2 Thiel.

Ueber das Leuchten der Ostsee. Von G. M. Michælis. Hamburg, 1830.

Grundriss der Naturgeschichte. Von Dr. H. Burmeister. Berlin, 1846.

Versuch einer genauen Beschreibung der in Schlesien einheimischen Arten der Gattung Raphidia. Linn. Von T. E. Schummel. Breslau, 1832.

Entomographien Von J. F. Eschscholtz. Berlin, 1822. 1. Lief.

Petri Artedi sueci Genera Piscium. Emend et Auc. a J. J. Walbaum, Grypeswaldiæ, 1792. Ichthyologiæ, Partes 3–4.

A Relation of a Voyage made in the years 1695–7, on the Coasts of Africa, &c. By Sieur Froger. London, 1698.

Beiträge zu der Inseckten-Geschichte. Von L. G. Scriba. Frankfurt, 1790 1 Heft.

De Tarantulæ anatome et Morsu. D. N. Caputi. Lycii, 1741.

Die Fundamentalgesetze an den Erscheinungen der Wärme. Von G. von Buquoy. Leipsig, 1819.

Skizzen zu einem Gesetzbuche der Natur zu einer sinnigen Auslegung desselben, etc. Von G. von Buquoy, Leipzig, 1817.

Diss. Inaug. sistens Prodromum observationum circa Ganglion Arnoldi Oticum in Homine Variisque animalibus, etc. pub. defend. F. G. Assmann. Lipsiæ, 1832.

Observations de situ tubi Intestinalis mammalium. Diss. quam pub. defend. G. L. Rapp. Tubingæ, 1832.

Diss. inaug. zool. sistens descriptionum Trionychos Ægyptiaci osteologicum. Auc. C. A. Mohring. Berolini, 1824.

Diss. Acad. Obser. quasdam Histor. Notonectidum, imprimis Fennicarum, illustrantes, etc. Auc. L. Homén. Aboæ, 1819.

Medical and Surgical Reporters, from Drs. Butler and Atkinson.

Geological Map of the State of Pennsylvania, &c. From Mr. J. H. Slack.

Geological and Topographical Map of the Anthracite Fields of Pennsylvania, &c. From J. H. Slack.

November 9th. From Dr. Wilson, on the usual condition.

Transactions of Royal Society of Edinburgh, vol. 20, pt. 4, vol. 21, pts. 2, 3, 4.

Barth's Travels in Africa, vols. 4 and 5.

Stainton Nat. History of Tineinae, vol. 3.

Dalyell's Powers of the Creator, vol. 3.

November 16th. Proceedings of the Amer. Acad. of Arts and Sciences. Vol 1. Pages 347 to 366, and vol. 3, pages 249 to 416. From the Academy.

History, Condition, and Prospects of the Indian Tribes. By Henry R. Schoolcraft, part 6th. From the War Department.

Christy's Letters on Geology and second preliminary Report of the Nantahadela and Tuckasegge Land and Mineral Company. From the Author.

Twenty-third Annual Report of the Young Men's Mercantile Library Association of Cincinnati. From the Society.

The American Journal of Science and Arts for November 1858. From the Editors.

The New York Journal of Science, for November, 1858. From the Editor.

The Canadian Naturalist and Geologist, No. 5, for October, 1858. From the Society of Nat. Hist. of Montreal.

Descriptions of some new Genera and Species from the Silurian and Devonian Formations of Canada. From the Geological Survey of Canada.

The Charleston Medical Journal and Review for November, 1858. From the Editor.

The New Orleans Medical and Surgical Journal for November 1858.

The following were presented by Dr. Wilson, on the usual conditions.

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General list of the Members of the Society for the year 1858.

Journal of the Franklin Institute, No. 5, for 1858.

Flora Indiæ Bataviæ, vol. 1, fasc. 6, and vol. 2, fasc. 6.

Archiv für Anatomie, Physiologie und Wissenschaftliche Medecin. Heft. 4. 1858.

Zeitschrift für Wissenschaftliche Zoologie. Leipzig, 9th Band 2 heft.

Journal für Ornithologie. Cassel. 4th vol. 4th heft., 6th vol. 4th heft.

Wiener Entomologische Monatschrift. vol. 2, No. 10. Oct. 1858.

Bibliotheque Universelle No. 9. 1858. Geneve.

Revue de Zoologie, No. 9. 1858, Paris.

Annales des Sciences Naturelles, 4th series, vol. 8, Nos. 5 and 6.

Comptes Rendus, Nos. 11, 12, 13, and 14. 1858.

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Archiv für die Holländischen Beiträge für Natur. und Heilkunde, Vol. 1. Hefts. 1, 2, 3, 4, and 5. 1857.

Lecons sur Physiologie et L'Anatomie Comparée de l'Homme et des Animaux, par Milne Edwards, vols. 1, 2, and vol. 3, 1st and 2d parts.

Beiträge zur Vegetabilischen Zellenbildung. Von Dippe.

Studien des Physiologischen Institute zu Breslau. Von K. B. Reichert.

Ueber das Verhältniss der Parthenogenesis zu den anderen Fortpflanzungsarten. By L. Radlkofer.

Entomographien. By A. Gerstaecker, vol. 1.

Fifteenth and last livraison of text of the Voyage of "la Recherche" to Iceland and Gröenland.

Die Juraformation, England, Frankreichs und des Südwestlichen Deutschlands. Von Dr. Albert Oppel.

Voyage autour du Monde execute pendant annees 1836 et 37 sur la corvette, La Bonite. Relation du voyage par A. De la Salie, vols. 1, 2, and 3 do. Botanique Introduction Premier et seconde Partie. Zoologie, vol. 1, part 2d, and vol. 2 Zoophytologie, vol. 1. Physique, vols. 1st and 2nd. Atlas, Botanique, 12, 13, 14, 15, 16, Livraisons Zoologie 16 and 17. Livraisons.

Histoire Naturelle des Iles Canaries, par G. Barkerwebb et Sabin Berthelot.

Voyage au Pole Sud et dans L'Oceanie, sur les corvettes l' Astrolabe et la Zelée. Atlas Botanique, Livraison 11th and 12th et Zoologie 25 et 26 Livr.

November 23d. The following were presented by Dr. Wilson, on the usual conditions.

Ueber das Kantische Prinsip für die Naturgeschichte, von D. Christoph Girtannu, 8vo. Gottingen, 1796.

Delectus Opusculorum ad scientiam naturalim spectantium. Edidit Christianus Frider. Ludwig. Lipsiæ, 1790, 8vo. Vol. 1

Verzeichniss und Beschreibung der Tyrolen Insecten. Johann Nepomuck Edlen, 8vo. Zurich, 1781.

Abrégé D'Histoire Naturelle des Quadrupedes vivipares et des Oiseaux. Par M. Holander. 8vo. Vols. 8 (4 texte et 4 planches,) Deux-Ponts, 1790.

Descriptio Comparata musculorum corporis humani et quadrupedis. Auctore Jacobo Douglass. 8vo. Lugduni. Batavorum, 1738.

Opuscula Medico-Physica Christoph. Andreæ Mangoldi Collegit, et edidit Ernestus Godfredus Baldingee, 8vo. Altenburg, 1769.

Diss. de Fundamenta Entomologiæ quae Raeside Dr. Carolo von Linnê, Publice defendere conabitur Andreas J. Blach et de Noxa Insectorum quae, &c. Michæl A. Baeckner, et de Pandora Insectorum &c. Ericus Ol. Rydbeck, et de Hospita Insectorum Flora quam, &c., Jonas G. Forskahl, et de Bigas Insectorum sistens, &c. Andreas Dahl. 4to. Upsal, 1767.

Letters on Iceland. Written by Uno Von Troil, D. D. 8vo. Dublin, 1780.

Thesaurus Subterraneus Ducatus Brunsvigii, Franc. Ernest. Brückmanni. 4to. Braunschweig, 1728.

Schmetterlingskalender, oder systematisches Verzeichniss aller Schmetterlinge, welche in Deutschland bekannt sind. Von F. T. Schott, 8vo. Frankfurt am Main, 1830.

Schmetterlings Belustigungen, für die Tugend und angehende Entomologen überhaupt. Erster Band. 4to. Nurnberg, 1825.

The Naturalist, illustrative of the Animal, Vegetable, and Mineral Kingdoms. Conducted by B. Maund and W. Holl, vol. 1, 4to. London, 1837.

Narrative of a voyage of discovery in the Lady Nelson to New South Wales, in the years 1800, 1801, and 1802. By James Grant. 4to. London, 1805.

Icones Cimicum descriptionibus illustratæ. Auctore Johanne Frederico Wolff. 4to. Erlangae, 18vo.

Unterricht was mit dem lieblichen Geschäpff denen Vögeln. Von T. Freyhern, 1706, 4to.

Specimen Zoölogiæ. Geographicæ, Quadrupedum domicilia et migrationes sistens, a Eberh. Aug. Gulielm. Zimmerman, 4 to. Lugduni Batavorum, 1777.

De Lacerta Amboinensi. Johannis Alberti Schlosser. 4to. Amstelodami, 1768.

Tableau Elementaire d'Histoire Naturelle, contenant les trois regnes de la nature, par Charles Chaisneau, fol. Paris, 1806.

Musei Gottwaldiani Testaceorum Stellarum Marinarum et Coralliorum quae supersunt tabulæ, Johann. Samuel Schröter, fol. Nunberg, 1782.

Berichte der Naturforschenden Gesellschaft zu Freiburg, 2 band. Nos. 30 and 31. From the Society.

Vierteljahrsschrift der Naturforschenden Gesellschaft in Zurich. Nos. 1, 2, 3, and 4 for 1857, and 1 and 2 for 1858. From the Society.

Proceedings of the Boston Soc. Nat. Hist. Vol. 6th, October, 1858. From the Society.

Report of the Superintendent of Education for Lower Canada for the year 1856. From Capt. Huguet Latour.

The Farmer's Journal and Transactions of the Lower Canada Board of Agriculture, Nos. 4 to 12 inclusive, for vol. 5th, 1858. From the same.

Journal of Education. Montreal. Vol 2. Nos. 7, 8, 9, and 10. From the same.

Report on the Chemical Analysis of the White Sulphur Water of the Artesian Well of Lafayette, Indiana. By C. M. Wetherill, M. D. From the Author.

Denkrede auf Christian S. Weik gehalten in der öffentlichen Sitzung der König. Bayer. Akad. der Wissenschaft. am 28th Nov. 1856, von Dr. Carl Fried. P. v. Martius. From the Author.

Procedings of the Royal Society of Edinburgh, Session of 1857–58. From the Society.

Papers read to the Botanical Society of Edinburgh. By George Lawson, Ph. D. Edinburgh. 1858. 8vo. tract from the Author

Ueber die Gattungen der Seigellarven. Siebente Abhandlung, über die Metamorphose der Echinodermen, von Joh. Müller, 4to. Berlin, 1855. From Dr. Leidy.

Ueber die Larven und die Metamorphose der Echinodermen, vierte Abhandlung, von Joh. Müller. 4to. Berlin, 1852. From Dr Leidy.

Ueber die Ophiurenlarven des Adriatischen Meeres, von Joh. Mûller. 4to. Berlin, 1852. From Dr. Leidy.

Ueber eine Echinodermen des Eifeler Kalkes, von Joh. Müller. 4to. Berlin, 1857. From Dr. Leidy.

Ueber die Larven und die Metamorphose der Ophiuren und Seeigel, von Joh. Müller. 4to. Berlin, 1848. From Dr. Leidy.

Observationes Anatomicæ de quibusdam vermibus maritimus. auctor Maximilianus. 4to. Berolini, 1852. From Dr. Leidy.

Chemische und Chemisch-Technische Untersuchungen der Steinkohlen Sachsens, von W. Stein. 4to. Leipzig, 1857. From Dr. Leidy.

Sulla successione normale del diversi membri del Terreno Triasico Nella Lombardia Memoria di Giulio Curioni, 1855. From the Author. Milan.

Also, the following from Dr. Wilson, on the usual conditions.

The Annals and Magazine of Natural History, 3d ser. vol. 2. Nos. 9 and 10 for Sept. and Oct., 1858.

The Zoologist. Nos. 192, 94, and 95, for July, Sept., and Oct., 1858.

The London, Ediuburgh, and Dublin Philosophical Magazine and Journal of Science. Nos. 106 and 107 for Sept. and Oct., 1858.

The Athenæum, 366, 68, and 69, for June, August, and Sept., 1858.

December 7th. Croix de procession, de cimetières et de carrefoues, par Léo Drouyn. From the Academie Impériale des Sciences, Belles Lettres et Arts de Bordeaux. 4to.

Memoire della Reale Academia della Scienze di Torino, serie seconda, Tome 17. Torino, 1858. From the Academie Royale des Sciences. 4to.

Memoire della Reale Accademia della Scienze del 1852 in avanti. Vol. 1, che-comprende quelle per Glianni, 1852, 53, and 54, et vol. 2 che continue quelle del 1855 et 1857. From the Acad. delle Scienze di Napoli. 4to.

Continuazione del Rendiconto della Reale Accademia delle Scienze del Mauro 1856, a tutto il 1857. Anno. 5. e 6. Napoli, 1857. From the same.

Neueste Schriften der Naturforschenden Gesellschaft in Danzig, sechsten Bandes, erstes Heft. Danzig, 1858. From the Society. 4to.

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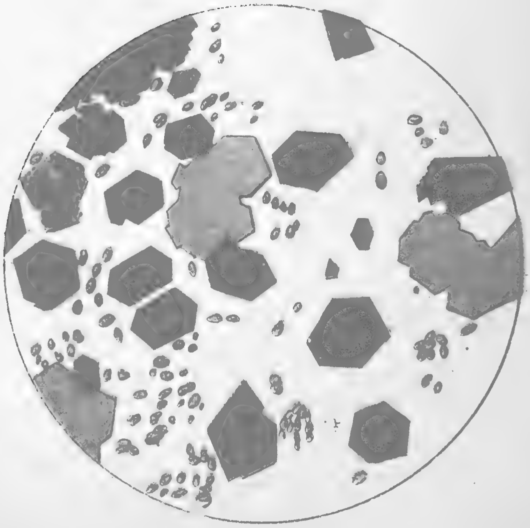

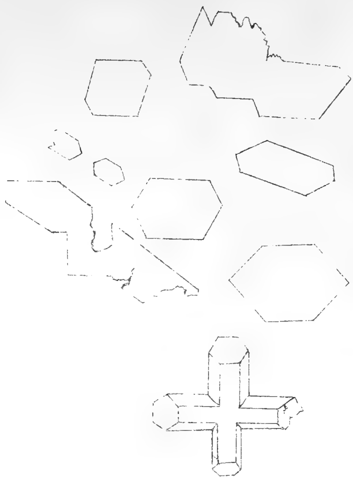

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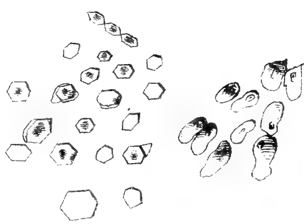

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